

Model 1

Answer the following questions :

1 Complete the following :

1 In the opposite figure :

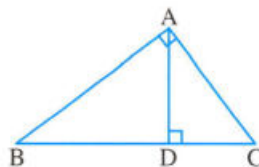
$AB \times \dots = BC \times AD$

2 In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots) = 90^\circ$

3 If the point $A \in$ the line L , then the projection of the point A on the line L is

4 The area of the circle of diameter length 14 cm. is cm^2 ($\pi = \frac{22}{7}$)

5 A trapezium whose bases lengths are 8 cm. , 10 cm. and its height is 5 cm. , then its area equals cm^2



2 Choose the correct answer :

1 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

2 A rhombus whose diagonals lengths are 6 cm. , 10 cm. has area cm^2

- (a) 60 (b) 30 (c) 15 (d) 10

3 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is

- (a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2

4 If the area of a trapezium is 100 cm^2 and its height is 5 cm. , then the length of its middle base equals cm.

- (a) 20 (b) 30 (c) 40 (d) 50

5 ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots^\circ$

- (a) 70 (b) 110 (c) 180 (d) 360

6 The measure of each angle of the regular pentagon is $^\circ$

- (a) 90 (b) 108 (c) 120 (d) 540

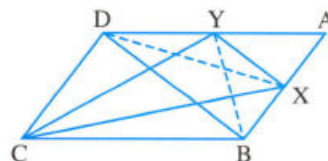
3 [a] The side lengths of one of two similar triangles are 3 cm. , 4 cm. , 5 cm. and the perimeter of the other triangle is 36 cm. Find the side lengths of the other triangle.

[b] In the opposite figure :

ABCD is a parallelogram , $X \in \overline{AB}$

, $Y \in \overline{AD}$ such that : The area of $\triangle CBX$ = the area of $\triangle CYD$

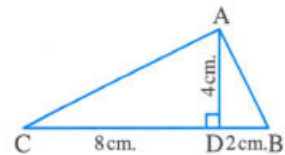
Prove that : $\overline{XY} \parallel \overline{BD}$



4 [a] In the opposite figure :

ABC is a triangle in which : $BD = 2$ cm.
 $, CD = 8$ cm. , $AD = 4$ cm. , $\overline{AD} \perp \overline{BC}$

Prove that : $m(\angle BAC) = 90^\circ$



[b] ABCD is a parallelogram in which : $AB = 18$ cm. and $BC = 12$ cm.

We draw $\overline{DE} \perp \overline{BC}$, $\overline{DO} \perp \overline{AB}$, $DE = 15$ cm.

Calculate the area of the parallelogram ABCD and find the length of \overline{DO}

5 [a] ABC is a triangle in which $m(\angle A) = 50^\circ$, $m(\angle B) = 60^\circ$,

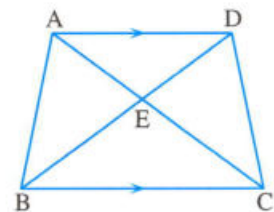
Arrange the lengths of the sides of the triangle in a descending order.

[b] In the opposite figure :

ABCD is a quadrilateral in which

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

Prove that : The area of $\triangle ABE$ = the area of $\triangle DCE$



Model 2

Answer the following questions :

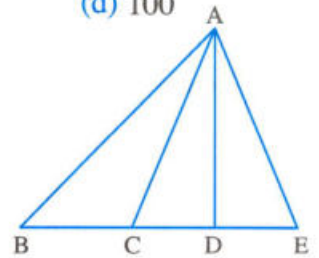
1 Complete the following :

- 1** The two polygons are similar if their corresponding sides are and their corresponding angles are
- 2** The area of a rhombus is 24 cm^2 , the length of one of its diagonals is 8 cm. , then the length of the other diagonal is
- 3** In $\triangle ABC$, if $(AB)^2 = (AC)^2 - (BC)^2$, then $\triangle ABC$ is right-angled at
- 4** A triangle whose side lengths are 6 cm. , 8 cm. and 11 cm. , then its type according to its angles is
- 5** The area of a triangle is equal to half of the area of a parallelogram if they have a common

2 Choose the correct answer :

- 1** A trapezium whose bases lengths are 6 cm. , 8 cm. , then the length of its middle base equals cm.
 (a) 48 (b) 24 (c) 14 (d) 7
- 2** If two polygons are similar and the ratio between the lengths of two corresponding sides is 1 : 3 and the perimeter of the smaller polygon is 15 cm. , then the perimeter of the greater polygon is cm.
 (a) 30 (b) 45 (c) 60 (d) 75

- 3 If the area of the triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base is cm.
 (a) 16 (b) 6 (c) 3 (d) 12
- 4 ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, then the projection of \overline{BD} on \overline{AC} is the point
 (a) A (b) B (c) C (d) D
- 5 A square of perimeter 20 cm. , then its area equals cm^2
 (a) 20 (b) 25 (c) 50 (d) 100
- 6 The number of the triangles in the opposite figure equals
 (a) 3 (b) 4
 (c) 5 (d) 6



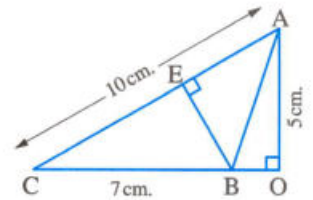
3 In the opposite figure :

$$\overline{AO} \perp \overline{CB}, \overline{BE} \perp \overline{AC}$$

, AC = 10 cm. , BC = 7 cm. and AO = 5 cm.

Find : 1 The length of \overline{BE}

2 The area of $\triangle ABC$



- 4 [a] ABCD is a parallelogram in which : AB = 8 cm. , AC = 20 cm. and BD = 12 cm.

Prove that : $m(\angle ABD) = 90^\circ$, then find the area of this parallelogram.

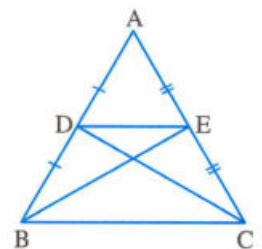
[b] In the opposite figure :

ABC is a triangle in which D is the midpoint of \overline{AB} , E is the midpoint of \overline{AC}

Prove that :

1 The area of the triangle DBC = the area of the triangle EBC

2 $\overline{DE} \parallel \overline{BC}$

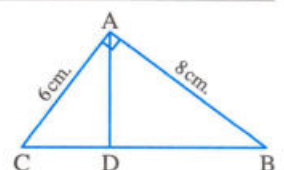


- 5 [a] In the opposite figure :

$\triangle DBA$ is similar to $\triangle ABC$, $m(\angle BAC) = 90^\circ$

Prove that : $\overline{AD} \perp \overline{BC}$ and if AB = 8 cm. , AC = 6 cm.

, find : the length of \overline{BD}



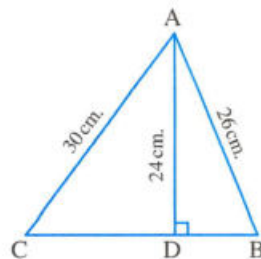
[b] In the opposite figure :

ABC is a triangle , $\overline{AD} \perp \overline{BC}$

If $AD = 24$ cm. , $AB = 26$ cm.

and $AC = 30$ cm.

, **find** : BC , then calculate the area of ΔABC



Model for the merge students

Answer the following questions :

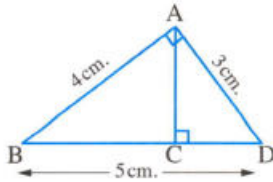
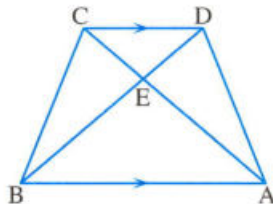
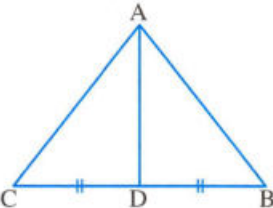
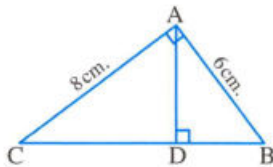
1 Choose the correct answer from those given :

- 1** The area of the parallelogram whose length of its base is 6 cm. and its corresponding height of this base is 4 cm. equals cm^2 .
 (a) 12 (b) 20 (c) 24 (d) 48
- 2** The triangle whose lengths of its sides are 6 cm. , 8 cm. , 10 cm. is
 (a) an acute-angled triangle. (b) a right-angled triangle.
 (c) an obtuse-angled triangle. (d) otherwise.
- 3** The rhombus whose lengths of its diagonals are 6 cm. and 10 cm. , then its area = cm^2 .
 (a) 60 (b) 30 (c) 15 (d) 10
- 4** The trapezium of length of its middle base 8 cm. and surface area 56 cm^2 , then its height = cm.
 (a) 32 (b) 24 (c) 448 (d) 7
- 5** All are similar.
 (a) squares (b) triangles (c) rectangles (d) parallelograms

2 Complete each of the following :

- 1** The projection of a point on a straight line is
- 2** If the triangle ABC is obtuse-angled at B , then $(AC)^2$ $(AB)^2 + (BC)^2$
- 3** The square whose length of its diagonal is 8 cm. , then its area = cm^2
- 4** The two triangles have same base and the vertices opposite to this base are on a straight line parallel to the base
- 5** The area of triangle = $\frac{1}{2} \times$ \times corresponding height.

3 Join from the column (A) to the suitable one from the column (B) :

Column (A)	Column (B)
<p>1 In the opposite figure :</p> <p>AC = cm.</p> 	<p>• BEC</p>
<p>2 In the opposite figure :</p> <p>Area of $\triangle AED$ = area of \triangle</p> 	<p>• 2.4</p>
<p>3 In the opposite figure :</p> <p>Area of $\triangle ABD$ = area of \triangle</p> 	<p>• Congruent</p>
<p>4 If the ratio of enlargement between two similar triangles = 1 , then the two triangles are</p>	<p>• 3.6</p>
<p>5 In the opposite figure :</p> <p>The length of the projection of \overline{AB} on \overline{BC} = cm.</p> 	<p>• ACD</p>

4 In the opposite figure :

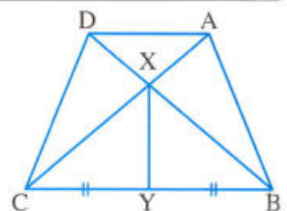
Area of the figure ABYX = Area of the figure DCYX

Complete the proof to prove that : $\overline{AD} \parallel \overline{BC}$

Given :

R.T.P. :

Proof : $\because \overline{XY}$ is a median in $\triangle XBC$



$$\therefore \text{Area of } \Delta \dots\dots\dots = \text{area } \Delta \dots\dots\dots \quad (1)$$

$$\therefore \text{area of the figure ABYX} = \text{area of the figure DCYX} \quad (2)$$

By subtracting (1) from (2) :

$$\therefore \text{Area of } \Delta \dots\dots\dots = \text{area of } \Delta \dots\dots\dots$$

By adding area of ΔADX to both sides

$$\therefore \text{Area of } \Delta \dots\dots\dots = \text{area of } \Delta \dots\dots\dots$$

$$\therefore \overline{AD} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

5 In the opposite figure :

$$\Delta ABC \sim \Delta AED$$

$$, m(\angle AED) = 44^\circ , AD = 3 \text{ cm.} , EA = 4 \text{ cm.}$$

$$, DB = 5 \text{ cm.} , BC = 8 \text{ cm.}$$

Complete to find the length of each of : \overline{ED} and \overline{EC}

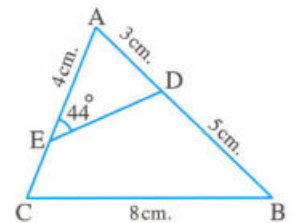
Solution :

$$\therefore \Delta ABC \sim \Delta AED$$

$$\therefore \frac{AB}{\dots\dots\dots} = \frac{\dots\dots\dots}{ED} = \frac{CA}{DA}$$

$$\therefore \frac{8}{\dots\dots\dots} = \frac{\dots\dots\dots}{ED} = \frac{CA}{3}$$

$$\therefore ED = \dots\dots\dots \text{ cm.} , AC = \dots\dots\dots \text{ cm.} , EC = \dots\dots\dots \text{ cm.} \quad (\text{The req.})$$





1

Cairo Governorate



El-Nozha Educational Zone
Futures Language Schools

Answer the following questions :

1 Choose the correct answer :

- 1 The length of the base of the triangle whose area is 60 cm^2 and its height is 10 cm. is
 (a) 6 cm. (b) 12 cm. (c) 15 cm. (d) 50 cm.
- 2 ABC is a triangle in which : $(AB)^2 - (BC)^2 < (AC)^2$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 3 The length of the diagonal of the square whose area is 50 cm^2 is cm.
 (a) $5\sqrt{2}$ (b) 15 (c) 12.5 (d) 10
- 4 The length of the projection of a given line segment the length of the original line segment.
 (a) $>$ (b) $=$ (c) $<$ (d) \leq
- 5 The area of the triangle is the area of the parallelogram which have a common base and included between two parallel straight lines.
 (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) 3
- 6 The projection of the point (3 , 5) on y-axis is
 (a) (3 , 0) (b) (0 , 0) (c) (0 , 5) (d) (5 , 3)

2 Complete each of the following :

- 1 The median of the triangle divides it into
- 2 The diagonals of the isosceles trapezium are
- 3 The area of the rhombus whose diagonal lengths are 8 cm. and 10 cm. is cm^2
- 4 If two triangles are similar to a third one , then the two triangles are
- 5 Two parallelograms with a common base and between two parallel straight lines one of them carries the base are
- 6 If the ratio of enlargement of two similar polygons is equal to 1 , then the two polygons are

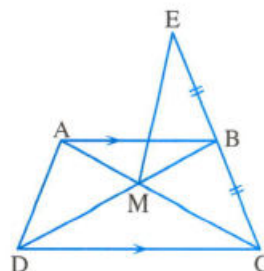
3 [a] In the opposite figure :

ABCD is a quadrilateral where

$\overline{AB} \parallel \overline{CD}$ and $EB = BC$

Prove that :

The area of $\triangle EBM$ = The area of $\triangle ADM$



[b] The area of a trapezium is 180 cm^2 , its height is 12 cm. If the ratio between the lengths of the parallel bases is 3 : 2, find the lengths of its parallel bases.

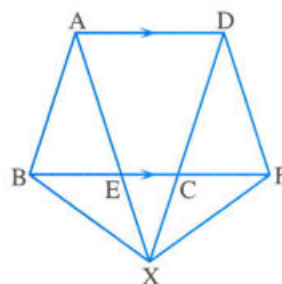
4 [a] In the opposite figure :

ABCD and ADFE

are two parallelograms

, $\overline{AE} \cap \overline{DC} = \{X\}$

Prove that : The area of $\triangle ABX$ = the area of $\triangle DFX$



[b] In the opposite figure :

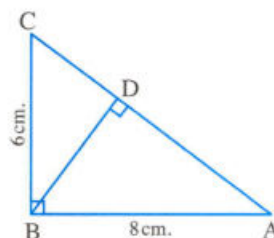
ABC is a right-angled triangle at B, $\overline{BD} \perp \overline{AC}$

, $AB = 8 \text{ cm.}$ and $BC = 6 \text{ cm.}$

Find : 1 The length of each of \overline{AC} and \overline{BD}

2 The length of the projection of \overline{BC} on \overline{AC}

3 The length of the projection of \overline{BA} on \overline{AC}



5 [a] In the opposite figure :

ABC is a triangle, where $m(\angle B) = m(\angle AYX)$

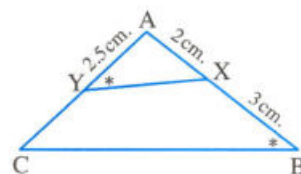
1 **Prove that :** $\triangle ABC \sim \triangle AYX$

2 If $AX = 2 \text{ cm.}$, $XB = 3 \text{ cm.}$ and

$AY = 2.5 \text{ cm.}$, **then find :** the length of \overline{CY}

[b] Determine the type of $\triangle ABC$ according to its angles where :

$AB = 17 \text{ cm.}$, $BC = 9 \text{ cm.}$ and $AC = 10 \text{ cm.}$



2

Cairo Governorate

Shoubra Educational Zone
Good Shepherd School*Answer the following questions :***1 Choose the correct answer :**

- 1 In $\triangle ABC$, if $(AC)^2 = (BC)^2 - (AB)^2$, then $\angle A$ is
- (a) acute. (b) right. (c) obtuse. (d) straight.
- 2 A square whose diagonal length is 10 cm. , its area = cm^2 .
- (a) 100 (b) 40 (c) 50 (d) 20
- 3 A rhombus is of area 60 cm^2 and the length of one of its diagonals equals 10 cm. , then the length of the other diagonal equals cm.
- (a) 4 (b) 8 (c) 10 (d) 12
- 4 The median of the triangle divides its surface into two triangles
- (a) congruent. (b) equal in area. (c) isosceles. (d) right-angled
- 5 If the base length of a triangle is 8 cm. and its corresponding height is 3 cm. , then its area equals cm^2 .
- (a) 6 (b) 12 (c) 24 (d) 38
- 6 If two polygons are similar and the ratio between the lengths of two corresponding sides is 2 : 3 , then the ratio between their perimeters is
- (a) 2 : 3 (b) 3 : 2 (c) 4 : 9 (d) 9 : 4

2 Complete each of the following :

- 1 If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AC} on \overline{BC} is
- 2 In $\triangle XYZ$, if $(XZ)^2 + (YZ)^2 > (XY)^2$, then $\angle Z$ is
- 3 A trapezium whose bases are of lengths 6 cm. and 10 cm. and its height is 12 cm. , then its area equals cm^2 .
- 4 The base angles of the isosceles trapezium are
- 5 If two adjacent sides of a parallelogram are of lengths 8 cm. and 10 cm. and its smaller height is 4 cm. , then its greater height is cm.
- 6 The area of the rhombus whose perimeter is 52 cm. and the length of one of its diagonals is 10 cm. equals cm^2 .

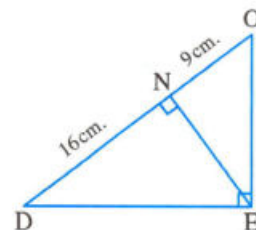
3 [a] In the opposite figure :

DEO is a right-angled triangle at E

, $\overline{EN} \perp \overline{DO}$, $DN = 16$ cm.

and $ON = 9$ cm.

Find : the lengths of \overline{EN} , \overline{DE} and \overline{EO}

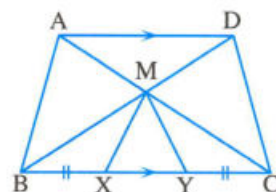


[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $BX = CY$

and $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that : the area of $\triangle ABXM$ = the area of $\triangle DCYM$

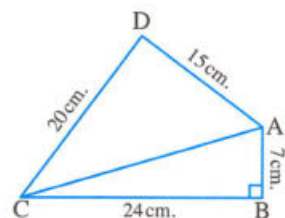


4 [a] In the opposite figure :

$m(\angle B) = 90^\circ$, $AB = 7$ cm., $BC = 24$ cm.

, $CD = 20$ cm. and $DA = 15$ cm.

Prove that : $m(\angle D) = 90^\circ$



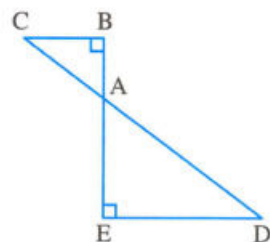
[b] In the opposite figure :

$\overline{BE} \cap \overline{DC} = \{A\}$ and

$m(\angle B) = m(\angle E) = 90^\circ$

Prove that :

$\triangle ABC \sim \triangle AED$



5 [a] ABC is a triangle whose side lengths are 5 cm., 7 cm. and 9 cm. Determine the type of the triangle ABC according to its angles.

[b] In the opposite figure :

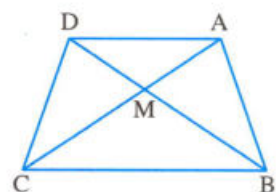
ABCD is a quadrilateral

, its diagonals intersect at M

and the area of $\triangle ABM$ = the area of $\triangle DCM$

Prove that :

$\overline{AD} \parallel \overline{BC}$



3

Giza Governorate

Official Schools
Math Inspection

Answer the following questions :

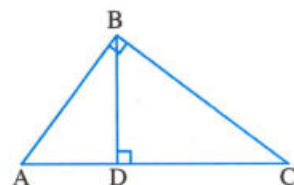
1 Choose the correct answer :

- 1 If two polygons are similar , then the corresponding are equal in measure.
(a) sides (b) angles (c) rays (d) vertices
- 2 The sum of measures of the interior angles of a triangle equals
(a) 360° (b) 180° (c) 90° (d) supplementary
- 3 In $\triangle ABC$, if $(AB)^2 + (BC)^2 = (AC)^2$, then the type of the triangle according to its angles is
(a) right-angled. (b) acute-angled. (c) obtuse-angled. (d) straight angle.
- 4 The rhombus whose diagonal lengths are 6 cm. , 10 cm. has the area
(a) 60 cm^2 (b) 30 cm^2 (c) 15 cm^2 (d) 10 cm^2
- 5 The area of the square = $\frac{1}{2}$ of the product of the lengths of its
(a) sides. (b) diagonals. (c) heights. (d) medians.
- 6 The parallelogram and with common base and between two parallel straight lines are equal in area.
(a) polygon (b) triangle (c) rectangle (d) trapezium

2 Complete :

1 In the opposite figure :

ABC is a right-angled triangle at B

, $\overline{BD} \perp \overline{AC}$, then $(BD)^2 = AD \times \dots\dots\dots$ 

- 2 The area of triangle is equal to half of the area of a parallelogram if they have a common and lie between two parallel lines.
- 3 If $\overline{AB} \perp \overleftrightarrow{CD}$ and $B \in \overleftrightarrow{CD}$, then the length of the projection of \overline{AB} on \overleftrightarrow{CD} equals
- 4 The area of the trapezium , its height is 5 cm. and the lengths of its two parallel bases are 24 cm. and 12 cm. equals cm^2
- 5 A square of side length 20 cm. , then its area equals cm^2
- 6 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle B) = \dots\dots\dots$

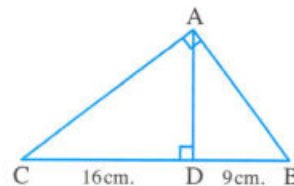
3 [a] In the opposite figure :

ABC is right-angled triangle at A

, $D \in \overline{CB}$, $\overline{AD} \perp \overline{CB}$

, $CD = 16$ cm. , $DB = 9$ cm.

Find : The length of each of \overline{AC} , \overline{AD}



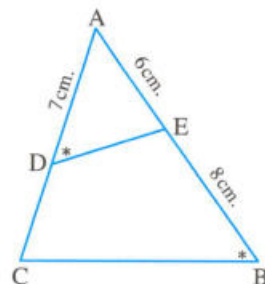
[b] In the opposite figure :

$m(\angle ADE) = m(\angle B)$, $AD = 7$ cm.

, $AE = 6$ cm. and $EB = 8$ cm.

1 Prove that : $\triangle ADE \sim \triangle ABC$

2 Find : the length of \overline{AC}

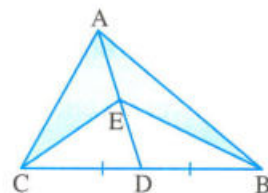


4 [a] In the opposite figure :

\overline{AD} is a median of $\triangle ABC$, $E \in \overline{AD}$

Prove that :

The area of $\triangle ACE =$ the area of $\triangle ABE$



[b] In the opposite figure :

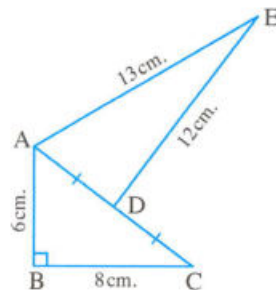
$m(\angle B) = 90^\circ$, D is the midpoint of \overline{AC}

, $AB = 6$ cm. , $BC = 8$ cm.

, $DE = 12$ cm. , $AE = 13$ cm.

1 Find : the length of \overline{AC}

2 Prove that : $m(\angle ADE) = 90^\circ$



5 [a] Find the height of a trapezium with area 450 cm^2 , its two parallel base lengths are 24 cm. and 12 cm.

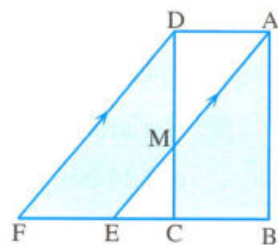
[b] In the opposite figure :

ABCD is a rectangle and AEFD

is a parallelogram where $\overline{AE} \parallel \overline{DF}$

Prove that :

The area of the figure ABCM = the area of the figure DMEF



4

Giza Governorate

6th of October Directorate of Education

Answer the following questions :

1 Choose the correct answer :

- 1 The diagonal lengths of a rhombus are 8 cm. , 10 cm. , then its area is cm²
 (a) 80 (b) 40 (c) 20 (d) 50
- 2 The projection of a line segment on a straight line perpendicular to it is a
 (a) ray. (b) point. (c) straight line. (d) line segment.
- 3 ABC is a triangle in which $(AB)^2 = (AC)^2 + (CB)^2$, then $\angle B$ is
 (a) right. (b) obtuse. (c) acute. (d) straight.
- 4 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle C) = m(\angle \dots\dots\dots)$
 (a) X (b) Y (c) Z (d) B
- 5 The angle whose measure is 170° is
 (a) acute. (b) obtuse. (c) right. (d) straight.
- 6 The lengths of the bases of a trapezium is 6 cm. and 10 cm. , then the length of its middle base is cm.
 (a) 16 (b) 15 (c) 9 (d) 8

2 Complete the following statements :

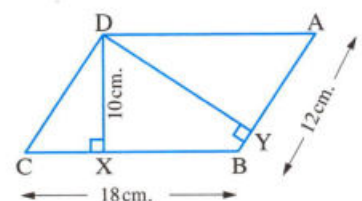
- 1 If two polygons are similar , then the lengths of their corresponding sides are
- 2 If two straight lines are intersecting , then each two vertically opposite angles are
- 3 A square whose area is 50 cm^2 , then its diagonal length is cm.
- 4 If $\triangle ABC$ is a right-angled triangle at B , $AB = 3 \text{ cm}$. , $BC = 4 \text{ cm}$.
 , then $AC = \dots\dots\dots \text{ cm}$.
- 5 The number of axes of symmetry of an equilateral triangle is
- 6 If the point $A \in \overleftrightarrow{XY}$, then the projection of A on \overleftrightarrow{XY} is

3 [a] In the opposite figure :

ABCD is a parallelogram , $AB = 12 \text{ cm}$.
 , $BC = 18 \text{ cm}$. , $DX = 10 \text{ cm}$.

Find : 1 The area of the parallelogram ABCD

2 The length of \overline{DY}



[b] Determine the type of the triangle ABC according to its angles if :

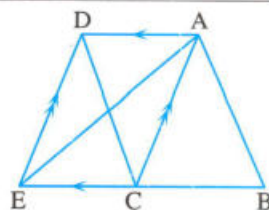
$AB = 5 \text{ cm.}$, $BC = 10 \text{ cm.}$, $AC = 7 \text{ cm.}$

4 [a] In the opposite figure :

$\overline{AC} \parallel \overline{DE}$, $\overline{AD} \parallel \overline{EB}$, C is the midpoint of \overline{BE}

Prove that :

The area of the shape ABCD = the area of $\triangle ABE$



[b] A trapezium its area is 48 cm^2 and its height is 6 cm. Find the length of its middle base , and if the length of one of its two bases is 7 cm. , find the length of the other base.

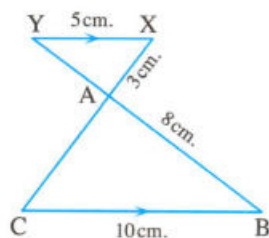
5 [a] In the opposite figure :

$\overline{XY} \parallel \overline{BC}$, $\overline{XC} \cap \overline{BY} = \{A\}$

, $XY = 5 \text{ cm.}$, $BC = 10 \text{ cm.}$, $AX = 3 \text{ cm.}$, $AB = 8 \text{ cm.}$

1 Prove that : $\triangle ABC \sim \triangle AXX$

2 Find : the lengths of \overline{AC} and \overline{AY}



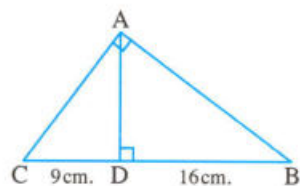
[b] In the opposite figure :

$\triangle ABC$ is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$

, $BD = 16 \text{ cm.}$, $DC = 9 \text{ cm.}$

Find : 1 The lengths of \overline{AB} , \overline{AD} and \overline{AC}

2 The area of $\triangle ABC$



5

Alexandria Governorate



El-Gomrok Educational Zone
Maths Supervision

Answer the following questions :

1 Choose the correct answer :

1 The triangle whose side lengths are 5 cm. , 12 cm. and 13 cm. , then the measure of its greatest angle equals

(a) 85° (b) 90° (c) 120° (d) 100°

2 The number of axes of symmetry of the isosceles triangle equals

(a) 1 (b) 2 (c) 3 (d) 4

3 If the ratio of enlargement between two similar polygons equals , then the two polygons are congruent.

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) 1 (d) 2

- 4 ABCD is a parallelogram, its area is 40 cm^2 , then the area of $\triangle ABC = \dots\dots\dots \text{cm}^2$
 (a) 10 (b) 15 (c) 20 (d) 60
- 5 The area of the rhombus whose diagonal lengths are 6 cm. and 8 cm. equals $\dots\dots\dots \text{cm}^2$
 (a) 3 (b) 24 (c) 16 (d) 12
- 6 The rectangle whose dimensions are 6 cm. and 8 cm., then its diagonal length equals $\dots\dots\dots \text{cm}$.
 (a) 7 (b) 15 (c) 10 (d) 17

2 Complete each of the following :

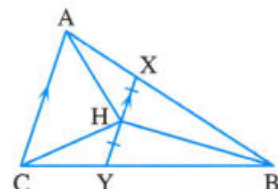
- 1 The projection of the line segment perpendicular to a straight line on this line is $\dots\dots\dots$
- 2 The median of the triangle divides its surface into two triangles $\dots\dots\dots$
- 3 The two triangles are similar if their corresponding angles are $\dots\dots\dots$
- 4 If $m(\angle ABC) = 60^\circ$, then $m(\text{reflex } \angle ABC) = \dots\dots\dots^\circ$
- 5 If $\triangle ABC \sim \triangle XYZ$, $m(\angle B) = 50^\circ$, then $m(\angle \dots\dots\dots) = 50^\circ$
- 6 The triangle ABC in which $(AC)^2 = (AB)^2 + (BC)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$

3 [a] In the opposite figure :

$\overline{XY} \parallel \overline{AC}$, H is the midpoint of \overline{XY}

Prove that :

The area of $\triangle AHB =$ the area of $\triangle CHB$



- [b] Show the type of the triangle ABC according to the measures of its angles, where $AB = 7 \text{ cm}$, $BC = 8 \text{ cm}$. and $AC = 9 \text{ cm}$.

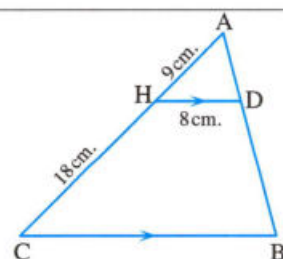
4 [a] In the opposite figure :

$\overline{DH} \parallel \overline{BC}$, $DH = 8 \text{ cm}$.

, $AH = 9 \text{ cm}$.

, $HC = 18 \text{ cm}$.

Find : the length of \overline{BC}



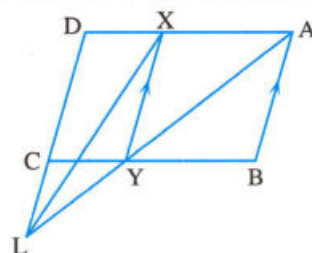
- [b] The area of a trapezium is 50 cm^2 and the lengths of its two parallel bases are 12 cm., 8 cm. Find its height.

5 [a] In the opposite figure :

ABCD is a parallelogram in which $\overline{AB} \parallel \overline{XY}$

Prove that :

The area of $\triangle AXL = \frac{1}{2}$ area of the parallelogram ABCD



[b] In the opposite figure :

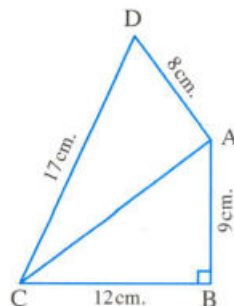
ABC is a right-angled triangle at B

, AB = 9 cm. , BC = 12 cm.

, DC = 17 cm.

, DA = 8 cm.

Prove that : $m(\angle DAC) = 90^\circ$



6

El-Kalyoubia Governorate



**Maths Supervision
Official Language School**

Answer the following questions :

1 Choose the correct answer from those given :

- 1 Two similar triangles , the ratio between the lengths of two corresponding sides is 5 : 3 , then the ratio between their perimeters is
 (a) 3 : 5 (b) 5 : 3 (c) 5 : 9 (d) 4 : 5
- 2 A square is of area 50 cm^2 , then the length of its diagonal equals cm.
 (a) 10 (b) 20 (c) 30 (d) 40
- 3 A parallelogram , the measure of one of its angles is 150° and its heights are 6 cm. and 5 cm. , then its area = cm^2
 (a) 30 (b) 50 (c) 60 (d) 72
- 4 In $\triangle ABC$, if $\frac{(AB)^2 + (BC)^2}{(AC)^2} < 1$, then $\angle B$ is
 (a) acute. (b) right. (c) straight. (d) obtuse.
- 5 The length of the projection of a given line segment the length of the original line segment.
 (a) < (b) > (c) = (d) \leq
- 6 In $\triangle ABC$, if $AB = AC$, $m(\angle B) = 50^\circ$, then $m(\angle A) =$
 (a) 50° (b) 60° (c) 70° (d) 80°

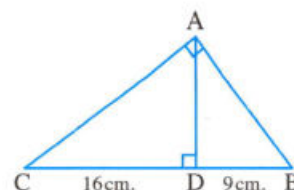
2 Complete the following :

- 1 A trapezium , the lengths of its two parallel bases are 6 cm. , 8 cm. and its height is 10 cm. , then its area = cm^2
- 2 The angle of measure 70° supplements an angle of measure $^\circ$

3 In the opposite figure :

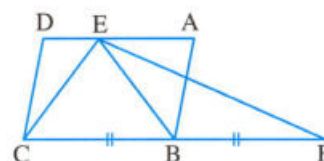
ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, then the length of \overline{AD} = cm.

4 The median of a triangle divides it into two triangles
5 If $\triangle ABC \sim \triangle DEF$, $AB = \frac{1}{2} DE$, $DF = 8$ cm. , then AC =
6 The projection of the point (5, -4) on X-axis is the point

3 [a] In the opposite figure :

ABCD is a parallelogram, B is the midpoint of \overline{CF}

Prove that : The area of $\triangle EFC$ = the area of $\square ABCD$


[b] In the opposite figure :

ABC is a right-angled triangle at B

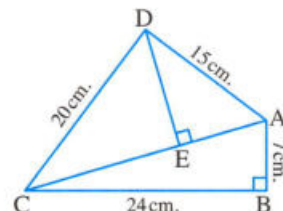
, $\overline{DE} \perp \overline{AC}$, $AB = 7$ cm.

, $BC = 24$ cm. , $DC = 20$ cm.

, $AD = 15$ cm.

Prove that : $m(\angle ADC) = 90^\circ$

, then find the length of the projection of \overline{AD} on \overline{AC}


4 [a] In the opposite figure :

ABC is a triangle, $D \in \overline{AB}$, $E \in \overline{AC}$

, the area of $\triangle ABE$ = the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$

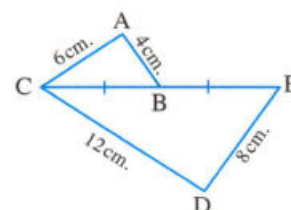
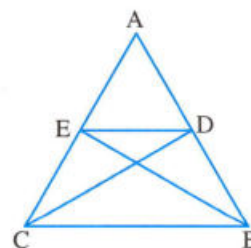
[b] In the opposite figure :

B is the midpoint of \overline{CE} , $AB = 4$ cm.

, $AC = 6$ cm. , $DE = 8$ cm. and $CD = 12$ cm.

Prove that : 1 $\triangle ACB \sim \triangle DCE$

2 \overline{CE} bisects $\angle ACD$


5 [a] A rhombus, the product of lengths of its diagonals is 72 cm^2 and its height is 9 cm.

Find : the perimeter of the rhombus.

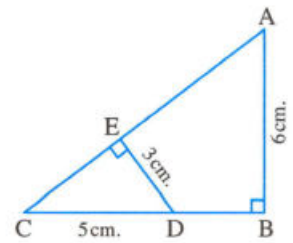
[b] In the opposite figure :

ABC is a right-angled triangle at B

, $\overline{DE} \perp \overline{AC}$

, $\triangle ABC \sim \triangle DEC$

Find : the lengths of \overline{CE} and \overline{AC}



7

El-Sharkia Governorate



East of Zagazig
Math Inspection

Answer the following questions :

1 Choose the correct answer :

1 The projection of a point on a given straight line is

- (a) a point. (b) a line segment. (c) a ray. (d) a straight line.

2 The lengths of two adjacent sides of a parallelogram are 8 cm. and 5 cm. and the smaller height is 4 cm. , then its area equals cm^2

- (a) 17 (b) 32 (c) 20 (d) 52

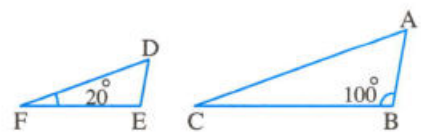
3 All are similar.

- (a) triangles (b) pentagons (c) squares (d) rectangles

4 In the opposite figure :

If $\triangle ABC \sim \triangle DEF$, then $m(\angle A) = \dots\dots\dots$

- (a) 20° (b) 60°
(c) 80° (d) 100°



5 The rhombus whose diagonal lengths are 6 cm. , 10 cm. has an area cm^2

- (a) 60 (b) 30 (c) 15 (d) 10

6 ABC is a triangle in which : $(BC)^2 = (AB)^2 + (AC)^2$, $m(\angle B) = 40^\circ$
 , then $m(\angle C) = \dots\dots\dots$

- (a) 40° (b) 50° (c) 90° (d) 140°

2 Complete :

1 The two triangles are similar if the corresponding are proportional.

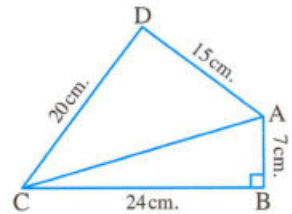
2 If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AB} on \overline{BC} is

- 3 The base angles of the isosceles trapezium are
- 4 The triangle whose side lengths are 6 cm. , 8 cm. , 11 cm. , then its type according to its angles is
- 5 If two polygons are similar and the ratio between the lengths of two corresponding sides is 3 : 4 , then the ratio between their perimeters is
- 6 The median of a triangle divides its surface into two triangles

3 [a] In the opposite figure :

ABCD is a quadrilateral in which : $m(\angle B) = 90^\circ$
 $AB = 7$ cm. , $BC = 24$ cm. , $CD = 20$ cm.
 and $DA = 15$ cm.

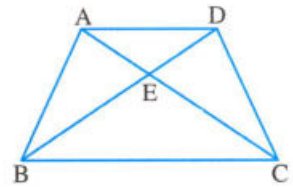
Prove that : $m(\angle D) = 90^\circ$



[b] In the opposite figure :

The area of $\triangle AEB$ = the area of $\triangle DEC$

Prove that : $\overline{AD} \parallel \overline{BC}$

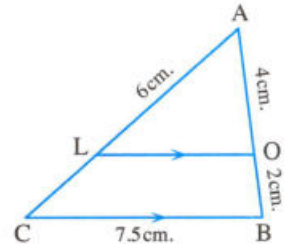


4 [a] In the opposite figure :

ABC is a triangle , $\overline{BC} \parallel \overline{OL}$
 $AO = 4$ cm. , $BO = 2$ cm. , $AL = 6$ cm. , $BC = 7.5$ cm.

1 Prove that : $\triangle ABC$ is similar to $\triangle AOL$

2 Find : The lengths of \overline{LC} and \overline{OL}

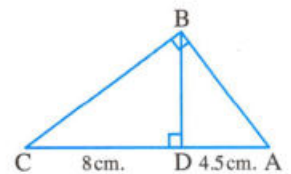


[b] In the opposite figure :

$\triangle ABC$ is right-angled at B and $\overline{BD} \perp \overline{AC}$

$AD = 4.5$ cm. and $DC = 8$ cm.

Find : The length of each of \overline{AB} , \overline{BC} and \overline{BD}

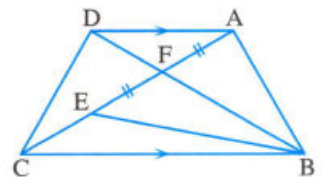


5 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $F \in \overline{AC}$ and $E \in \overline{AC}$

such that : $AF = FE$

Prove that : The area of $\triangle BFE$ = the area of $\triangle DFC$



[b] A trapezium of lengths of two parallel bases 6 cm. and 4 cm.

Find its area if its height is 5 cm.



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from those given :

- 1 If the area of a triangle is 30 cm^2 , its height is 5 cm. , then its corresponding base length is cm.
 (a) 6 (b) 12 (c) 18 (d) 5
- 2 The area of the square whose diagonal length is 12 cm. is cm^2
 (a) 3 (b) 144 (c) 72 (d) 9
- 3 The corresponding angles of two similar polygons are in measure.
 (a) equal (b) different (c) alternate (d) proportional
- 4 The rhombus whose diagonal lengths are 6 cm. , 8 cm. , then its area = cm^2
 (a) 10 (b) 12 (c) 24 (d) 48
- 5 In a parallelogram , the lengths of two adjacent sides are 7 cm. , 9 cm. and the smaller height is 4 cm. , then its area is cm^2
 (a) 28 (b) 32 (c) 36 (d) 63
- 6 In $\triangle ABC$, if $(AB)^2 + (BC)^2 < (AC)^2$, then $\angle A$ is
 (a) right. (b) acute. (c) obtuse. (d) straight.

2 Complete each of the following :

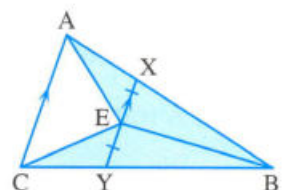
- 1 Two similar polygons to a third one are
- 2 ABCD is a parallelogram , $E \in \overline{CD}$, the area of $\triangle AEB = 20 \text{ cm}^2$, then the area of the parallelogram ABCD = cm^2
- 3 The isosceles triangle has axes of symmetry.
- 4 Two triangles are similar if the lengths of their corresponding sides are
- 5 The median of a triangle divides it into two triangles
- 6 The type of the triangle whose side lengths are 3 cm. , 4 cm. and 5 cm. according to its angles is

3 [a] In the opposite figure :

$\overline{AC} \parallel \overline{XY}$, E is the midpoint of \overline{XY}

Prove that :

The area of $\triangle ABE =$ the area of $\triangle CBE$

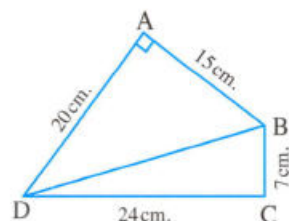


[b] In the opposite figure :

$m(\angle A) = 90^\circ$, $AB = 15$ cm. , $AD = 20$ cm.

, $BC = 7$ cm. , $CD = 24$ cm.

Prove that : $m(\angle C) = 90^\circ$



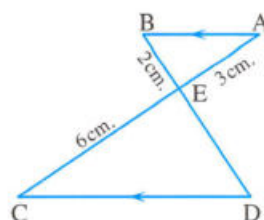
4 [a] In the opposite figure :

$\overline{AB} \parallel \overline{DC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

, $AE = 3$ cm. , $BE = 2$ cm. , $EC = 6$ cm.

1 Prove that : $\triangle ABE \sim \triangle CDE$

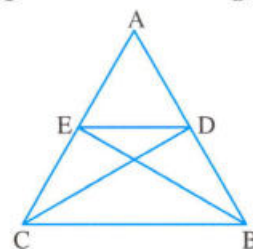
2 Find : the length of \overline{DE}



[b] In the opposite figure :

The area of $\triangle ABE$ = the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$

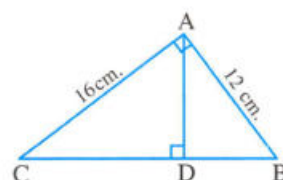


5 [a] In the opposite figure :

$\triangle ABC$ is right-angled at A , $\overline{AD} \perp \overline{BC}$

, $AB = 12$ cm. , $AC = 16$ cm.

Find : the lengths of \overline{BC} and \overline{AD}



[b] Find the area of the trapezium with two parallel bases of lengths 10 cm. , 14 cm. and its height is 8 cm.

9

Ismailia Governorate



**Directorate of Education
Maths Supervision**

Answer the following questions :

1 Choose the correct answer :

1 In $\triangle ABC$, if $(AC)^2 = (AB)^2 + (BC)^2$, then $m(\angle B) = \dots\dots\dots$

(a) 30°

(b) 60°

(c) 90°

(d) 100°

2 In the opposite figure :

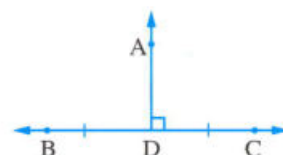
The length of the projection of \overline{AD} on \overline{BC} is $\dots\dots\dots$

(a) 0

(b) 1

(c) 2

(d) 3



- 3 The area of the square whose diagonal length is 8 cm. is cm^2

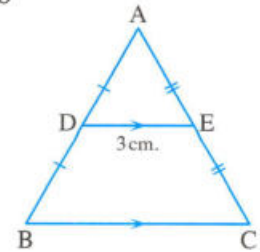
(a) 25 (b) 30 (c) 32 (d) 40

- 4 In the opposite figure :

If $DE = 3 \text{ cm.}$,

then $BC = \dots\dots\dots \text{cm.}$

(a) 1 (b) 5 (c) 6 (d) 7



- 5 The measures of base angles of an isosceles trapezium are

(a) equal. (b) complementary. (c) parallel. (d) supplementary.

- 6 The area of a parallelogram is 60 cm^2 and the length of one base is 12 cm. , then the corresponding height is cm.

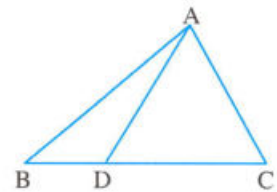
(a) 1 (b) 5 (c) 10 (d) 12

2 Complete :

- 1 The area of the triangle = $\frac{1}{2} \times \dots\dots\dots \times h$

- 2 In the opposite figure :

If the area of $\triangle ADB = \frac{1}{2}$ the area of $\triangle ADC$
 , then $BD = \dots\dots\dots DC$



- 3 The two diagonals are perpendicular and equal in length in

- 4 If $\triangle XYZ \sim \triangle ABC$, $m(\angle X) = 30^\circ$, $m(\angle Y) = 90^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$

- 5 If the two triangles are similar and congruent , then the ratio between the lengths of two corresponding sides equals

- 6 If the area of a trapezium = 84 cm^2 , and the length of the middle base = 12 cm.
 , then its height = cm.

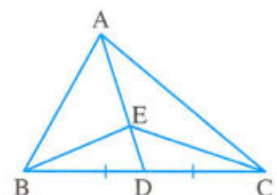
3 [a] In the opposite figure :

ABC is a triangle

, \overline{AD} is a median , $E \in \overline{AD}$

Prove that :

The area of $\triangle ABE =$ the area of $\triangle ACE$

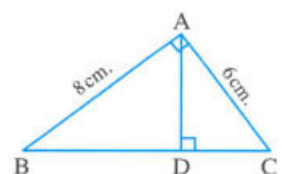


- [b] In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

, $AB = 8 \text{ cm.}$, $AC = 6 \text{ cm.}$,

Find by proof : the lengths of \overline{AD} , \overline{CD} and \overline{BD}

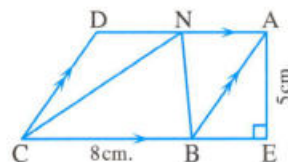


- 4 [a] Determine the type of the ΔABC according to its angles if $AB = 6$ cm. , $AC = 12$ cm. , $BC = 8$ cm.

[b] In the opposite figure :

$ABCD$ is a parallelogram , $CB = 8$ cm.
 , $AE = 5$ cm. , $N \in \overline{DA}$, $E \in \overline{CB}$, $\overline{AE} \perp \overline{CE}$

Find by proof : the area of ΔNCB



- 5 [a] In the opposite figure :

If $\overline{AD} \parallel \overline{BC}$

, prove that :

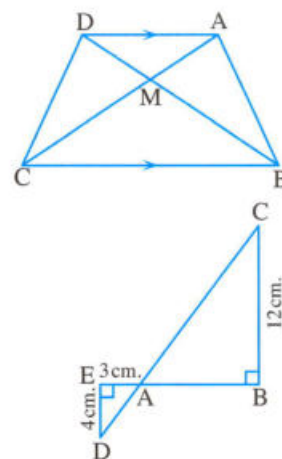
the area of $\Delta AMB =$ the area of ΔDMC

[b] In the opposite figure :

$\overline{BE} \cap \overline{DC} = \{A\}$, $m(\angle B) = 90^\circ$, $m(\angle E) = 90^\circ$

1 Prove that : $\Delta ABC \sim \Delta AED$

2 Find : the lengths of \overline{AB} , \overline{AC}



10

Damietta Governorate


 New Damietta Zone
 El-kafrawi Language School

Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 The area of a parallelogram is 30 cm^2 and its base length is 6 cm. , then its corresponding height is cm.
 (a) 15 (b) 10 (c) 5 (d) 90
- 2 The median of a triangle divides its surface into two triangles
 (a) similar. (b) congruent. (c) equal in area. (d) equal in perimeter.
- 3 In ΔABC , if $(AC)^2 < (AB)^2 + (BC)^2$, then the type of $\angle B$ is
 (a) obtuse. (b) right. (c) straight. (d) acute.
- 4 The trapezium whose middle base length = 8 cm. and its height = 5 cm. , its area = cm^2
 (a) 60 (b) 40 (c) 30 (d) 20
- 5 If $\overline{AB} \parallel \overline{CD}$, then the length of the projection of \overline{AB} on \overline{CD} the length of \overline{AB}
 (a) > (b) < (c) = (d) otherwise.

- 6 The rhombus whose diagonal lengths are 10 cm. , 6 cm. , its area = cm^2
 (a) 30 (b) 40 (c) 60 (d) 120

2 Complete the following :

- 1 A square its diagonal length = 10 cm. , then its area = cm^2
 2 The two polygons are similar if their corresponding angles are and their corresponding sides are
 3 The area of a triangle is equal to half of the area of a parallelogram if they have a common base and
 4 The area of the rectangle =
 5 The number of axes of symmetry of an isosceles triangle equals
 6 If $\overline{AB} \perp \overline{CD}$, then the length of the projection of \overline{AB} on \overline{CD} equals

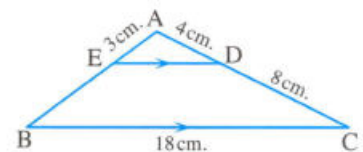
- 3 [a] Find the height of the trapezium whose area is 70 cm^2 and the two base lengths are 12 cm. , 8 cm.

[b] In the opposite figure :

$\overline{ED} \parallel \overline{BC}$, $AD = 4 \text{ cm.}$, $DC = 8 \text{ cm.}$
 , $EA = 3 \text{ cm.}$, $BC = 18 \text{ cm.}$

1 **Prove that :** $\triangle AED \sim \triangle ABC$

2 **Find :** the length of \overline{ED}

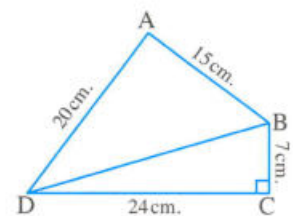


- 4 [a] Determine the type of the triangle ABC according to its angles where $AB = 7 \text{ cm.}$
 , $BC = 6 \text{ cm.}$, $AC = 9 \text{ cm.}$

[b] In the opposite figure :

$m(\angle C) = 90^\circ$, $AB = 15 \text{ cm.}$
 , $BC = 7 \text{ cm.}$, $CD = 24 \text{ cm.}$, $AD = 20 \text{ cm.}$

Prove that : $m(\angle A) = 90^\circ$



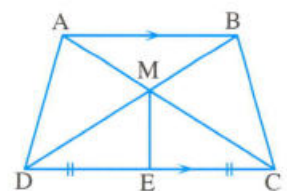
- 5 [a] **In the opposite figure :**

$\overline{AB} \parallel \overline{CD}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, E is the midpoint of \overline{CD}

Prove that :

The area of the figure ADEM = the area of the figure BCEM



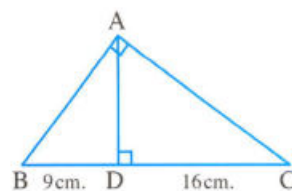
[b] In the opposite figure :

ABC is a triangle , $m(\angle BAC) = 90^\circ$

, $\overline{AD} \perp \overline{BC}$, $BD = 9$ cm.

, $DC = 16$ cm.

Find : AD , AB , AC



11

Assiut Governorate



Administration of Distinguished & Governmental Language Schools

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 A rhombus its two diagonals are of lengths 8 cm. and 6 cm. , its area equals cm^2

- (a) 14 (b) 20 (c) 24 (d) 48

2 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}

- (a) = (b) > (c) < (d) otherwise

3 The sum of measures of the interior angles of a triangle equals

- (a) 90° (b) 180° (c) 360° (d) 120°

4 In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

, $DC = 9$ cm. , $DB = 16$ cm.

, then $AD =$ cm.

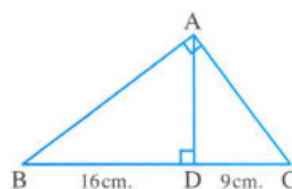
- (a) 144 (b) 25 (c) 50 (d) 12

5 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

6 All are similar.

- (a) squares (b) rectangles (c) triangles (d) parallelograms



2 Complete the following :

1 ABCD is a parallelogram in which $m(\angle A) = 60^\circ$, then $m(\angle B) =$ $^\circ$

2 The two triangles are similar if their corresponding side lengths are

3 A square is of perimeter 16 cm. , then its area equals cm^2

4 ABCD is a parallelogram , its area = 36 cm^2 , $E \in \overline{AD}$, then the area of $\triangle EBC$ equal cm^2

5 If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) = 70^\circ$, $m(\angle Y) = 60^\circ$, then $m(\angle Z) = \dots\dots\dots^\circ$

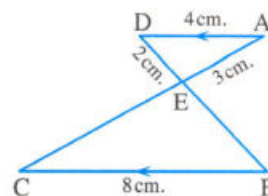
6 The median of a triangle divides it into two triangles $\dots\dots\dots$ in area.

3 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{DB} = \{E\}$, $AD = 4$ cm. , $BC = 8$ cm.
 , $AE = 3$ cm. and $ED = 2$ cm.

1 Prove that : $\triangle AED \sim \triangle CEB$

2 Find : the perimeter of $\triangle EBC$

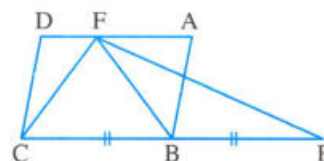


[b] Find the area of a trapezium if the lengths of its parallel bases are 5 cm. , 9 cm. and its height is 4 cm.

4 [a] In the opposite figure :

ABCD is a parallelogram , $E \in \overrightarrow{CB}$
 where $BC = BE$

Prove that : the area of $\triangle FCE =$ the area of $\square ABCD$



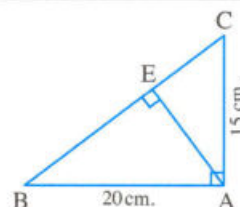
[b] Determine the type of the triangle ABC according to its angles where $AB = 7$ cm.
 , $BC = 6$ cm. and $AC = 9$ cm.

5 [a] In the opposite figure :

ABC is a right-angled triangle at A
 , $\overline{AE} \perp \overline{BC}$, $AB = 20$ cm. , $AC = 15$ cm.

Find : 1 The length of the projection of \overline{AB} on \overline{BC}

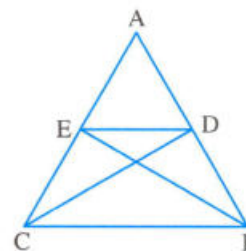
2 The length of \overline{EC}



[b] In the opposite figure :

If the area of $\triangle ADC =$ the area of $\triangle AEB$

, prove that : $\overline{DE} \parallel \overline{BC}$



12

South Sinai Governorate



The Educational Directorate
 Tur Sinai Educational Zone

Answer the following questions :

1 Choose the correct answer :

1 The diagonals of the isosceles trapezium are $\dots\dots\dots$

- (a) congruent. (b) perpendicular. (c) parallel. (d) bisecting each other.

- 2 If the area of a triangle is 24 cm^2 and its height is 8 cm. , then its corresponding base length is cm.
 (a) 16 (b) 6 (c) 3 (d) 2
- 3 $\triangle ABC$ is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$ intersecting it at D , then the projection of \overline{BD} on \overline{AC} is
 (a) A (b) B (c) C (d) D
- 4 A square whose perimeter is 20 cm. , then its area is cm^2
 (a) 20 (b) 25 (c) 50 (d) 100
- 5 If the ratio between the lengths of two corresponding sides in two similar polygons is 1 : 3 and the perimeter of the smaller polygon is 15 cm. , then the perimeter of the greater polygon is cm.
 (a) 30 (b) 45 (c) 60 (d) 75
- 6 A rhombus whose diagonal lengths are 6 cm. and 11 cm. , then its area is cm^2
 (a) 66 (b) 17 (c) 33 (d) 5

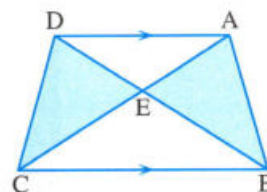
2 Complete the following :

- 1 The area of the triangle = \times
- 2 The area of the parallelogram whose base length is 6 cm. and its corresponding height is 4 cm. equals cm^2
- 3 The median of a triangle divides its surface into two triangles in area.
- 4 The two polygons are similar if the corresponding sides are and the corresponding angles are
- 5 In $\triangle ABC$, if $(AC)^2 + (CB)^2 = (AB)^2$, then $m(\angle \text{.....}) = 90^\circ$
- 6 A trapezium whose two parallel bases are of lengths 8 cm. , 10 cm. and its height is 5 cm. , then its area is cm^2

3 [a] In the opposite figure :

ABCD is a quadrilateral
 $\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

Prove that : the area of $\triangle ABE$ = the area of $\triangle DCE$



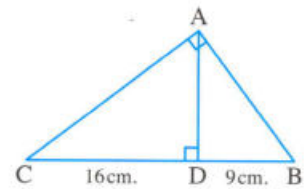
- [b] Determine the type of $\triangle ABC$ according to its angles , where $AB = 6 \text{ cm}$, $BC = 8 \text{ cm}$, and $AC = 11 \text{ cm}$.

4 [a] In the opposite figure :

$\triangle ABC$ is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$

, $BD = 9$ cm. , $CD = 16$ cm.

Find : the length of \overline{AC} and \overline{AD}



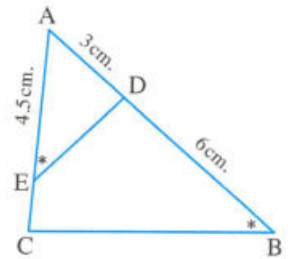
[b] In the opposite figure :

$m(\angle AED) = m(\angle B)$, $AD = 3$ cm.

, $AE = 4.5$ cm. , $BD = 6$ cm.

1 Prove that : $\triangle ADE \sim \triangle ACB$

2 Find : the length of \overline{EC}

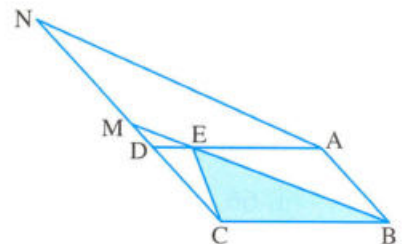


5 [a] In the opposite figure :

ABCD , ABMN are two parallelograms

Prove that :

The area of $\triangle EBC = \frac{1}{2}$ the area of \square ABMN

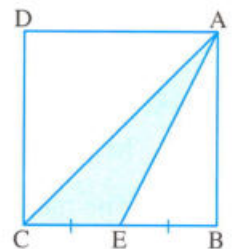


[b] In the opposite figure :

ABCD is a square , its perimeter is 24 cm.

, E is the midpoint of \overline{BC}

Find with proof : the area of $\triangle AEC$



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Answers of the schools examinations on Geometry

1 Cairo

1

- 1 (b) 2 (a) 3 (d) 4 (d) 5 (c) 6 (c)

2

- 1 two triangles equal in area.
2 equal in length 3 40
4 similar. 5 equal in area 6 congruent

3

- [a] $\therefore \triangle ABC, \triangle ABD$ have a common base \overline{AB}
 $\therefore \overline{AB} \parallel \overline{CD}$

\therefore The area of $\triangle ABC$ = the area of $\triangle ABD$
Subtracting the area of $\triangle ABM$ from both sides

\therefore The area of $\triangle MBC$ = the area of $\triangle ADM$ (1)

$\therefore \overline{MB}$ is a median in $\triangle EMC$

\therefore The area of $\triangle EBM$ = the area of $\triangle MBC$ (2)

From (1) and (2):

\therefore The area of $\triangle EBM$ = the area of $\triangle ADM$
(Q.E.D.)

- [b] Let the lengths of the two parallel bases be $3X$ cm.
and $2X$ cm.

$$\therefore \frac{1}{2} (3X + 2X) \times 12 = 180$$

$$\therefore 5X = 30 \quad \therefore X = 6$$

\therefore The lengths of the two bases are:

18 cm. and 12 cm. (The req.)

4

- [a] $\therefore \triangle ABX, \square ABCD$ have a common base \overline{AB}
 $\therefore \overline{AB} \parallel \overline{XD}$

\therefore The area of $\triangle ABX = \frac{1}{2}$ the area of $\square ABCD$ (1)

$\therefore \triangle DFX, \square ADFE$ have a common base \overline{DF}
 $\therefore \overline{DF} \parallel \overline{AX}$

\therefore The area of $\triangle DFX = \frac{1}{2}$ the area of $\square ADFE$ (2)

$\therefore \square ABCD, \square ADFE$ have a common
base \overline{AD}

$\therefore \overline{AD} \parallel \overline{BF}$

\therefore The area of $\square ABCD$ = the area of $\square ADFE$ (3)

From (1), (2) and (3):

\therefore The area of $\triangle ABX$ = the area of $\triangle DFX$
(Q.E.D.)

- [b] In $\triangle ABC: \therefore m(\angle B) = 90^\circ, \overline{BD} \perp \overline{AC}$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (8)^2 + (6)^2 = 100$$

$$\therefore AC = 10 \text{ cm.}$$

$$\therefore BD = \frac{AB \times BC}{AC} = \frac{8 \times 6}{10} = 4.8 \text{ cm. (First req.)}$$

$\therefore \overline{DC}$ is the projection of \overline{BC} on \overline{AC}

$$\therefore (BC)^2 = CD \times AC$$

$$\therefore (6)^2 = CD \times 10$$

$$\therefore CD = \frac{36}{10} = 3.6 \text{ cm. (Second req.)}$$

$\therefore \overline{DA}$ is the projection of \overline{BA} on \overline{AC}

$$\therefore DA = 10 - 3.6 = 6.4 \text{ cm. (Third req.)}$$

5

- [a] $\therefore m(\angle B) = m(\angle AXY)$

$\therefore \angle A$ is a common angle

$$\therefore m(\angle C) = m(\angle AXY)$$

$\therefore \triangle ABC \sim \triangle AXY$ (First req.)

$$\therefore \frac{AB}{AY} = \frac{AC}{AX} \quad \therefore \frac{5}{2.5} = \frac{AC}{2}$$

$$\therefore AC = \frac{5 \times 2}{2.5} = 4 \text{ cm.}$$

$$\therefore CY = 4 - 2.5 = 1.5 \text{ cm (Second req.)}$$

- [b] $\therefore (AB)^2 = (17)^2 = 289$

$$\therefore (BC)^2 + (AC)^2 = (9)^2 + (10)^2 = 181$$

$$\therefore (AB)^2 > (BC)^2 + (AC)^2$$

$\therefore \triangle ABC$ is an obtuse-angled triangle. (The req.)

2 Cairo

1

- 1 (b) 2 (c) 3 (d) 4 (b) 5 (b) 6 (a)

2

1 \overline{BC}

2 acute

3 96

4 congruent

5 5

6 120

3

- [a] $\therefore m(\angle DEO) = 90^\circ, \overline{EN} \perp \overline{OD}$

$$\therefore (EN)^2 = DN \times NO = 16 \times 9 = 144$$

$$\therefore EN = 12 \text{ cm.}$$

$$\therefore (DE)^2 = DN \times DO = 16 \times 25 = 400$$

∴ DE = 20 cm.

∴ (EO)² = ON × DO = 9 × 25 = 225

∴ EO = 15 cm. (The req.)

[b] ∵ ΔADB, ΔADC have a common base \overline{AD}

∴ $\overline{AD} \parallel \overline{BC}$

∴ The area of ΔADB = the area of ΔADC
Subtracting the area of ΔADM from both sides

∴ The area of ΔAMB = the area of ΔDCM (1)

∴ ∵ ΔBMX, ΔCMY have a common vertex M
∴ BX = CY

∴ The area of ΔBMX = the area of ΔCMY (2)

Adding (1) and (2):

∴ The area of ΔBXM = the area of ΔCYM
(Q.E.D.)

4

[a] In ΔABC: ∵ m(∠B) = 90°

∴ (AC)² = (AB)² + (BC)² = (7)² + (24)² = 625

In ΔADC: ∵ (AC)² = 625

∴ (AD)² + (CD)² = (15)² + (20)² = 625

∴ (AC)² = (AD)² + (CD)²
∴ m(∠D) = 90° (Q.E.D.)

[b] ∵ m(∠B) = m(∠E) = 90°

∴ m(∠BAC) = m(∠EAD) (V.O.A.)

∴ m(∠C) = m(∠D)
∴ ΔABC ~ ΔAED (Q.E.D.)

5

[a] Let AB = 5 cm, BC = 7 cm, AC = 9 cm.

∴ (AC)² = (9)² = 81

∴ (AB)² + (BC)² = (5)² + (7)² = 74

∴ (AC)² > (AB)² + (BC)²

∴ ΔABC is an obtuse-angled triangle (The req.)

[b] ∵ The area of ΔABM = the area of ΔDCM

Adding the area of ΔADM to both sides

∴ The area of ΔADB = the area of ΔADC
and they have a common base \overline{AD} and on one side of it

∴ $\overline{AD} \parallel \overline{BC}$ (Q.E.D.)

3

Giza

1

1 (b) 2 (b) 3 (a) 4 (b) 5 (b) 6 (c)

2

1 CD 2 base 3 zero
4 90 5 400 6 m(∠Y)

3

[a] ∵ m(∠BAC) = 90°, $\overline{AD} \perp \overline{BC}$

∴ (AC)² = CD × BC = 16 × 25 = 400

∴ AC = 20 cm.

∴ (AD)² = CD × BD = 16 × 9 = 144

∴ AD = 12 cm. (The req.)

[b] ∵ m(∠ADE) = m(∠B)

∴ ∠A is a common angle

∴ m(∠AED) = m(∠C)

∴ ΔADE ~ ΔABC (First req.)

∴ $\frac{AD}{AB} = \frac{AE}{AC}$ ∴ $\frac{7}{14} = \frac{6}{AC}$

∴ AC = $\frac{6 \times 14}{7} = 12$ cm. (Second req.)

4

[a] In ΔABC: ∵ \overline{AD} is a median

∴ The area of ΔACD = the area of ΔABD (1)

In ΔEBC: ∵ \overline{ED} is a median

∴ The area of ΔECD = the area of ΔEBD (2)

Subtracting (2) from (1):

∴ The area of ΔACE = the area of ΔABE
(Q.E.D.)

[b] In ΔABC: ∵ m(∠B) = 90°

∴ (AC)² = (AB)² + (BC)² = (6)² + (8)² = 100

∴ AC = 10 cm. (First req.)

∴ D is the midpoint of \overline{AC}

∴ AD = $\frac{1}{2}$ AC = 5 cm.

In ΔADE: ∵ (AE)² = (13)² = 169

∴ (AD)² + (DE)² = (5)² + (12)² = 169

∴ (AE)² = (AD)² + (DE)²

∴ m(∠ADE) = 90° (Second req.)

5

[a] ∴ $\frac{1}{2} (24 + 12) \times h = 450$



$$\therefore 18 \times h = 450$$

$$\therefore h = \frac{450}{18} = 25 \text{ cm.} \quad (\text{The req.})$$

- [b] $\therefore \square ABCD$, $\square AEFD$ have a common base
 $\therefore AD \parallel BF$

\therefore The area of $\square ABCD$ = the area of $\square AEFD$
 Subtracting the area of $\triangle AMD$ from both sides
 \therefore The area of the figure $ABCM$ = the area of the figure $DMEF$ (Q.E.D.)

4

Giza

1

- 1 (b) 2 (b) 3 (c) 4 (c) 5 (b) 6 (d)

2

- 1 proportional 2 equal in measure 3 10
 4 5 5 3 6 A

3

- [a] The area of $\square ABCD = BC \times CD$
 $= 18 \times 10 = 180 \text{ cm}^2$

$$\therefore DY = \frac{\text{The area}}{AB} = \frac{180}{12} = 15 \text{ cm.} \quad (\text{The req.})$$

- [b] In $\triangle ABC$: $\therefore (BC)^2 = (10)^2 = 100$
 $\therefore (AB)^2 + (AC)^2 = (5)^2 + (7)^2 = 74$
 $\therefore (BC)^2 > (AB)^2 + (AC)^2$
 $\therefore \triangle ABC$ is an obtuse-angled triangle (The req.)

4

- [a] $\therefore \triangle ACD$, $\triangle ACE$ have a common base \overline{AC}
 $\therefore \overline{AC} \parallel \overline{DE}$

\therefore The area of $\triangle ACD$ = the area of $\triangle ACE$
 by adding area of $\triangle ABC$

\therefore The area of the shape $ABCD$ = the area of $\triangle ABE$ (Q.E.D.)

- [b] The length of the middle base = $\frac{\text{Area}}{h} = \frac{48}{6} = 8 \text{ cm.}$

$$\therefore \therefore \text{The length of the middle base} = \frac{1}{2} (b_1 + b_2)$$

$$\therefore 8 = \frac{1}{2} (7 + b_2)$$

$$\therefore 7 + b_2 = 16$$

$$\therefore b_2 = 16 - 7 = 9 \text{ cm.} \quad (\text{The req.})$$

5

- [a] $\therefore \overline{XY} \parallel \overline{BC}$, \overline{XC} is a transversal
 $\therefore m(\angle C) = m(\angle X)$ (alternate angles)

$$\therefore m(\angle CAB) = m(\angle XAY) \quad (\text{V.O.A.})$$

$$\therefore m(\angle B) = m(\angle Y)$$

$$\therefore \triangle ABC \sim \triangle AXY \quad (\text{First req.})$$

$$\therefore \frac{AB}{AY} = \frac{BC}{YX} = \frac{AC}{AX}$$

$$\therefore \frac{8}{AY} = \frac{10}{5} = \frac{AC}{3}$$

$$\therefore AC = \frac{10 \times 3}{5} = 6 \text{ cm.} \quad \therefore AY = \frac{8 \times 5}{10} = 4 \text{ cm.} \quad (\text{Second req.})$$

$$[b] \therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$$

$$\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$$

$$\therefore AB = 20 \text{ cm.}$$

$$\therefore (AD)^2 = BD \times CD = 16 \times 9 = 144$$

$$\therefore AD = 12 \text{ cm.}$$

$$\therefore (AC)^2 = CD \times BC = 9 \times 25 = 225$$

$$\therefore AC = 15 \text{ cm.} \quad (\text{First req.})$$

$$\therefore \text{the area of } \triangle ABC = \frac{1}{2} \times BC \times AD$$

$$= \frac{1}{2} \times 25 \times 12 = 150 \text{ cm}^2$$

(Second req.)

5

Alexandria

1

- 1 (b) 2 (a) 3 (c) 4 (c) 5 (b) 6 (c)

2

- 1 a point 2 equal in area
 3 equal in measure
 4 300° 5 Y 6 B

3

- [a] $\therefore \overline{BH}$ is a median in $\triangle BXY$

$$\therefore \text{The area of } \triangle BXH = \text{the area of } \triangle BYH \quad (1)$$

$$\therefore \therefore XH = YH, \overline{XY} \parallel \overline{AC}$$

$$\therefore \text{The area of } \triangle AXH = \text{the area of } \triangle CYH \quad (2)$$

Adding (1) and (2) :

$$\therefore \text{The area of } \triangle AHB = \text{the area of } \triangle CHB \quad (\text{Q.E.D.})$$

$$[b] \therefore (AC)^2 = (9)^2 = 81$$

$$\therefore (AB)^2 + (BC)^2 = (7)^2 + (8)^2 = 113$$

$$\therefore (AC)^2 < (AB)^2 + (BC)^2$$

$\therefore \triangle ABC$ is an acute-angled triangle (The req.)

4

- [a] $\because \overline{DH} \parallel \overline{BC}$, \overline{AB} is a transversal
 $\therefore m(\angle B) = m(\angle ADH)$ (corresponding angles)
 $\therefore \angle A$ is a common angle
 $\therefore m(\angle C) = m(\angle AHD)$
 $\therefore \triangle ABC \sim \triangle ADH$
 $\therefore \frac{AC}{AH} = \frac{BC}{DH} \quad \therefore \frac{27}{9} = \frac{BC}{8}$
 $\therefore BC = \frac{8 \times 27}{9} = 24$ cm. (The req.)
- [b] \because The area $= \frac{1}{2} (b_1 + b_2) \times h$
 $\therefore 50 = \frac{1}{2} (12 + 8) \times h$
 $\therefore 50 = 10 \times h$
 $\therefore h = \frac{50}{10} = 5$ cm. (The req.)

5

- [a] \because ABCD is a parallelogram
 $\therefore \overline{AX} \parallel \overline{BY} \quad \therefore \overline{AB} \parallel \overline{XY}$
 \therefore ABYX is a parallelogram
 $\therefore \overline{AY}$ is a diagonal of \square ABYX
 \therefore The area of $\triangle AXY = \frac{1}{2}$ the area of \square ABYX (1)
 $\therefore \overline{AB} \parallel \overline{XY}$, $\overline{AB} \parallel \overline{CD}$
 $\therefore \overline{CD} \parallel \overline{XY} \quad \therefore \overline{DX} \parallel \overline{CY}$
 \therefore CDXY is a parallelogram
 $\therefore \triangle XYL$, \square CDXY have a common base \overline{XY}
 $\therefore \overline{XY} \parallel \overline{DL}$
 \therefore The area of $\triangle XYL = \frac{1}{2}$ the area of \square CDXY (2)
 Adding (1) and (2):
 \therefore The area of $\triangle AXL = \frac{1}{2}$ the area of \square ABCD (Q.E.D.)

- [b] In $\triangle ABC$: $\because m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$
 In $\triangle ACD$: $\because (CD)^2 = (17)^2 = 289$
 $\therefore (AD)^2 + (AC)^2 = (8)^2 + 225 = 289$
 $\therefore (CD)^2 = (AD)^2 + (AC)^2$
 $\therefore m(\angle DAC) = 90^\circ$ (Q.E.D.)

6 El-Kalyoubia

1

- [1] (b) [2] (a) [3] (c) [4] (d) [5] (d) [6] (d)

2

- [1] 70 [2] 110° [3] 12
 [4] equal in area [5] 4 cm. [6] (5, 0)

3

- [a] $\because \triangle CBE$, \square ABCD have a common base \overline{BC}
 $\therefore \overline{BC} \parallel \overline{AD}$
 \therefore The area of $\triangle CBE = \frac{1}{2}$ the area of \square ABCD (1)
 $\therefore \overline{EB}$ is a median in $\triangle EFC$
 \therefore The area of $\triangle CBE = \frac{1}{2}$ the area of $\triangle EFC$ (2)
 From (1), (2):
 \therefore The area of $\triangle EFC =$ the area of \square ABCD (Q.E.D.)

- [b] In $\triangle ABC$: $\because m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$
 $\therefore AC = 25$ cm.
 In $\triangle ACD$: $\because (AC)^2 = 625$
 $\therefore (AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$
 $\therefore (AC)^2 = (AD)^2 + (CD)^2$
 $\therefore m(\angle ADC) = 90^\circ$ (First req.)
 $\therefore \overline{AE}$ is the projection of \overline{AD} on \overline{AC}
 $\therefore (AD)^2 = AE \times AC$
 $\therefore 225 = AE \times 25$
 $\therefore AC = \frac{225}{25} = 9$ cm. (Second req.)

4

- [a] \because The area of $\triangle ABE =$ the area of $\triangle ACD$
 Subtracting the area of $\triangle ADE$
 \therefore The area of $\triangle EDB =$ the area of $\triangle EDC$
 and they have a common base \overline{DE} and on one side of it
 $\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)
- [b] $\because \frac{AC}{DC} = \frac{6}{12} = \frac{1}{2} \quad \therefore \frac{CB}{CE} = \frac{1}{2}$
 $\therefore \frac{AB}{DE} = \frac{4}{8} = \frac{1}{2}$
 $\therefore \frac{AC}{DC} = \frac{CB}{CE} = \frac{AB}{DE}$
 $\therefore \triangle ACB \sim \triangle DCE$ (Q.E.D.1)
 $\therefore m(\angle ACB) = m(\angle DCE)$
 $\therefore \overline{CE}$ bisects $\angle ACD$ (Q.E.D.2)



5

[a] \therefore The area = $\frac{1}{2}$ the product of the diagonal lengths

$$\therefore \text{The area} = \frac{1}{2} \times 72 = 36 \text{ cm}^2.$$

$$\therefore \text{The side length} = \frac{A}{h} = \frac{36}{9} = 4 \text{ cm}.$$

$$\therefore \text{The perimeter} = 4 \times 4 = 16 \text{ cm. (The req.)}$$

[b] In $\triangle DEC$: $\therefore m(\angle CED) = 90^\circ$

$$\therefore (CE)^2 = (CD)^2 - (ED)^2 = (5)^2 - (3)^2 = 16$$

$$\therefore CE = 4 \text{ cm. (First req.)}$$

$$\therefore \triangle ABC \sim \triangle DEC$$

$$\therefore \frac{AB}{DE} = \frac{AC}{DC}$$

$$\therefore \frac{6}{3} = \frac{AC}{5}$$

$$\therefore AC = \frac{6 \times 5}{3} = 10 \text{ cm. (Second req.)}$$

7

El-Sharkia

1

- 1 (a) 2 (b) 3 (c) 4 (b) 5 (b) 6 (b)

2

- 1 side lengths 2 B 3 congruent
4 obtuse-angled 5 3 : 4
6 equal in area

3

[a] In $\triangle ABC$: $\therefore m(\angle B) = 90^\circ$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$$

$$\text{In } \triangle ADC: \therefore (AC)^2 = 625$$

$$\therefore (AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$$

$$\therefore (AC)^2 = (AD)^2 + (CD)^2$$

$$\therefore m(\angle D) = 90^\circ \quad (\text{Q.E.D.})$$

[b] \therefore The area of $\triangle AEB$ = the area of $\triangle DEC$

Adding the area of $\triangle ADE$ to both sides

$$\therefore \text{The area of } \triangle ADB = \text{the area of } \triangle ADC$$

and they have a common base \overline{AD} and on one side of it

$$\therefore \overline{AD} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

4

[a] $\therefore \overline{BC} \parallel \overline{OL}$, \overline{AB} is a transversal

$$\therefore m(\angle B) = m(\angle AOL) \text{ (corresponding angles)}$$

$$\therefore \angle A \text{ is a common angle}$$

$$\therefore m(\angle C) = m(\angle ALO)$$

$$\therefore \triangle ABC \sim \triangle AOL \quad (\text{First req.})$$

$$\therefore \frac{AB}{AO} = \frac{BC}{OL} = \frac{AC}{AL} \quad \therefore \frac{6}{4} = \frac{7.5}{OL} = \frac{AC}{6}$$

$$\therefore OL = \frac{7.5 \times 4}{6} = 5 \text{ cm}.$$

$$\therefore AC = \frac{6 \times 6}{4} = 9 \text{ cm}.$$

$$\therefore LC = 9 - 6 = 3 \text{ cm. (Second req.)}$$

[b] $\therefore m(\angle ABC) = 90^\circ$, $\overline{BD} \perp \overline{AC}$

$$\therefore (AB)^2 = AD \times AC = 4.5 \times 12.5 = 56.25$$

$$\therefore AB = 7.5 \text{ cm}.$$

$$\therefore (BC)^2 = CD \times AC = 8 \times 12.5 = 100$$

$$\therefore BC = 10 \text{ cm}.$$

$$\therefore BD = \frac{AB \times BC}{AC} = \frac{7.5 \times 10}{12.5} = 6 \text{ cm. (The req.)}$$

5

[a] $\therefore \triangle ADB$, $\triangle ADC$ have a common base \overline{AD}
 $\therefore \overline{AD} \parallel \overline{BC}$

$$\therefore \text{The area of } \triangle ADB = \text{the area of } \triangle ADC$$

Subtracting the area of $\triangle ADF$ from both sides

$$\therefore \text{The area of } \triangle AFB = \text{the area of } \triangle DFC \quad (1)$$

$$\therefore \overline{BF} \text{ is a median in } \triangle ABE$$

$$\therefore \text{The area of } \triangle BFE = \text{the area of } \triangle AFB \quad (2)$$

From (1), (2):

$$\text{The area of } \triangle BFE = \text{the area of } \triangle DFC \quad (\text{Q.E.D.})$$

$$[b] \text{ The area} = \frac{1}{2} (6 + 4) \times 5 = 25 \text{ cm}^2 \quad (\text{The req.})$$

8

El-Dakahlia

1

- 1 (b) 2 (c) 3 (a) 4 (c) 5 (c) 6 (b)

2

- 1 similar 2 40
3 one 4 proportional
5 equal in area 6 right-angled

3

[a] $\therefore \overline{BE}$ is a median in $\triangle BXY$

$$\therefore \text{The area of } \triangle BXE = \text{the area of } \triangle BYE \quad (1)$$

$$\therefore \text{XE} = \text{YE}, \overline{AC} \parallel \overline{XY}$$

$$\therefore \text{The area of } \triangle AXE = \text{the area of } \triangle CYE \quad (2)$$

Adding (1) + (2) :

∴ The area of $\triangle ABE$ = the area of $\triangle CBE$
(Q.E.D.)

[b] In $\triangle ABD$: $\therefore m(\angle A) = 90^\circ$

$$\therefore (BD)^2 = (AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$$

In $\triangle BCD$: $\therefore (BD)^2 = 625$

$$\therefore (BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$$

$$\therefore (BD)^2 = (BC)^2 + (CD)^2$$

∴ $m(\angle C) = 90^\circ$ (Q.E.D.)

4

[a] $\therefore \overline{AB} \parallel \overline{CD}$, \overline{AC} is a transversal

∴ $m(\angle A) = m(\angle C)$ (alternate angles)

∴ $m(\angle AEB) = m(\angle CED)$ (V.O.A.)

∴ $m(\angle B) = m(\angle D)$

∴ $\triangle ABE \sim \triangle CDE$ (First req.)

$$\therefore \frac{BE}{DE} = \frac{AE}{CE} \quad \therefore \frac{2}{DE} = \frac{3}{6}$$

$$\therefore DE = \frac{2 \times 6}{3} = 4 \text{ cm.} \quad \text{(Second req.)}$$

[b] \therefore The area of $\triangle ABE$ = the area of $\triangle ACD$

Subtracting the area of $\triangle ADE$ from both sides

∴ The area of $\triangle EDB$ = the area of $\triangle EDC$

∴ they have a common base \overline{DE} and on one side of it

∴ $\overline{DE} \parallel \overline{BC}$ (Q.E.D.)

5

[a] $\therefore m(\angle BAC) = 90^\circ$

$$\therefore (BC)^2 = (AB)^2 + (AC)^2 = (12)^2 + (16)^2 = 400$$

$$\therefore BC = 20 \text{ cm.}$$

∴ $\overline{AD} \perp \overline{BC}$

$$\therefore AD = \frac{AB \times AC}{BC} = \frac{12 \times 16}{20} = 9.6 \text{ cm.} \quad \text{(The req.)}$$

[b] The area = $\frac{1}{2} (10 + 14) \times 8 = 96 \text{ cm}^2$ (The req.)

9

Ismailia

1

[1] (c) [2] (a) [3] (c) [4] (c) [5] (a) [6] (b)

2

[1] base [2] $\frac{1}{2}$ [3] the square
[4] 60° [5] 1 [6] 7

3

[a] $\therefore \overline{AD}$ is a median in $\triangle ABC$

∴ The area of $\triangle ABD$ = the area of $\triangle ACD$ (1)

∴ \overline{ED} is a median in $\triangle BEC$

∴ The area of $\triangle BED$ = the area of $\triangle CED$ (2)

Subtracting (2) From (1) :

∴ The area of $\triangle ABE$ = the area of $\triangle ACE$
(Q.E.D.)

[b] $\therefore m(\angle BAC) = 90^\circ$

$$\therefore (BC)^2 = (AC)^2 + (AB)^2 = (6)^2 + (8)^2 = 100$$

$$\therefore BC = 10 \text{ cm.}$$

∴ $\overline{AD} \perp \overline{BC}$

$$\therefore AD = \frac{AB \times AC}{BC} = \frac{8 \times 6}{10} = 4.8 \text{ cm.}$$

$$\therefore (AC)^2 = CD \times BC \quad \therefore (6)^2 = CD \times 10$$

$$\therefore CD = \frac{36}{10} = 3.6 \text{ cm.}$$

$$\therefore BD = 10 - 3.6 = 6.4 \text{ cm.} \quad \text{(The req.)}$$

4

[a] $\therefore (AC)^2 = (12)^2 = 144$

$$\therefore (AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$$

$$\therefore (AC)^2 > (AB)^2 + (BC)^2$$

∴ $\triangle ABC$ is an obtuse-angled triangle (The req.)

[b] The area of $\triangle NCB = \frac{1}{2} \times BC \times AE$

$$= \frac{1}{2} \times 8 \times 5 = 20 \text{ cm}^2$$

(The req.)

5

[a] $\therefore \triangle ADB$, $\triangle ADC$ have a common base \overline{AD}

∴ $\overline{AD} \parallel \overline{BC}$

∴ The area of $\triangle ADB$ = the area of $\triangle ADC$

subtracting the area of $\triangle ADM$ from both sides

∴ The area of $\triangle AMB$ = the area of $\triangle DMC$
(Q.E.D.)

[b] $\therefore m(\angle B) = m(\angle E) = 90^\circ$

∴ $m(\angle BAC) = m(\angle EAD)$ (V.O.A.)

∴ $m(\angle C) = m(\angle D)$

∴ $\triangle ABC \sim \triangle AED$ (First req.)

$$\therefore \frac{AB}{AE} = \frac{BC}{ED} = \frac{AC}{AD} \quad \therefore \frac{AB}{3} = \frac{12}{4}$$

$$\therefore AB = \frac{12 \times 3}{4} = 9 \text{ cm.}$$



∴ in $\triangle ABC$: $\because m(\angle B) = 90^\circ$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$$

$$\therefore AC = 15 \text{ cm.} \quad (\text{Second req.})$$

10 Damietta

1

- 1 (c) 2 (c) 3 (d) 4 (b) 5 (c) 6 (a)

2

- 1 50 2 equal in measure ∴ proportional
3 between two parallel lines
4 length \times width 5 1 6 zero

3

[a] \because The area = $\frac{1}{2} (b_1 + b_2) \times h$

$$\therefore 70 = \frac{1}{2} (12 + 8) \times h$$

$$\therefore 70 = 10 \times h$$

$$\therefore h = \frac{70}{10} = 7 \text{ cm.} \quad (\text{The req.})$$

[b] $\because \overline{ED} \parallel \overline{BC}$, \overline{AB} is a transversal

$$\therefore m(\angle AED) = m(\angle B) \text{ (corresponding angles)}$$

$$\because \angle A \text{ is a common angle}$$

$$\therefore m(\angle ADE) = m(\angle C)$$

$$\therefore \triangle AED \sim \triangle ABC \quad (\text{First req.})$$

$$\therefore \frac{ED}{BC} = \frac{AD}{AC} \quad \therefore \frac{ED}{18} = \frac{4}{12}$$

$$\therefore ED = \frac{4 \times 18}{12} = 6 \text{ cm.} \quad (\text{Second req.})$$

4

[a] $\because (AC)^2 = (9)^2 = 81$

$$\therefore (AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$$

$$\therefore (AC)^2 < (AB)^2 + (BC)^2$$

$$\therefore \triangle ABC \text{ is an acute-angled triangle} \quad (\text{The req.})$$

[b] In $\triangle BCD$: $\because m(\angle C) = 90^\circ$

$$\therefore (BD)^2 = (BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$$

$$\text{In } \triangle ABD : \because (BD)^2 = 625$$

$$\therefore (AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$$

$$\therefore (BD)^2 = (AB)^2 + (AD)^2$$

$$\therefore m(\angle A) = 90^\circ \quad (\text{Q.E.D.})$$

5

[a] $\because \triangle ABD$, $\triangle ABC$ have a common base \overline{AB}
 $\therefore \overline{AB} \parallel \overline{CD}$

$$\therefore \text{The area of } \triangle ABD = \text{the area of } \triangle ABC$$

Subtracting the area of $\triangle ABM$ from both sides

$$\therefore \text{The area of } \triangle ADM = \text{the area of } \triangle BCM \quad (1)$$

$$\because \overline{ME} \text{ is a median in } \triangle DCM$$

$$\therefore \text{The area of } \triangle DME = \text{the area of } \triangle CME \quad (2)$$

Adding (1) + (2) :

$$\therefore \text{The area of the figure ADEM} = \text{the area of the figure BCEM} \quad (\text{Q.E.D.})$$

[b] $\because m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

$$\therefore (AD)^2 = BD \times CD = 9 \times 16 = 144$$

$$\therefore AD = 12 \text{ cm.}$$

$$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$$

$$\therefore AB = 15 \text{ cm.}$$

$$\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$$

$$\therefore AC = 20 \text{ cm.} \quad (\text{The req.})$$

11 Assiut

1

- 1 (c) 2 (a) 3 (b) 4 (d) 5 (c) 6 (a)

2

- 1 120° 2 proportional 3 16
4 18 5 50° 6 equal

3

[a] $\because \overline{AD} \parallel \overline{BC}$, \overline{AC} is a transversal

$$\therefore m(\angle A) = m(\angle C) \text{ (alternate angles)}$$

$$\because m(\angle AED) = m(\angle CEB) \quad (\text{V.O.A.})$$

$$\therefore m(\angle D) = m(\angle B)$$

$$\therefore \triangle AED \sim \triangle CEB \quad (\text{First req.})$$

$$\therefore \frac{AE}{CE} = \frac{ED}{EB} = \frac{AD}{CB} = \frac{\text{the perimeter of } \triangle AED}{\text{the perimeter of } \triangle CEB}$$

$$\therefore \frac{4}{8} = \frac{4 + 2 + 3}{\text{the perimeter of } \triangle CEB}$$

$$\therefore \text{The perimeter of } \triangle CEB = \frac{9 \times 8}{4} = 18 \text{ cm.} \quad (\text{Second req.})$$

[b] The area = $\frac{1}{2} (5 + 9) \times 4 = 28 \text{ cm}^2 \quad (\text{The req.})$

4

[a] $\because \triangle FBC$, $\triangle ABCD$ have a common base \overline{BC}
 $\therefore \overline{AD} \parallel \overline{BC}$

\therefore The area of $\triangle FBC = \frac{1}{2}$ the area of $\square ABCD$ (1)

$\therefore \overline{FB}$ is a median in $\triangle FCE$

\therefore The area of $\triangle FCB = \frac{1}{2}$ the area of $\triangle FCE$ (2)

From (1), (2):

\therefore The area of $\triangle FCE =$ the area of $\square ABCD$ (Q.E.D.)

[b] $\therefore (AC)^2 = (9)^2 = 81$

$\therefore (AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore \triangle ABC$ is an acute-angled triangle. (The req.)

5

[a] $\therefore m(\angle BAC) = 90^\circ, \overline{AE} \perp \overline{BC}$

$\therefore (BC)^2 = (AC)^2 + (AB)^2 = (15)^2 + (20)^2 = 625$

$\therefore BC = 25$ cm.

$\therefore \overline{BE}$ is the projection of \overline{AB} on \overline{BC}

$\therefore (AB)^2 = BE \times BC$

$\therefore (20)^2 = BE \times 25$

$\therefore BE = \frac{400}{25} = 16$ cm. (First req.)

$\therefore EC = 25 - 16 = 9$ cm. (Second req.)

[b] \therefore The area of $\triangle ADC =$ the area of $\triangle AEB$

Subtracting the area of $\triangle ADE$ from both sides

\therefore The area of $\triangle EDC =$ the area of $\triangle EDB$

\therefore they have a common base \overline{DE} and on one side of it

$\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)

12 South Sinai

1

[1] (a) [2] (b) [3] (d) [4] (b) [5] (b) [6] (c)

2

[1] $\frac{1}{2} \times \text{base length} \times \text{height}$ [2] 24 [3] equal

[4] proportional, equal in measure

[5] C

[6] 45

3

[a] $\therefore \triangle ADB, \triangle ADC$ have a common base \overline{AD}

$\therefore \overline{AD} \parallel \overline{BC}$

\therefore The area of $\triangle ADB =$ the area of $\triangle ADC$

Subtracting the area of $\triangle ADE$ from both sides

\therefore The area of $\triangle ABE =$ the area of $\triangle DCE$ (Q.E.D.)

[b] $\therefore (AC)^2 = (11)^2 = 121$

$\therefore (AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$

$\therefore (AC)^2 > (AB)^2 + (BC)^2$

$\therefore \triangle ABC$ is an obtuse-angled triangle (The req.)

4

[a] $\therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$

$\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$

$\therefore AC = 20$ cm.

$\therefore (AD)^2 = CD \times BD = 16 \times 9 = 144$

$\therefore AD = 12$ cm. (The req.)

[b] $\therefore m(\angle AED) = m(\angle B)$

$\therefore \angle A$ is a common angle

$\therefore m(\angle ADE) = m(\angle C)$

$\therefore \triangle ADE \sim \triangle ACB$ (First req.)

$\therefore \frac{AD}{AC} = \frac{AE}{AB} \therefore \frac{3}{AC} = \frac{4.5}{9}$

$\therefore AC = \frac{3 \times 9}{4.5} = 6$ cm.

$\therefore EC = 6 - 4.5 = 1.5$ cm. (Second req.)

5

[a] $\therefore \square ABCD, \square ABMN$ have a common base \overline{AB}
 $\therefore \overline{AB} \parallel \overline{CN}$

\therefore The area of $\square ABCD =$ the area of $\square ABMN$ (1)

$\therefore \triangle EBC, \square ABCD$ have a common base \overline{BC}
 $\therefore \overline{AD} \parallel \overline{BC}$

\therefore The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABCD$ (2)

From (1), (2):

\therefore The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABMN$ (Q.E.D.)

[b] \therefore The side length of the square $= 24 \div 4 = 6$ cm.

\therefore The area of $\triangle AEC = \frac{1}{2} \times CE \times AB$

$= \frac{1}{2} \times 3 \times 6 = 9$ cm².

(The req.)



Model Examinations of the School Book on



Geometry

Model 1

Answer the following questions :

1 Complete the following :

1 In the opposite figure :

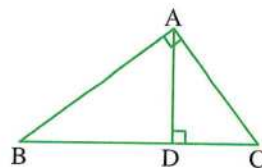
$$AB \times \dots = BC \times AD$$

2 In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots) = 90^\circ$

3 If the point $A \in$ the line L , then the projection of the point A on the line L is

4 The area of the circle of diameter length 14 cm. is cm^2 ($\pi = \frac{22}{7}$)

5 A trapezium whose bases lengths are 8 cm. , 10 cm. and its height is 5 cm. , then its area equals cm^2 .



2 Choose the correct answer :

1 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

2 A rhombus whose diagonals lengths are 6 cm. , 10 cm. has area cm^2 .

- (a) 60 (b) 30 (c) 15 (d) 10

3 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5, then the ratio between their perimeters is

- (a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2

4 If the area of a trapezium is 100 cm^2 and its height is 5 cm. , then the length of its middle base equals cm.

- (a) 20 (b) 30 (c) 40 (d) 50

5 ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots^\circ$

- (a) 70 (b) 110 (c) 180 (d) 360

6 The measure of each angle of the regular pentagon is $^\circ$

- (a) 90 (b) 108 (c) 120 (d) 540

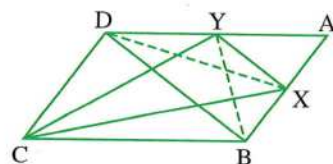
3 [a] The side lengths of one of two similar triangles are 3 cm. , 4 cm. , 5 cm. and the perimeter of the other triangle is 36 cm. Find the side lengths of the other triangle.

[b] In the opposite figure :

ABCD is a parallelogram , $X \in \overline{AB}$

, $Y \in \overline{AD}$ such that : The area of $\triangle CBX =$ the area of $\triangle CYD$

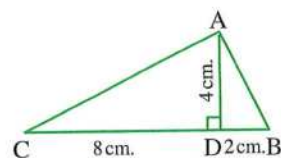
Prove that : $\overline{XY} \parallel \overline{BD}$



4 [a] In the opposite figure :

ABC is a triangle in which : $BD = 2$ cm.
 $CD = 8$ cm. , $AD = 4$ cm. , $\overline{AD} \perp \overline{BC}$

Prove that : $m(\angle BAC) = 90^\circ$



[b] ABCD is a parallelogram in which : $AB = 18$ cm. and $BC = 12$ cm.

We draw $\overline{DE} \perp \overline{BC}$, $\overline{DO} \perp \overline{AB}$, $DE = 15$ cm.

Calculate the area of the parallelogram ABCD and find the length of \overline{DO}

5 [a] ABC is a triangle in which $m(\angle A) = 50^\circ$, $m(\angle B) = 60^\circ$,

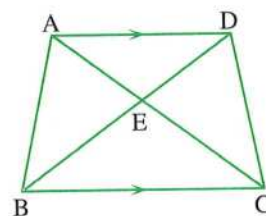
Arrange the lengths of the sides of the triangle in a descending order.

[b] In the opposite figure :

ABCD is a quadrilateral in which

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

Prove that : The area of $\triangle ABE =$ the area of $\triangle DCE$



Model 2

Answer the following questions :

1 Complete the following :

- [1]** The two polygons are similar if their corresponding sides are and their corresponding angles are
- [2]** The area of a rhombus is 24 cm^2 , the length of one of its diagonals is 8 cm. , then the length of the other diagonal is
- [3]** In $\triangle ABC$, if $(AB)^2 = (AC)^2 - (BC)^2$, then $\triangle ABC$ is right-angled at
- [4]** A triangle whose side lengths are 6 cm. , 8 cm. and 11 cm. , then its type according to its angles is
- [5]** The area of a triangle is equal to half of the area of a parallelogram if they have a common

2 Choose the correct answer :

- [1]** A trapezium whose bases lengths are 6 cm. , 8 cm. , then the length of its middle base equals cm.
 (a) 48 (b) 24 (c) 14 (d) 7
- [2]** If two polygons are similar and the ratio between the lengths of two corresponding sides is 1 : 3 and the perimeter of the smaller polygon is 15 cm. , then the perimeter of the greater polygon is cm.
 (a) 30 (b) 45 (c) 60 (d) 75

3 If the area of the triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base is cm.

- (a) 16 (b) 6 (c) 3 (d) 12

4 ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, then the projection of \overline{BD} on \overline{AC} is the point

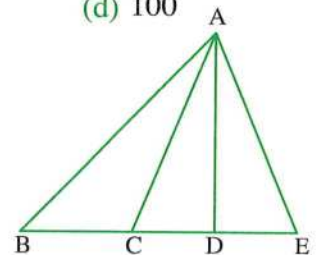
- (a) A (b) B (c) C (d) D

5 A square of perimeter 20 cm. , then its area equals cm^2

- (a) 20 (b) 25 (c) 50 (d) 100

6 The number of the triangles in the opposite figure equals

- (a) 3 (b) 4
(c) 5 (d) 6



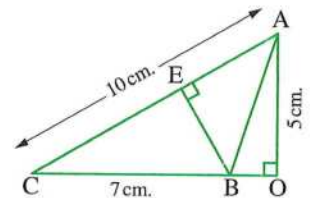
3 In the opposite figure :

$$\overline{AO} \perp \overline{CB}, \overline{BE} \perp \overline{AC}$$

, AC = 10 cm. , BC = 7 cm. and AO = 5 cm.

Find : 1 The length of \overline{BE}

2 The area of $\triangle ABC$



4 [a] ABCD is a parallelogram in which : AB = 8 cm. , AC = 20 cm. and BD = 12 cm.

Prove that : $m(\angle ABD) = 90^\circ$, then find the area of this parallelogram.

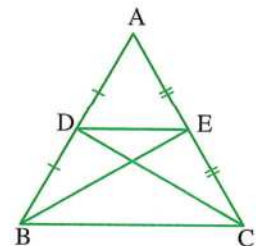
[b] In the opposite figure :

ABC is a triangle in which D is the midpoint of \overline{AB} , E is the midpoint of \overline{AC}

Prove that :

1 The area of the triangle DBC = the area of the triangle EBC

2 $\overline{DE} \parallel \overline{BC}$

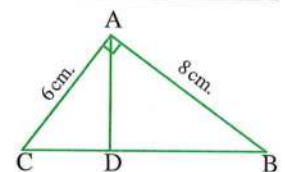


5 [a] In the opposite figure :

$\triangle DBA$ is similar to $\triangle ABC$, $m(\angle BAC) = 90^\circ$

Prove that : $\overline{AD} \perp \overline{BC}$ and if AB = 8 cm. , AC = 6 cm.

, find : the length of \overline{BD}



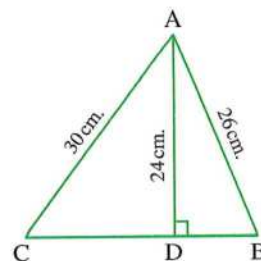
[b] In the opposite figure :

ABC is a triangle , $\overline{AD} \perp \overline{BC}$

If $AD = 24$ cm. , $AB = 26$ cm.

and $AC = 30$ cm.

, **find** : BC , then calculate the area of $\triangle ABC$



Model for the merge students

Answer the following questions :

1 Choose the correct answer from those given :

- [1]** The area of the parallelogram whose length of its base is 6 cm. and its corresponding height of this base is 4 cm. equals cm^2

(a) 12 (b) 20 (c) 24 (d) 48

- [2]** The triangle whose lengths of its sides are 6 cm. , 8 cm. , 10 cm. is

(a) an acute-angled triangle. (b) a right-angled triangle.
(c) an obtuse-angled triangle. (d) otherwise.

- [3]** The rhombus whose lengths of its diagonals are 6 cm. and 10 cm. , then its area = cm^2

(a) 60 (b) 30 (c) 15 (d) 10

- [4]** The trapezium of length of its middle base 8 cm. and surface area 56 cm^2 , then its height = cm.

(a) 32 (b) 24 (c) 448 (d) 7

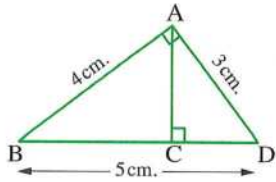
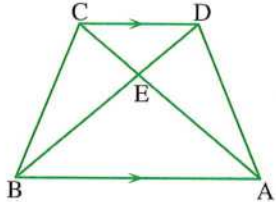
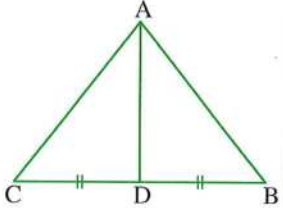
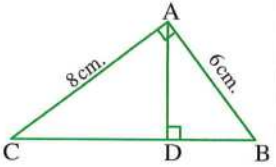
- [5]** All are similar.

(a) squares (b) triangles (c) rectangles (d) parallelograms

2 Complete each of the following :

- [1]** The projection of a point on a straight line is
[2] If the triangle ABC is obtuse-angled at B , then $(AC)^2$ $(AB)^2 + (BC)^2$
[3] The square whose length of its diagonal is 8 cm. , then its area = cm^2
[4] The two triangles have same base and the vertices opposite to this base are on a straight line parallel to the base
[5] The area of triangle = $\frac{1}{2} \times$ \times corresponding height.

3 Join from the column (A) to the suitable one from the column (B) :

Column (A)	Column (B)
<p>1 In the opposite figure :</p> <p>AC = cm.</p> 	<p>• BEC</p>
<p>2 In the opposite figure :</p> <p>Area of $\triangle AED$ = area of \triangle</p> 	<p>• 2.4</p>
<p>3 In the opposite figure :</p> <p>Area of $\triangle ABD$ = area of \triangle</p> 	<p>• Congruent</p>
<p>4 If the ratio of enlargement between two similar triangles = 1, then the two triangles are</p>	<p>• 3.6</p>
<p>5 In the opposite figure :</p> <p>The length of the projection of \overline{AB} on \overrightarrow{BC} = cm.</p> 	<p>• ACD</p>

4 In the opposite figure :

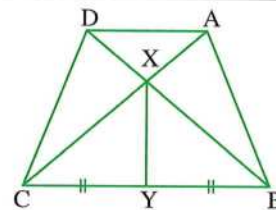
Area of the figure ABYX = Area of the figure DCYX

Complete the proof to prove that : $\overline{AD} \parallel \overline{BC}$

Given :

R.T.P. :

Proof : $\because \overline{XY}$ is a median in $\triangle XBC$



$$\therefore \text{Area of } \Delta \dots\dots\dots = \text{area } \Delta \dots\dots\dots \quad (1)$$

$$\therefore \text{area of the figure ABYX} = \text{area of the figure DCYX} \quad (2)$$

By subtracting (1) from (2) :

$$\therefore \text{Area of } \Delta \dots\dots\dots = \text{area of } \Delta \dots\dots\dots$$

By adding area of ΔADX to both sides

$$\therefore \text{Area of } \Delta \dots\dots\dots = \text{area of } \Delta \dots\dots\dots$$

$$\therefore \overline{AD} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

5 In the opposite figure :

$$\Delta ABC \sim \Delta AED$$

$$, m(\angle AED) = 44^\circ , AD = 3 \text{ cm.} , EA = 4 \text{ cm.}$$

$$, DB = 5 \text{ cm.} , BC = 8 \text{ cm.}$$

Complete to find the length of each of : \overline{ED} and \overline{EC}

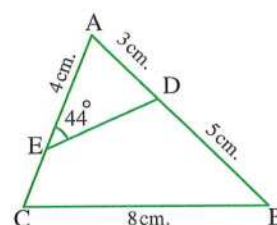
Solution :

$$\therefore \Delta ABC \sim \Delta AED$$

$$\therefore \frac{AB}{\dots\dots\dots} = \frac{\dots\dots\dots}{ED} = \frac{CA}{DA}$$

$$\therefore \frac{8}{\dots\dots\dots} = \frac{\dots\dots\dots}{ED} = \frac{CA}{3}$$

$$\therefore ED = \dots\dots\dots \text{ cm.} , AC = \dots\dots\dots \text{ cm.} , EC = \dots\dots\dots \text{ cm.} \quad (\text{The req.})$$





1

Cairo Governorate

East Nasr City Educational Administration
Manarat Al Salem Language School

Answer the following questions :

1 Choose the correct answer :

- 1 The trapezium whose area is 30 cm^2 and its height is 5 cm, then its middle base length is cm.
 (a) 6 (b) 30 (c) 150 (d) 3
- 2 If two polygons are similar and the ratio between the lengths of two corresponding sides is 3 : 5, then the ratio between their perimeters is
 (a) 5 : 3 (b) 3 : 5 (c) 1 : 2 (d) 1 : 3
- 3 The diagonals of an isosceles trapezium are
 (a) congruent. (b) perpendicular.
 (c) bisecting each other. (d) parallel.
- 4 ABC is a triangle, if $(AC)^2 > (AB)^2 + (BC)^2$, then $\angle B$ is
 (a) obtuse. (b) acute. (c) right. (d) straight.
- 5 The length of the projection of a given line segment the length of the original line segment.
 (a) \geq (b) $>$ (c) \leq (d) $=$

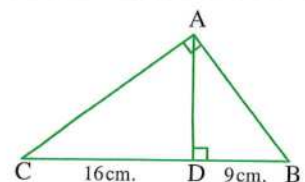
2 Complete the following :

- 1 The median of a triangle divides it into two triangles in area.
- 2 The measure of the exterior angle of an equilateral triangle is°
- 3 The base length of a parallelogram is 7 cm. and the corresponding height is 4 cm, then its area equals cm^2 .
- 4 If the area of a square is 18 cm^2 , then the length of its diagonal is cm.
- 5 In a triangle, if the sum of the areas of two squares on two sides is equal to the area of the square on the third side, then the angle opposite to this side is

3 [a] In the opposite figure :

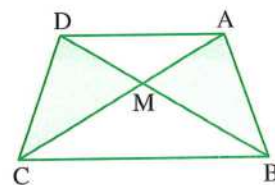
$$m(\angle BAC) = 90^\circ$$

$$\overline{AD} \perp \overline{BC}, BD = 9 \text{ cm.}, DC = 16 \text{ cm.}$$

Find : The length of each of \overline{AB} , \overline{AC} , \overline{AD} 

[b] In the opposite figure :

If the area of $\triangle AMB$ = the area of $\triangle CMD$
 , prove that : $\overline{AD} \parallel \overline{BC}$



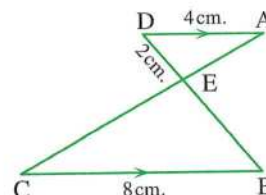
4 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AD = 4$ cm.

, $BC = 8$ cm. , $DE = 2$ cm.

1 Prove that : $\triangle ADE \sim \triangle CBE$

2 Find : the length of \overline{BE}



[b] Identify the type of $\triangle BAC$ according to the measures of its angles where
 $AB = 7$ cm. , $BC = 9$ cm. , $AC = 12$ cm.

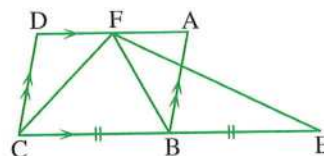
5 [a] In the opposite figure :

ABCD is a parallelogram

, $E \in \overrightarrow{CB}$, $F \in \overline{AD}$, $CB = BE$

Prove that :

The area of $\triangle FEC$ = The area of the parallelogram ABCD



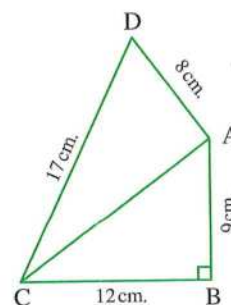
[b] In the opposite figure :

$AB = 9$ cm. , $BC = 12$ cm.

, $AD = 8$ cm. , $DC = 17$ cm.

, $m(\angle B) = 90^\circ$

Prove that : $m(\angle DAC) = 90^\circ$



2

Cairo Governorate



Cairo Education zone
 Hadyek El-Maady O.L.S.

Answer the following questions :

1 Choose the correct answer :

1 A rhombus has diagonal lengths 6 cm. and 8 cm. , its area = cm^2

(a) 12

(b) 24

(c) 48

(d) 8

2 The triangle whose side lengths are 6 cm. , 8 cm. and 10 cm. is

(a) acute-angled.

(b) right-angled.

(c) obtuse-angled.

(d) isosceles.

- 3 If two triangles are similar, then the corresponding sides are
 (a) proportional. (b) equal. (c) congruent. (d) parallel.
- 4 The number of axes of symmetry of the equilateral triangle is
 (a) 1 (b) 2 (c) 3 (d) 4
- 5 The triangle whose base length is 6 cm. and its corresponding height is 5 cm., its area is cm^2 .
 (a) 30 (b) 12 (c) 15 (d) 6

2 Complete the following by the correct answers :

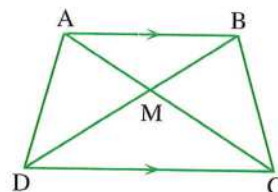
- 1 The median of the triangle divides it into two triangles in area.
- 2 The area of the parallelogram = length of base \times corresponding
- 3 A square is of side length 5 cm. , its area is cm^2 .
- 4 The polygon ABCD is similar to the polygon XYZL , then $m(\angle BCD) = m(\angle \dots\dots\dots)$
- 5 The sum of measures of the interior angles of a triangle equals $^\circ$

3 [a] In the opposite figure :

$$\overline{AB} \parallel \overline{DC}$$

Prove that :

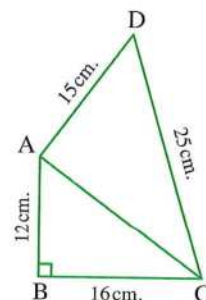
The area of $\triangle BMC =$ the area of $\triangle AMD$



[b] In the opposite figure :

ABCD is a quadrilateral where $m(\angle ABC) = 90^\circ$
 , $AB = 12 \text{ cm.}$, $BC = 16 \text{ cm.}$, $CD = 25 \text{ cm.}$
 and $AD = 15 \text{ cm.}$

- 1 Find : The length of \overline{AC}
- 2 Prove that : The triangle ADC is a right-angled triangle.

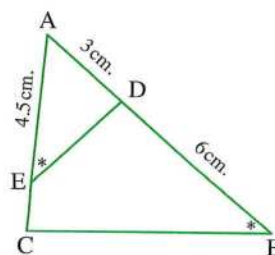


- 4 [a] Determine the type of the triangle ABC according to its angles where
 $AB = 7 \text{ cm.}$, $BC = 3 \text{ cm.}$ and $AC = 6 \text{ cm.}$

[b] In the opposite figure :

$m(\angle AED) = m(\angle ABC)$
 , $AD = 3 \text{ cm.}$, $AE = 4.5 \text{ cm.}$, $DB = 6 \text{ cm.}$

- 1 Prove that : $\triangle AED \sim \triangle ABC$
- 2 Find : The length of \overline{EC}

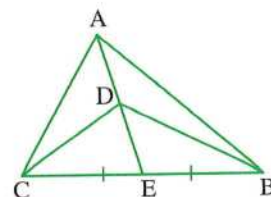


- 5 [a]** A trapezium of lengths of two parallel bases 6 cm. and 4 cm.
Find its area if its height is 5 cm.

[b] In the opposite figure :

\overline{AE} is a median in the triangle ABC

Prove that : The area of $\triangle ABD$ = the area of $\triangle ACD$



3

Giza Governorate



Mathematics Inspection

Answer the following questions :

1 Choose the correct answer :

- 1** If $\triangle ABC \sim \triangle DEF$, $m(\angle B) = 50^\circ$, $m(\angle C) = 60^\circ$, then $m(\angle D) = \dots\dots\dots$
(a) 70° (b) 90° (c) 110° (d) 180°
- 2** In $\triangle ABC$, if $(AC)^2 = (AB)^2 + (BC)^2$, then $\angle B$ is $\dots\dots\dots$ angle.
(a) a right (b) an acute (c) an obtuse (d) a reflex
- 3** The ratio between the area of a triangle and the area of a parallelogram if they have a common base and included between two parallel straight lines equals $\dots\dots\dots$
(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3
- 4** If the projection of a line segment on a straight line is a point , then the line segment is $\dots\dots\dots$ to the straight line.
(a) \in (b) \equiv (c) \perp (d) $//$
- 5** If two polygons are similar , then their corresponding angles are $\dots\dots\dots$ in measure.
(a) equal (b) different (c) proportional (d) supplementary

2 Complete :

- 1** If $\triangle ABC$ is right-angled at B , $AB = 3$ cm. , $BC = 4$ cm. , then $AC = \dots\dots\dots$ cm.
- 2** The base length in a parallelogram is 8 cm. and its corresponding height is 6 cm. , then its area equals $\dots\dots\dots$ cm^2
- 3** Two triangles which have the same base and their vertices opposite to this base lie on a straight line parallel to the base are $\dots\dots\dots$
- 4** A square of diagonal length 10 cm. , then its area equals $\dots\dots\dots$ cm^2
- 5** A rhombus of diagonal lengths are 4 cm. and 6 cm. , then its area equals $\dots\dots\dots$ cm^2

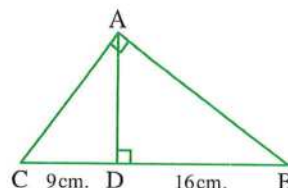
- 3 [a]** Determine the type of the angle B in $\triangle ABC$ in which $AB = 6$ cm. , $BC = 8$ cm. and $AC = 10$ cm.

[b] In the opposite figure :

$$m(\angle BAC) = m(\angle BDA) = 90^\circ$$

$$DB = 16 \text{ cm.}, DC = 9 \text{ cm.}$$

Find : the length of each of \overline{AB} and \overline{AD}



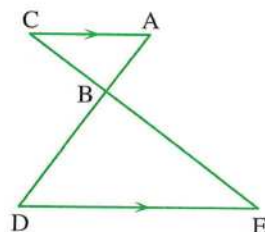
- 4 [a]** Find the area of the trapezium whose lengths of its two parallel bases are 4 cm. and 6 cm. and its height is 3 cm.

[b] In the opposite figure :

$$\overline{AC} \parallel \overline{ED}$$

Prove that :

$$\triangle ABC \sim \triangle DBE$$



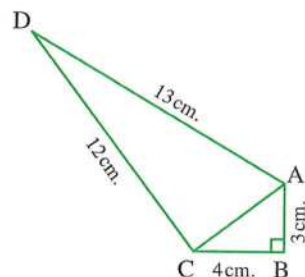
- 5 [a] In the opposite figure :**

$$AB = 3 \text{ cm.}, BC = 4 \text{ cm.}, AD = 13 \text{ cm.}$$

$$CD = 12 \text{ cm.}, m(\angle B) = 90^\circ$$

[1] Find : the length of \overline{AC}

[2] Prove that : $m(\angle ACD) = 90^\circ$



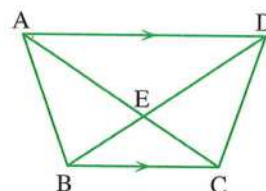
[b] In the opposite figure :

ABCD is a quadrilateral

in which $\overline{AD} \parallel \overline{BC}$

Prove that :

The area of $\triangle AEB$ = the area of $\triangle DEC$



4

Giza Governorate



North Giza Educational Administration
El-Orman Language School

Answer the following questions :

- 1** Choose the correct answer from those given :

- [1]** The area of the rhombus whose diagonal lengths are 6 cm. and 8 cm. equals cm^2
 (a) 7 (b) 24 (c) 48 (d) 14
- [2]** ABCD is a parallelogram in which $m(\angle A) = 120^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 120 (b) 60 (c) 90 (d) 180
- [3]** If $\triangle ABC \cong \triangle XYZ$ and $m(\angle X) = 70^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$
 (a) 70 (b) 55 (c) 50 (d) 80

- 4 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle B) = m(\angle \dots)$
 (a) C (b) Z (c) X (d) Y
- 5 ABC is a triangle in which $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.

2 Complete :

- 1 The two polygons are similar if their corresponding side lengths are and their corresponding angles are
- 2 If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) + m(\angle B) = 60^\circ$, then $m(\angle Z) = \dots^\circ$
- 3 If $\triangle ABC$ is an obtuse-angled triangle at B, then $(AC)^2 \dots (AB)^2 + (BC)^2$
- 4 If the length of the diagonal of a square is 10 cm., then its area is cm^2
- 5 If the ratio between the lengths of two corresponding sides of two similar polygons is 2 : 5 and the perimeter of the smaller one is 12 cm., then the perimeter of the other one is

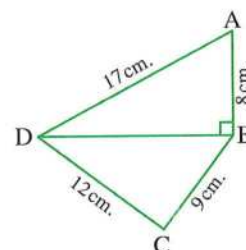
3 [a] In the opposite figure :

ABCD is a quadrilateral in which :

AB = 8 cm., BC = 9 cm.

, CD = 12 cm., AD = 17 cm. and $\overline{DB} \perp \overline{AB}$

- 1 Find : the length of \overline{BD}
- 2 Prove that : $m(\angle C) = 90^\circ$



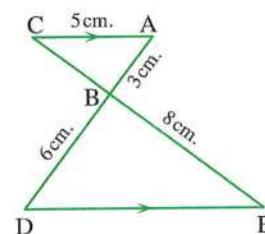
- [b] Identify the type of $\triangle ABC$ according to the measures of its angles where
 AB = 5 cm., BC = 6 cm., AC = 7 cm.

4 [a] In the opposite figure :

$\overline{AC} \parallel \overline{ED}$, $\overline{AD} \cap \overline{CE} = \{B\}$, AC = 5 cm.

, AB = 3 cm., BD = 6 cm., BE = 8 cm.

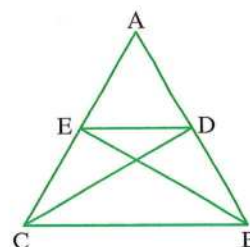
- 1 Prove that : $\triangle ABC \sim \triangle DBE$
- 2 Find : the perimeter of the triangle BED



[b] In the opposite figure :

If the area of $\triangle ADC$ = the area of $\triangle AEB$

, prove that : $\overline{DE} \parallel \overline{BC}$



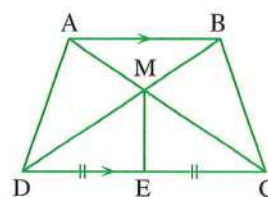
5 [a] In the opposite figure :

$$\overline{AB} \parallel \overline{DC}, \overline{AC} \cap \overline{BD} = \{M\}$$

, E is the midpoint of \overline{CD}

Prove that :

the area of the figure ADEM = the area of the figure BCEM

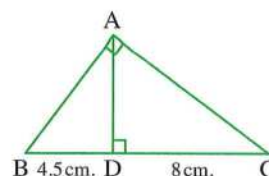
**[b] In the opposite figure :**

ABC is a triangle , $m(\angle BAC) = 90^\circ$

, $\overline{AD} \perp \overline{BC}$, $BD = 4.5$ cm.

, $DC = 8$ cm.

Find : AD , AB , AC



5 Alexandria Governorate



Middle Educational Zone
Math Supervision

Answer the following questions :

1 Choose the correct answer :

- 1 If \overline{AB} is perpendicular to \overleftrightarrow{XY} , then the length of the projection of \overline{AB} on \overleftrightarrow{XY}
 (a) = 0 (b) < AB (c) > AB (d) = AB
- 2 In $\triangle ABC$, if $(AB)^2 < (BC)^2 + (AC)^2$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 3 If $\triangle ABC \sim \triangle DEO$, $3 AB = DE$, then $BC = \dots\dots\dots EO$
 (a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) 3
- 4 In $\triangle XYZ$, if $m(\angle Y) = 90^\circ$, $XY = 6$ cm. , $XZ = 10$ cm. , then $YZ = \dots\dots\dots$ cm.
 (a) 16 (b) 4 (c) 40 (d) 8
- 5 All are similar.
 (a) squares (b) triangles (c) rectangles (d) parallelograms

2 Complete each of the following :

- 1 The area of the triangle whose base length is 6 cm. and its corresponding height is 8 cm. equals cm^2
- 2 Two triangles are similar if the corresponding angles are
- 3 The area of the square whose side length is 4 cm. equals cm^2
- 4 A rectangle is a with equal angles.
- 5 The area of the trapezium whose middle base is of length 7 cm. and its height is 6 cm. equals cm^2

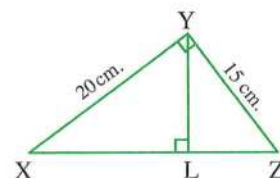
- 3 [a] Determine the type of the angle X in the $\triangle XYZ$ in which
 $XY = 4$ cm. , $YZ = 7$ cm. , $XZ = 5$ cm.

- [b] Find the area of the parallelogram ABCD in which $\overline{AE} \perp \overline{BC}$ intersecting it at E
 , $AE = 24$ cm. , $BC = 50$ cm.

- 4 [a] In the opposite figure :

XYZ is a triangle in which $\overline{YL} \perp \overline{XZ}$
 , $m(\angle XYZ) = 90^\circ$, $YZ = 15$ cm.
 , $XY = 20$ cm.

Find : The lengths of \overline{XZ} , \overline{YL}

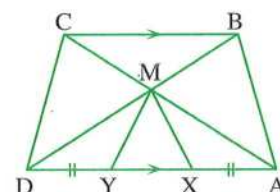


- [b] In the opposite figure :

If $\overline{AD} \parallel \overline{BC}$, $AX = DY$

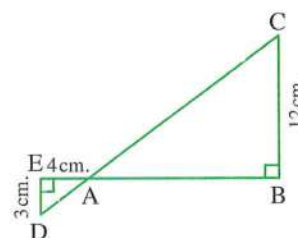
, prove that :

the area of the figure ABMX = the area of the figure DCMY



- 5 [a] In the opposite figure :

If $\overline{BE} \cap \overline{DC} = \{A\}$, $m(\angle E) = m(\angle B) = 90^\circ$
 , $AE = 4$ cm. , $ED = 3$ cm. , $BC = 12$ cm.
 , prove that : $\triangle ABC \sim \triangle AED$
 , then find : the length of \overline{BE}



- [b] Find the area of the rhombus whose diagonal lengths are 10 cm. , 8 cm.

6

El-Kalyoubia Governorate



Math Supervision

Answer the following questions :

- 1 Choose the correct answer :

- 1 The lengths of two adjacent sides of a parallelogram are 8 cm. and 5 cm. and the smaller height is 4 cm. , then its area equals cm^2
 (a) 17 (b) 32 (c) 20 (d) 52
- 2 The median of the triangle divides its surface into two triangles
 (a) congruent. (b) equal in area.
 (c) equal in perimeter. (d) similar.
- 3 The ratio between the lengths of two corresponding sides in two similar triangles is 3 : 5 , then the ratio between their perimeters equals
 (a) 5 : 2 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2

- 4 $\triangle ABC$ is a right-angled triangle at B , then the projection of \overline{AB} on \overleftrightarrow{BC} is
 (a) \overline{AB} (b) \overline{BC} (c) $\{B\}$ (d) 0
- 5 In $\triangle ABC$ if $(AC)^2 > (AB)^2 + (BC)^2$, then the type of $\angle A$ is
 (a) right. (b) acute. (c) straight. (d) obtuse.

2 Complete each of the following :

- 1 The measure of the exterior angle of an equilateral triangle equals °
- 2 The two triangles are similar if their side lengths are
- 3 A rhombus its diagonal lengths are 8 cm. , 6 cm. , then its area equals cm^2
- 4 The two triangles drawn on a common base and their vertices are on a straight line parallel to the base are
- 5 If the ratio of enlargement between two similar polygons is 1 , then the two polygons are

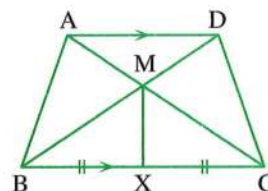
- 3 [a] The lengths of two parallel bases in a trapezium are 10 cm. and 8 cm. , and its height is 5 cm. Find the length of its middle base and its area.

[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$ and X is the midpoint of \overline{BC}

Prove that :

The area of the figure ABXM = the area of the figure DCXM

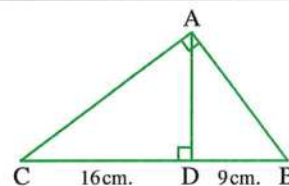


- 4 [a] In the opposite figure :

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, DB = 9 cm. , CD = 16 cm.

Find : The length of each of \overline{AD} , \overline{AB} , \overline{AC}



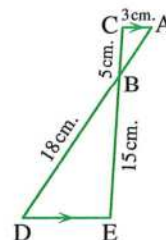
[b] In the opposite figure :

$\overline{AC} \parallel \overline{ED}$, AC = 3 cm. , BC = 5 cm.

, BD = 18 cm. , BE = 15 cm.

1 Prove that : $\triangle ABC \sim \triangle DBE$

2 Find : The length of each of \overline{AB} , \overline{ED}



- 5 [a] In the opposite figure :

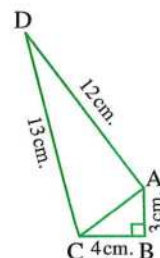
ABCD is a quadrilateral where $m(\angle ABC) = 90^\circ$

, AB = 3 cm. , BC = 4 cm.

, AD = 12 cm. , DC = 13 cm.

1 Find : The length of \overline{AC}

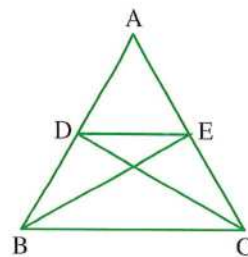
2 Prove that : $m(\angle DAC) = 90^\circ$



[b] In the opposite figure :

The area of $\triangle ABE$ = the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$



7

El-Sharkia Governorate



Directorate of Education
Omar Al-Farouk Governmental Language School

Answer the following questions :

1 Complete the following :

- 1 The area of a trapezium is 50 cm^2 and its middle base is of length 10 cm. , then its height equals cm.
- 2 In $\triangle ABC$, if $(AB)^2 = (AC)^2 + (BC)^2$, then \angle is right.
- 3 The area of a triangle = half \times \times corresponding height.
- 4 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle A) = m(\angle \text{.....})$
- 5 The median of a triangle divides its surface into two triangles in area.

2 Choose the correct answer :

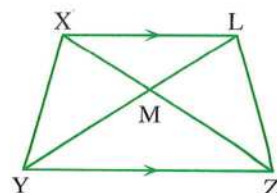
- 1 All are similar.
(a) triangles (b) pentagons (c) squares (d) rectangles
- 2 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}
(a) $>$ (b) $<$ (c) \neq (d) $=$
- 3 The area of a parallelogram is 50 cm^2 and the length of its base is 10 cm. , then the corresponding height is cm.
(a) 12 (b) 25 (c) 5 (d) 10
- 4 A square is of perimeter 4 cm. , then its area equals cm^2
(a) 4 (b) 1 (c) 16 (d) 8
- 5 If the ratio between the perimeters of two similar polygons is 4 : 7 , then the ratio between the lengths of two corresponding sides of the two polygons is
(a) 2 : 7 (b) 4 : 7 (c) 7 : 4 (d) 2 : 1

3 [a] In the opposite figure :

$\overline{XL} \parallel \overline{YZ}$

, M is the point of intersection of the diagonals.

Prove that : The area of $\triangle ZML$ = the area of $\triangle YMX$



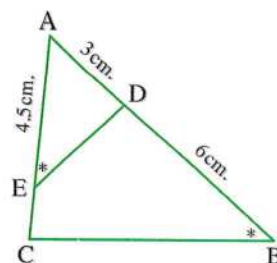
[b] In the opposite figure :

$m(\angle AED) = m(\angle B)$, $AD = 3$ cm.

, $AE = 4.5$ cm. , $DB = 6$ cm.

1 Prove that : $\triangle ADE \sim \triangle ACB$

2 Find : The length of \overline{EC}



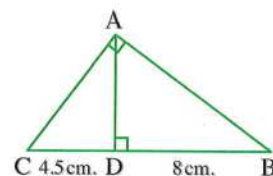
4 [a] In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

, $CD = 4.5$ cm. and $DB = 8$ cm.

Find : **1** The length of \overline{AC}

2 The area of $\triangle ABC$



[b] In the opposite figure :

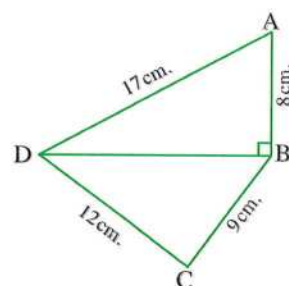
$m(\angle ABD) = 90^\circ$, $AB = 8$ cm.

, $AD = 17$ cm. , $BC = 9$ cm.

, $DC = 12$ cm.

1 Find : The length of \overline{BD}

2 Prove that : $m(\angle C) = 90^\circ$



5 [a] A parallelogram , whose side lengths are 5 cm. and 7 cm. and its smaller height is 4 cm. Find the area of the parallelogram and the greater height.

[b] XYZ is a triangle where $XY = 12$ cm. , $YZ = 13$ cm. , $XZ = 4$ cm. Determine the type of the triangle according to the measures of its angles.

8

El-Monofia Governorate



**Quesna Educational Directorate
Math Supervision**

Answer the following questions :

1 Complete :

- 1** The area of a square is 50 cm^2 , then the length of its diagonal is
- 2** The median of a triangle divides its surface into two triangles
- 3** If the point $A \in$ the straight line L , then the projection of A on L is
- 4** The area of a triangle is equal to half of the area of a parallelogram if they have
- 5** The type of the triangle ABC where $AB = 8$ cm. , $AC = 17$ cm. , $BC = 15$ cm. according to its angles is

2 Choose the correct answer :

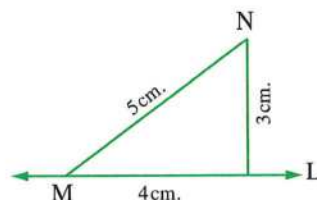
- 1** The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is

(a) 2 : 5 (b) 3 : 5 (c) 5 : 4 (d) 5 : 2

2 In the opposite figure :

The length of the projection of \overline{MN} on the straight line L is

(a) 3 cm. (b) 4 cm.
(c) 5 cm. (d) zero



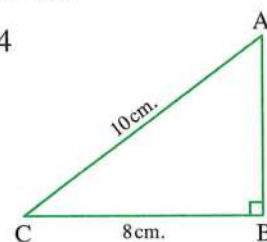
- 3** The number of axes of symmetry of the isosceles trapezium is

(a) 1 (b) 2 (c) 3 (d) 4

4 In the opposite figure :

The area of $\triangle ABC$ is cm^2

(a) 24 (b) 40
(c) 48 (d) 80



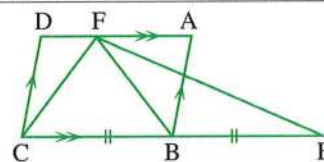
- 5** If $\triangle ABC$ is an obtuse-angled triangle at B , then $(AB)^2 + (BC)^2$ $(AC)^2$

(a) < (b) > (c) \leq (d) \geq

3 [a] In the opposite figure :

ABCD is a parallelogram , CB = BE

Prove that : The area of $\triangle FEC$ = the area of $\square ABCD$

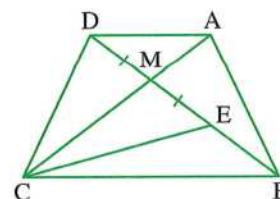


[b] In the opposite figure :

ME = MD

, the area of $\triangle AMB$ = the area of $\triangle CME$

Prove that : $\overline{AD} \parallel \overline{BC}$



- 4 [a]** Two pieces of land have equal area , one of them has the shape of a rhombus whose diagonal lengths are 18 m. , 24 m. and the other has the shape of a trapezium whose height is 12 m. Find the length of its middle base.

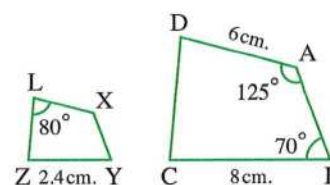
[b] In the opposite figure :

The figure $ABCD \sim$ the figure $XYZL$

Calculate : $m(\angle BCD)$, the length of \overline{XL}

If the perimeter of $ABCD = 26$ cm.

, **find :** the perimeter of $XYZL$



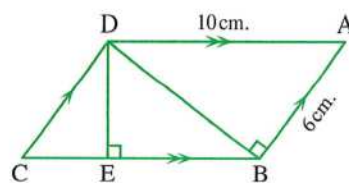
5 [a] In the opposite figure :

ABCD is a parallelogram , $AB = 6$ cm. , $AD = 10$ cm.
 $\overline{DB} \perp \overline{AB}$, $\overline{DE} \perp \overline{BC}$

Find : **1** The area of the parallelogram ABCD

2 The length of the projection of \overline{DB} on \overleftrightarrow{BC}

3 The length of \overline{DE}



[b] In the opposite figure :

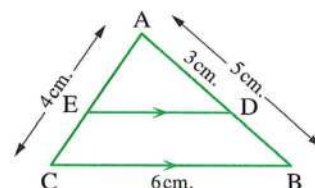
ABC is a triangle , $AB = 5$ cm.

, $BC = 6$ cm. , $AC = 4$ cm.

, $AD = 3$ cm. , $\overline{DE} \parallel \overline{BC}$

1 Prove that : $\triangle ADE \sim \triangle ABC$

2 Find : The length of each of \overline{ED} and \overline{AE}



9 El-Gharbia Governorate



The Central Math Supervision
Governorate Language Schools

Answer the following questions :

1 Complete the following :

- 1** The diagonal length of the square whose area is 50 cm^2 equals
- 2** Each of two polygons is similar to a third are
- 3** ABC is a triangle , $AB = 8$ cm. , $BC = 9$ cm. and $AC = 6$ cm. , then its type according to its angles is
- 4** The projection of a line segment on a straight line perpendicular to it is
- 5** The measure of the angle of the regular octagon equals°

2 Choose the correct answer from those given :

- 1** In $\triangle XYZ$, if $(XZ)^2 = (XY)^2 - (ZY)^2$, then $\angle Y$ is angle.
 (a) a straight (b) an obtuse (c) a right (d) an acute
- 2** ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) =$
 (a) 70° (b) 110° (c) 180° (d) 140°
- 3** If the area of a triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base is cm.
 (a) 16 (b) 6 (c) 3 (d) 12
- 4** A trapezium whose lengths of two parallel bases are 6 cm. and 8 cm. , then the length of its middle base equals cm.
 (a) 48 (b) 24 (c) 14 (d) 7

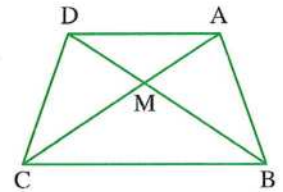
- 5 If the perimeter of a square equals $(3X - 1)$ cm. and the area of this square equals 25 cm^2 , then $X = \dots\dots\dots$

(a) 5 (b) 8 (c) 6 (d) 7

3 [a] In the opposite figure :

ABCD is a quadrilateral
 , the area of $\triangle AMB =$ the area of $\triangle DMC$

Prove that : $\overline{AD} \parallel \overline{BC}$



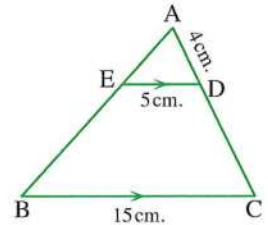
[b] In the opposite figure :

$\overline{ED} \parallel \overline{BC}$, $AD = 4 \text{ cm}$.

, $ED = 5 \text{ cm}$.

, $BC = 15 \text{ cm}$.

Find with proof : the length of \overline{DC}

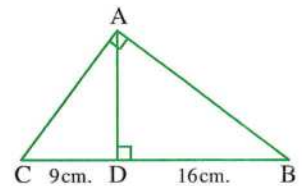


4 [a] In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{CB}$

, $CD = 9 \text{ cm}$, $DB = 16 \text{ cm}$.

Find : The length of each of \overline{AB} , \overline{AC} and \overline{AD}



- [b] ABCD is a trapezium in which $\overline{AD} \parallel \overline{BC}$, if $BC = 2AD = 20 \text{ cm}$.
 and its area = 180 cm^2 , find its height.

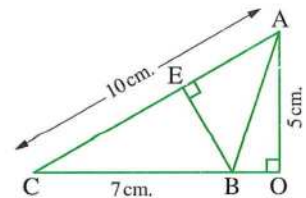
5 [a] In the opposite figure :

$\overline{AO} \perp \overline{CB}$, $\overline{BE} \perp \overline{AC}$

, $AC = 10 \text{ cm}$, $BC = 7 \text{ cm}$. and $AO = 5 \text{ cm}$.

Find : 1 The length of \overline{BE}

2 The area of $\triangle ABC$



- [b] ABCD is a parallelogram in which $AB = 8 \text{ cm}$, $AC = 20 \text{ cm}$. and $BD = 12 \text{ cm}$.

Prove that : $m(\angle ABD) = 90^\circ$, then find : the area of this parallelogram.



Answer the following questions :


1 Choose the correct answer from those given :

- 1 If the height of a triangle is 8 cm , its corresponding base length is 6 cm .
 , then its surface area equals $\dots\dots\dots \text{ cm}^2$

(a) 24 (b) 42 (c) 48 (d) 68

- 2 If the perimeter of a square is 20 cm. , then its area equals
- (a) 20 cm^2 (b) 25 cm^2 (c) 50 cm^2 (d) 100 cm^2
- 3 The rhombus whose lengths of its diagonals are 6 cm. , 10 cm. , then its area equals cm^2
- (a) 10 (b) 15 (c) 30 (d) 60
- 4 The length of the middle base of a trapezium whose parallel base lengths are 6 cm. , 8 cm. is cm.
- (a) 7 (b) 14 (c) 24 (d) 48
- 5 $\triangle ABC$ is right-angled at B , $AB = 6 \text{ cm}$, $BC = 8 \text{ cm}$, $\overline{BD} \perp \overline{AC}$ intersecting it at D , then the length of $\overline{BD} =$ cm.
- (a) 5 (b) 10 (c) 4.8 (d) 2.4

2 Complete each of the following :

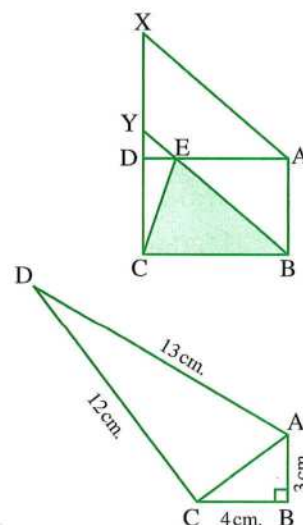
- 1 If the enlargement ratio of two similar polygons = 1 , then the two polygons are
- 2 The number of rectangles in the opposite figure is 
- 3 If $\triangle ABC$ is obtuse-angled at B , then $(AC)^2$ $(AB)^2 + (BC)^2$
- 4 If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) + m(\angle B) = 100^\circ$, then $m(\angle Z) =$ $^\circ$
- 5 The triangle whose side lengths are 6 cm. , 8 cm. , 11 cm. , then its type according to its angles is

3 [a] In the opposite figure :

ABCD is a rectangle , ABYX is a parallelogram

Prove that :

The area of $\triangle EBC = \frac{1}{2}$ the area of the parallelogram ABYX



[b] In the opposite figure :

$m(\angle B) = 90^\circ$

, $AB = 3 \text{ cm}$, $BC = 4 \text{ cm}$.

, $DA = 13 \text{ cm}$, $DC = 12 \text{ cm}$.

Prove that : $m(\angle ACD) = 90^\circ$

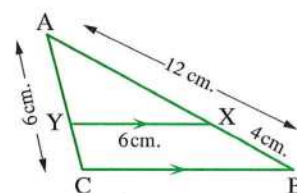
4 [a] In the opposite figure :

$\overline{XY} \parallel \overline{BC}$, $AC = XY = 6 \text{ cm}$.

, $AB = 12 \text{ cm}$, $XB = 4 \text{ cm}$.

1 Prove that : $\triangle AXY \sim \triangle ABC$

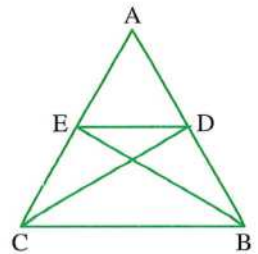
2 Find : The length of \overline{BC}



[b] In the opposite figure :

The area of $\triangle ABE =$ the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$

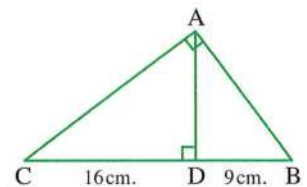


5 [a] In the opposite figure :

$\triangle ABC$ is right-angled at A , $\overline{AD} \perp \overline{BC}$

, BD = 9 cm. , CD = 16 cm.

Find : The length of each of \overline{AB} , \overline{AD}



- [b]** Find the area of the trapezium with two parallel base lengths 8 cm. , 10 cm. and its height is 6 cm.

11

Ismailia Governorate



**Directorate of Education
Directing Mathematics**

Answer the following questions :

1 Choose the correct answer :

- [1]** The rhombus whose diagonal lengths are 6 cm. , 10 cm. has an area cm^2 .
 (a) 60 (b) 30 (c) 15 (d) 10
- [2]** In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- [3]** The rectangle has axes of symmetry.
 (a) 1 (b) 2 (c) 3 (d) 4
- [4]** If the area of a triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base equals cm.
 (a) 16 (b) 6 (c) 3 (d) 2
- [5]** The diagonal length of a square whose area is 18 cm^2 is cm.
 (a) 2 (b) 6 (c) 9 (d) 36

2 Complete the following :

- [1]** The sum of measures of two complementary angles is $^\circ$
- [2]** The area of the parallelogram = the area of the triangle with common base and lies between two parallel lines one of them carrying this base.
- [3]** The projection of the point (7 , 4) on the y-axis is the point
- [4]** The two diagonals of an isosceles trapezium are

- 5 If the lengths of two adjacent sides in a parallelogram are 6 cm. , 7 cm. and its smaller height is 5 cm. , then its area is cm^2

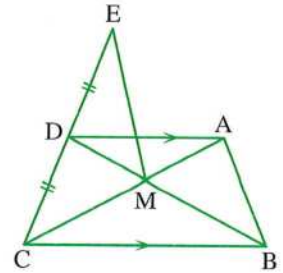
- 3 [a] In the opposite figure :

$$\overline{AD} \parallel \overline{BC}$$

, D is the midpoint of \overline{EC}

Prove that :

The area of $\triangle ABM =$ the area of $\triangle DME$



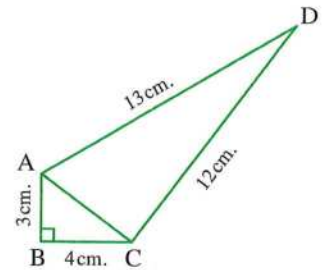
- [b] In the opposite figure :

$$m(\angle B) = 90^\circ$$

, AB = 3 cm. , BC = 4 cm.

, AD = 13 cm. , DC = 12 cm.

Prove that : $m(\angle ACD) = 90^\circ$



- 4 [a] Find the area of the trapezium with two parallel base lengths 8 cm. , 10 cm. and its height is 6 cm.

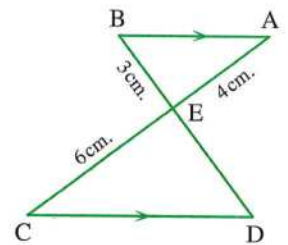
- [b] In the opposite figure :

$$\overline{AB} \parallel \overline{CD}, \overline{AC} \cap \overline{BD} = \{E\}$$

, AE = 4 cm. , BE = 3 cm. , CE = 6 cm.

1 **Prove that :** $\triangle ABE \sim \triangle CDE$

2 **Find :** The length of \overline{ED}



- 5 [a] In the opposite figure :

The area of the figure ABCD = the area of the figure ABCE

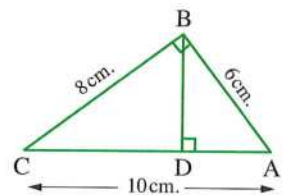
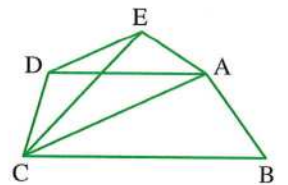
Prove that : $\overline{AC} \parallel \overline{ED}$

- [b] In the opposite figure :

$\triangle ABC$ is right-angled at B , $\overline{BD} \perp \overline{AC}$

, AB = 6 cm. , BC = 8 cm. , AC = 10 cm.

Find : The length of each of \overline{BD} and \overline{CD}





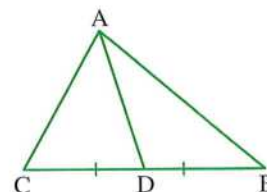
Answer the following questions :

1 Choose the correct answer :

- 1 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 2 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}
 (a) < (b) > (c) = (d) \neq
- 3 In $\triangle ABC$, if $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 50^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$
 (a) 50 (b) 40 (c) 90 (d) 130
- 4 If ABCD is a parallelogram , $m(\angle A) + m(\angle C) = 160^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 80 (b) 100 (c) 160 (d) 360

5 In the opposite figure :

ABC is a triangle , \overline{AD} is a median ,
 then the ratio between
 the area of $\triangle ADB$: the area of $\triangle ABC$ is
 (a) 1 : 2 (b) 2 : 1 (c) 1 : 3 (d) 3 : 1



2 Complete :

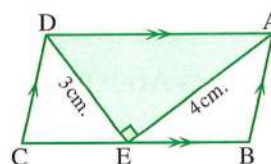
- 1 If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) + m(\angle B) = 80^\circ$, then $m(\angle Z) = \dots\dots\dots^\circ$
- 2 If the area of a square is 50 cm^2 , then the length of its diagonal is cm.
- 3 If the two triangles are similar , then their corresponding sides are
- 4 If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AB} on \overline{BC} is
- 5 The area of a triangle is equal to half of the area of a parallelogram , if they have a common base

3 [a] In the opposite figure :

ABCD is a parallelogram , $AE = 4 \text{ cm}$,
 $DE = 3 \text{ cm}$, $m(\angle AED) = 90^\circ$

Complete : 1 The area of $\triangle AED = \dots\dots\dots \text{ cm}^2$

2 The area of the parallelogram ABCD = cm^2

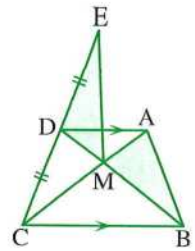


[b] In the opposite figure :

$$\overline{AD} \parallel \overline{BC}$$

, D is the midpoint of \overline{EC}

Prove that : The area of $\triangle AMB$ = the area of $\triangle DME$



4 [a] In the opposite figure :

If the area of $\triangle AMB$ = the area of $\triangle DMC$

, prove that : $\overline{AD} \parallel \overline{BC}$

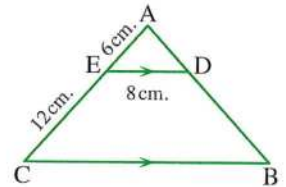
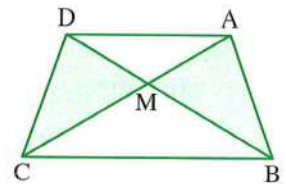
[b] In the opposite figure :

$\overline{ED} \parallel \overline{BC}$, $ED = 8$ cm. , $AE = 6$ cm.

, $EC = 12$ cm.

1 Prove that : $\triangle ADE \sim \triangle ABC$

2 Find : The length of \overline{BC}



5 [a] In the opposite figure :

$\overline{AD} \perp \overline{BC}$, $m(\angle BAC) = 90^\circ$

, $DB = 9$ cm. , $DC = 16$ cm.

Find : The length of each of \overline{AB} , \overline{AD} , \overline{AC}

[b] In the opposite figure :

$m(\angle C) = 90^\circ$, $\overline{AE} \perp \overline{BD}$

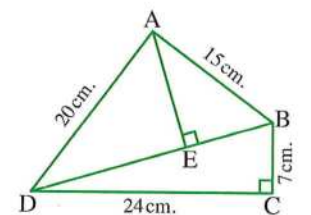
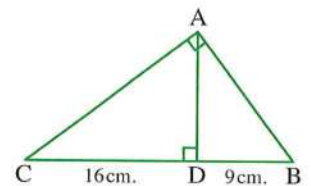
, $BC = 7$ cm. , $CD = 24$ cm.

, $AB = 15$ cm. , $AD = 20$ cm.

1 Find : The length of \overline{BD}

2 Prove that : $m(\angle BAD) = 90^\circ$

3 Find : The length of \overline{AE}



13

Damietta Governorate



Math Supervision

Answer the following questions :

1 Choose the correct answer from those given :

1 The area of the rhombus whose diagonal lengths are 8 cm. and 10 cm. equals cm^2

(a) 80

(b) 40

(c) 20

(d) 18

- 2 If the projection of a line segment on a straight line is a point, then the line segment the straight line.
 (a) \parallel (b) \perp (c) \equiv (d) \subset
- 3 If the length of the base of a triangle is 6 cm. and its corresponding height is 3 cm., then its area equals cm^2
 (a) 18 (b) 9 (c) 6 (d) 2
- 4 A square whose diagonal length is 6 cm. , then its area equals cm^2
 (a) 36 (b) 24 (c) 12 (d) 18
- 5 The two vertically opposite angles are
 (a) complementary. (b) supplementary. (c) adjacent. (d) equal in measure.

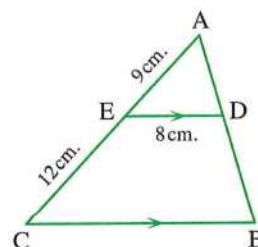
2 Complete the following :

- 1 The area of the parallelogram = \times its corresponding height.
- 2 If the ratio between two corresponding side lengths in two similar polygons is 3 : 4, then the ratio between their perimeters is
- 3 In $\triangle ABC$, if $(AB)^2 = (AC)^2 + (BC)^2$, then $m(\angle \dots) = 90^\circ$
- 4 If $\triangle ABC \sim \triangle DEF$ and $m(\angle C) = 70^\circ$, then $m(\angle F) = \dots^\circ$
- 5 The number of diagonals of the quadrilateral equals

3 [a] In the opposite figure :

ABC is a triangle, $\overline{ED} \parallel \overline{BC}$, $AE = 9$ cm.
 $EC = 12$ cm., $ED = 8$ cm.

- 1 **Prove that :** $\triangle ABC \sim \triangle ADE$
 2 **Find :** The length of \overline{BC}

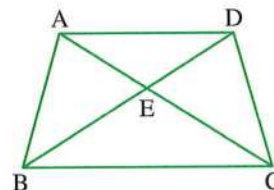


[b] In the opposite figure :

The area of $\triangle AEB$ = The area of $\triangle DEC$

Prove that :

$\overline{AD} \parallel \overline{BC}$

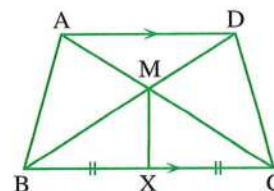


4 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, X is the midpoint of \overline{BC}

Prove that :

The area of the figure $ABXM$ = The area of the figure $DCXM$

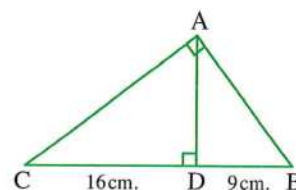


- [b]** $ABCD$ is a trapezium in which $\overline{AD} \parallel \overline{BC}$, if $BC = 2AD = 20$ cm. and its area = 180 cm^2 , find its height.

5 [a] In the opposite figure :

ABC is a triangle , $m(\angle BAC) = 90^\circ$
 $\overline{AD} \perp \overline{BC}$, $BD = 9$ cm. , $DC = 16$ cm.

Find : AD , AB , AC



- [b]** Determine the type of the triangle ABC according to its angles where $AB = 7$ cm.
 $BC = 6$ cm. , $AC = 9$ cm.

14 El-Fayoum Governorate**Math Supervision**

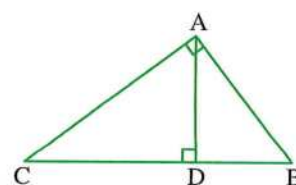
Answer the following questions :

1 Choose the correct answer from the given ones :

- [1]** A rectangle its width is 6 cm. and its length is 8 cm. , then its diagonal length is cm.
 (a) 14 (b) 48 (c) 4 (d) 10
- [2]** The diagonal length of a square = 8 cm. , then its area = cm^2 .
 (a) 24 (b) 32 (c) 64 (d) 12
- [3]** A circle its area = $16\pi \text{ cm}^2$, then its diameter length = cm.
 (a) 7 (b) 16 (c) 32 (d) 8
- [4]** ABC is an obtuse-angled triangle at B , then $(AC)^2$ $(AB)^2 + (BC)^2$
 (a) < (b) = (c) > (d) \leq
- [5]** ABCD is a rectangle , then the projection of \overline{AC} on \overrightarrow{BC} is
 (a) \overline{AB} (b) \overline{BC} (c) \overline{CD} (d) \overline{AD}

2 Complete the following :

- [1]** If two polygons are similar , then the corresponding side lengths are and the corresponding angles are
- [2]** In the triangle ABC , if $(AB)^2 = (AC)^2 - (BC)^2$, then $m(\angle \dots) = 90^\circ$
- [3]** Triangles with congruent bases on one straight line and have a common vertex are
- [4]** The perimeter of a rhombus is 24 cm. and its area is 30 cm^2 , then its height is cm.
- [5] In the opposite figure :**
 $(AC)^2 = CD \times \dots$



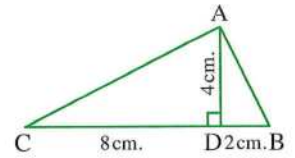
3 [a] In the opposite figure :

ABC is a triangle in which :

BD = 2 cm. , CD = 8 cm. , AD = 4 cm.

, $\overline{AD} \perp \overline{BC}$

Prove that : $m(\angle BAC) = 90^\circ$

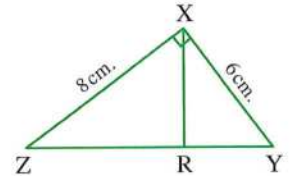


[b] In the opposite figure :

ΔXYZ is similar to ΔRYX , $m(\angle YXZ) = 90^\circ$

Prove that : $\overline{XR} \perp \overline{YZ}$ and if $XY = 6$ cm. , $XZ = 8$ cm.

, **find :** the length of \overline{RZ}



4 [a] In the opposite figure :

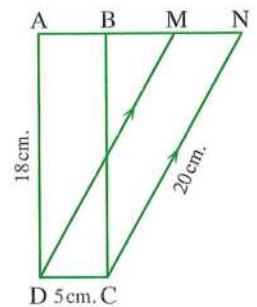
ABCD is a rectangle , $M \in \overline{AB}$, $N \in \overline{AB}$

, $\overline{CN} \parallel \overline{DM}$, $CD = 5$ cm. , $AD = 18$ cm.

1 Find : The area of the figure MNCD

2 If $CN = 20$ cm.

, **find** the length of the perpendicular from M to \overline{CN}



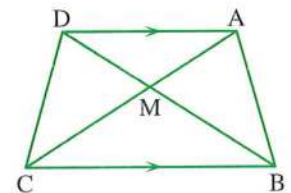
[b] In the opposite figure :

ABCD is a quadrilateral in which

$\overline{CB} \parallel \overline{DA}$

Prove that :

The area of the triangle AMB = the area of the triangle DMC



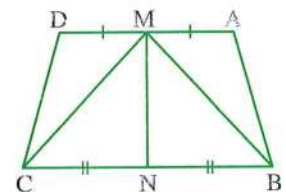
5 [a] In the opposite figure :

ABCD is a quadrilateral , $AM = MD$

, $CN = NB$

, the area of the figure ABNM = the area of the figure DCNM

Prove that : $\overline{CB} \parallel \overline{DA}$



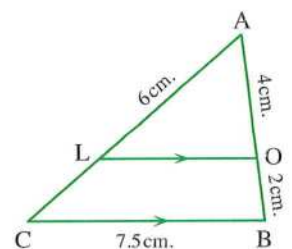
[b] In the opposite figure :

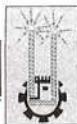
ABC is a triangle , $\overline{BC} \parallel \overline{OL}$

, $AO = 4$ cm. , $BO = 2$ cm. , $AL = 6$ cm. , $BC = 7.5$ cm.

1 Prove that : ΔABC is similar to ΔAOL

2 Find : The lengths of \overline{LC} and \overline{OL}



15 Aswan Governorate

 Kom Ombo Educational Directorate
 Al-Qahmury Formal Language School

Answer the following questions :

1 Choose the correct answer :

- 1 The area of a rhombus whose two diagonal lengths are 6 cm. and 10 cm. is cm²
 (a) 60 (b) 30 (c) 15 (d) 10
- 2 The number of axes of symmetry of a square equals
 (a) 1 (b) 2 (c) 3 (d) 4
- 3 All are similar.
 (a) squares. (b) triangles. (c) rectangles. (d) parallelograms
- 4 In $\triangle ABC$, if $(AB)^2 = (AC)^2 + (BC)^2 + 4$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 5 The area of a triangle is 24 cm² and its height is 8 cm. , then the length of the corresponding base is cm.
 (a) 16 (b) 6 (c) 3 (d) 12

2 Complete the following :

- 1 In $\triangle ABC$, if $(AC - BC)(AC + BC) = (AB)^2$, then $m(\angle \dots) = 90^\circ$
- 2 If $\overline{AB} \perp \overline{BC}$, then the length of the projection of \overline{AC} on \overline{BC} equals
- 3 If $\triangle ABC \sim \triangle XYZ$ and $m(\angle A) + m(\angle B) = 60^\circ$, then $m(\angle Z) = \dots\dots\dots^\circ$
- 4 The diagonal length of the square whose area is 50 cm² equals cm.
- 5 The area of the circle of diameter length 14 cm. is cm² (Where $\pi = \frac{22}{7}$)

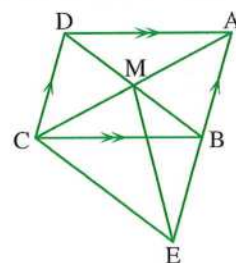
3 [a] In the opposite figure :

ABCD is a parallelogram

, $\overline{AC} \cap \overline{DB} = \{M\}$, $E \in \overline{AB}$

where the area of $\triangle AME =$ the area of $\triangle ABC$

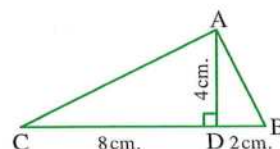
Prove that : The figure BECD is a parallelogram.


[b] In the opposite figure :

ABC is a triangle in which : $BD = 2$ cm.

, $CD = 8$ cm. , $AD = 4$ cm. , $\overline{AD} \perp \overline{BC}$

Prove that : $m(\angle BAC) = 90^\circ$



4 [a] In the opposite figure :

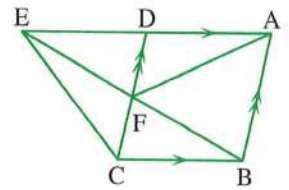
ABCD is a parallelogram

, $E \in \overrightarrow{AD}$, $\overline{BE} \cap \overline{CD} = \{F\}$

Prove that :

The area of the triangle AFD = the area of the triangle EFC

- [b]** Determine the type of the triangle XYZ according to its angles
 , where $XY = 8$ cm. , $YZ = 11$ cm. and $XZ = 6$ cm.



5 [a] In the opposite figure :

$\overline{AC} \parallel \overline{DE}$, $AC = 4$ cm. , $AB = 3$ cm.

, $CB = 2$ cm. and $DE = 8$ cm.

[1] Prove that : $\triangle ABC \sim \triangle EBD$

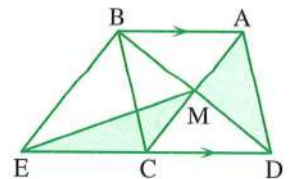
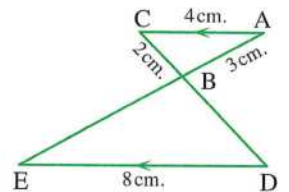
[2] Find : The length of \overline{BE}

[b] In the opposite figure :

$\overline{AB} \parallel \overline{CD}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, the area of the triangle AMD = the area of the triangle MCE

Prove that : $\overline{MC} \parallel \overline{BE}$



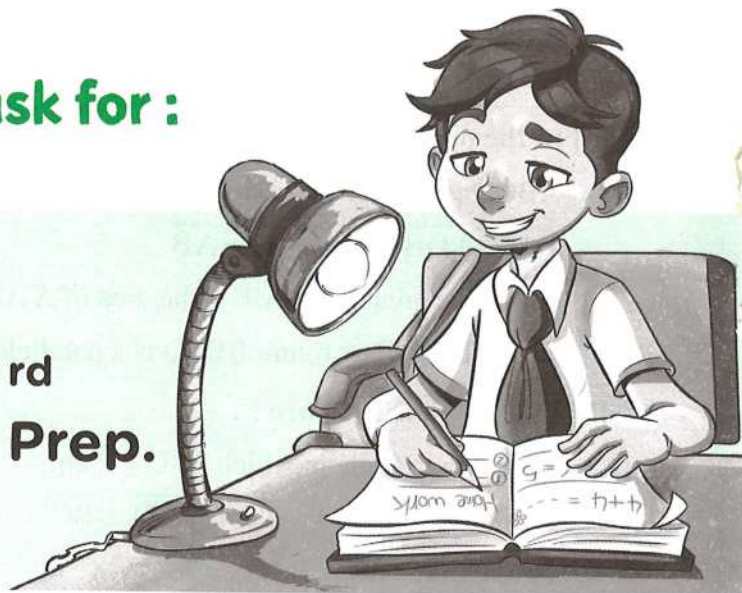
For the next year ask for :

EL-MONASSER

In :

- **Maths**
- **Science**
- **Hello English**

3rd Prep.



Answers of the schools examinations on Geometry

1

Cairo

- 1 1 (a) 2 (b) 3 (a)
4 (a) 5 (c)
- 2 1 equal 2 120° 3 28
4 6 5 a right angle

3

[a] In $\triangle ABC$:

$$\begin{aligned}\because m(\angle BAC) &= 90^\circ, \overline{AD} \perp \overline{BC} \\ \therefore (AB)^2 &= BD \times BC = 9 \times 25 = 225 \\ \therefore AB &= 15 \text{ cm.} \\ \therefore (AC)^2 &= CD \times CB = 16 \times 25 = 400 \\ \therefore AC &= 20 \text{ cm.} \\ \therefore (AD)^2 &= BD \times CD = 9 \times 16 = 144 \\ \therefore AD &= 12 \text{ cm.} \quad (\text{The req.})\end{aligned}$$

[b] \because The area of $\triangle AMB$ = the area of $\triangle CMD$ Adding the area of $\triangle CMB$ to both sides

\therefore The area of $\triangle ACB$ = the area of $\triangle DCB$
and they have a common base \overline{BC} and on one side of it

$$\therefore \overline{AD} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

4

[a] In $\triangle ADE$, CBE :

$$\begin{aligned}\because \overline{AD} \parallel \overline{BC}, \overline{AC} \text{ is a transversal} \\ \therefore m(\angle A) &= m(\angle C) \text{ (alternate angles)} \quad (1) \\ \because \overline{AD} \parallel \overline{BC}, \overline{BD} \text{ is a transversal} \\ \therefore m(\angle D) &= m(\angle B) \text{ (alternate angles)} \quad (2) \\ \therefore m(\angle AED) &= m(\angle CEB) \text{ (V.O.A.)} \quad (3)\end{aligned}$$

From (1), (2) and (3):

$$\therefore \triangle ADE \sim \triangle CBE \quad (\text{First req.})$$

$$\therefore \frac{AD}{CB} = \frac{DE}{BE} = \frac{AE}{CE} \quad \therefore \frac{4}{8} = \frac{2}{BE}$$

$$\therefore BE = \frac{2 \times 8}{4} = 4 \text{ cm.} \quad (\text{Second req.})$$

[b] In $\triangle BAC$:

$$\begin{aligned}\because (AC)^2 &= (12)^2 = 144 \\ \therefore (AB)^2 + (BC)^2 &= (7)^2 + (9)^2 = 130\end{aligned}$$

$$\therefore (AC)^2 > (AB)^2 + (BC)^2$$

$\therefore \triangle BAC$ is an obtuse-angled triangle. (The req.)

5

[a] $\because \triangle BFC$, $\square ABCD$ have the common base \overline{BC}

$$\therefore F \in \overline{AD}$$

$$\therefore \text{The area of } \triangle BFC = \frac{1}{2} \text{ the area of } \square ABCD \quad (1)$$

$$\therefore \overline{FB} \text{ is a median in } \triangle FEC$$

$$\therefore \text{The area of } \triangle BFC = \frac{1}{2} \text{ the area of } \triangle FEC \quad (2)$$

From (1) and (2):

$$\therefore \text{The area of } \triangle FEC = \text{The area of } \square ABCD \quad (\text{Q.E.D.})$$

[b] In $\triangle ABC$:

$$\because m(\angle B) = 90^\circ$$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$$

$$\therefore AC = 15 \text{ cm.}$$

In $\triangle ADC$:

$$\therefore (CD)^2 = (17)^2 = 289$$

$$\therefore (AD)^2 + (AC)^2 = (8)^2 + (15)^2 = 289$$

$$\therefore (CD)^2 = (AD)^2 + (AC)^2$$

$$\therefore m(\angle DAC) = 90^\circ \quad (\text{Q.E.D.})$$

2

Cairo

- 1 1 (b) 2 (b) 3 (a)
4 (c) 5 (c)
- 2 1 equal 2 height 3 25
4 YZL 5 180°

3

[a] $\because \triangle ACD$, $\triangle BCD$ have a common base \overline{CD}

$$\therefore \overline{AB} \parallel \overline{DC}$$

$$\therefore \text{The area of } \triangle ACD = \text{the area of } \triangle BCD$$

Subtracting the area of $\triangle MCD$ from both sides

$$\therefore \text{The area of } \triangle AMD = \text{the area of } \triangle BMC \quad (\text{Q.E.D.})$$

[b] In $\triangle ABC$:

$$\because m(\angle B) = 90^\circ$$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (12)^2 + (16)^2 = 400$$

$$\therefore AC = 20 \text{ cm.} \quad (\text{First req.})$$

Geometry

In $\triangle ACD$:

- $\therefore (CD)^2 = (25)^2 = 625$
- $\therefore (AD)^2 + (AC)^2 = (15)^2 + (20)^2 = 625$
- $\therefore (CD)^2 = (AD)^2 + (AC)^2$
- $\therefore m(\angle DAC) = 90^\circ$
- $\therefore \triangle ADC$ is a right-angled triangle. (Second req.)

4

[a] In $\triangle ABC$:

- $\therefore (AB)^2 = (7)^2 = 49$
- $\therefore (BC)^2 + (AC)^2 = (3)^2 + (6)^2 = 45$
- $\therefore (AB)^2 > (BC)^2 + (AC)^2$
- $\therefore \triangle ABC$ is an obtuse-angled triangle.

(The req.)

[b] In $\triangle ADE$, $\triangle ACB$:

- $\therefore m(\angle AED) = m(\angle B)$
- $\therefore \angle A$ is a common angle
- $\therefore m(\angle ADE) = m(\angle C)$
- $\therefore \triangle ADE \sim \triangle ACB$ (First req.)
- $\therefore \frac{AD}{AC} = \frac{DE}{CB} = \frac{AE}{AB} \quad \therefore \frac{3}{AC} = \frac{4.5}{9}$
- $\therefore AC = \frac{3 \times 9}{4.5} = 6 \text{ cm.}$
- $\therefore EC = 6 - 4.5 = 1.5 \text{ cm.}$ (Second req.)

5

[a] The area = $\left(\frac{6+4}{2}\right) \times 5 = 25 \text{ cm}^2$

[b] $\therefore \overline{AE}$ is a median in $\triangle ABC$

\therefore The area of $\triangle ABE$ = the area of $\triangle ACE$ (1)

$\therefore \therefore DE$ is a median in $\triangle DBC$

\therefore The area of $\triangle DBE$ = the area of $\triangle DCE$ (2)

Subtracting (2) from (1) :

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$

(Q.E.D.)

3

Giza

- | | | | |
|---|-------|-------|-------|
| 1 | 1 (a) | 2 (a) | 3 (a) |
| | 4 (c) | 5 (a) | |

- | | | |
|---|-----------------|------|
| 2 | 1 5 | 2 48 |
| | 3 equal in area | 4 50 |
| | | 5 12 |

3

[a] In $\triangle ABC$:

- $\therefore (AC)^2 = (10)^2 = 100$
- $\therefore (AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$
- $\therefore (AC)^2 = (AB)^2 + (BC)^2$
- $\therefore m(\angle B) = 90^\circ$
- $\therefore \angle B$ is right. (The req.)

[b] In $\triangle ABC$:

- $\therefore m(\angle BAC) = 90^\circ$
- $\therefore \overline{AD} \perp \overline{BC}$
- $\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$
- $\therefore AB = 20 \text{ cm.}$
- $\therefore (AD)^2 = BD \times CD = 16 \times 9 = 144$
- $\therefore AD = 12 \text{ cm.}$ (The req.)

4

[a] The area = $\left(\frac{4+6}{2}\right) \times 3 = 15 \text{ cm}^2$

[b] In $\triangle ABC$, $\triangle DBE$:

- $\therefore \overline{AC} \parallel \overline{ED}$, \overline{CE} is a transversal
- $\therefore m(\angle C) = m(\angle E)$ (alternate angles) (1)
- $\therefore \overline{AC} \parallel \overline{ED}$, \overline{AD} is a transversal
- $\therefore m(\angle A) = m(\angle D)$ (alternate angles) (2)
- $\therefore \therefore m(\angle CBA) = m(\angle EBD)$ (V.O.A.) (3)
- From (1) , (2) and (3) :
- $\therefore \triangle ABC \sim \triangle DBE$ (Q.E.D.)

5

[a] In $\triangle ABC$:

- $\therefore (\angle B) = 90^\circ$
- $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$
- $\therefore AC = 5 \text{ cm.}$ (First req.)

In $\triangle ACD$:

- $\therefore (AD)^2 = (13)^2 = 169$
- $\therefore (AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$
- $\therefore (AD)^2 = (AC)^2 + (CD)^2$
- $\therefore m(\angle ACD) = 90^\circ$ (Second req.)

[b] In $\triangle ACB$, $\triangle DCB$ have a common base \overline{BC}

- $\therefore \overline{DA} \parallel \overline{CB}$
- \therefore The area of $\triangle ACB$ = the area of $\triangle DCB$

Subtracting the area of $\triangle ECB$ from both sides

\therefore The area of $\triangle AEB$ = The area of $\triangle DEC$

(Q.E.D.)

4

Giza

- 1 (b) 2 (b) 3 (a)
4 (d) 5 (c)

- 2 1 proportional, equal in measure 2 120°
3 $>$ 4 50 5 30 cm.

3

[a] In $\triangle ABD$:

$\therefore \overline{DB} \perp \overline{AB}$

$\therefore m(\angle ABD) = 90^\circ$

$\therefore (BD)^2 = (AD)^2 - (AB)^2 = (17)^2 - (8)^2 = 225$

$\therefore BD = 15$ cm. (First req.)

In $\triangle BCD$:

$\therefore (BD)^2 = (15)^2 = 225$

$\therefore (BC)^2 + (CD)^2 = (9)^2 + (12)^2 = 225$

$\therefore (BD)^2 = (BC)^2 + (CD)^2$

$\therefore m(\angle C) = 90^\circ$ (Second req.)

[b] In $\triangle ABC$:

$\therefore (AC)^2 = (7)^2 = 49$

$\therefore (AB)^2 + (BC)^2 = (5)^2 + (6)^2 = 61$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore \triangle ABC$ is an acute-angled triangle. (The req.)

4

[a] In $\triangle ABC$, $\triangle DBE$:

$\therefore \overline{AC} \parallel \overline{ED}$, \overline{AD} is a transversal

$\therefore m(\angle A) = m(\angle D)$ (alternate angles) (1)

$\therefore \overline{AC} \parallel \overline{ED}$, \overline{CE} is a transversal

$\therefore m(\angle C) = m(\angle E)$ (alternate angles) (2)

$\therefore m(\angle ABC) = m(\angle DBE)$ (V.O.A.) (3)

From (1), (2) and (3):

$\therefore \triangle ABC \sim \triangle DBE$ (First req.)

$\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{DE} \quad \therefore \frac{3}{6} = \frac{5}{DE}$

$\therefore DE = \frac{5 \times 6}{3} = 10$ cm.

\therefore The perimeter of $\triangle BED = 8 + 10 + 6 = 24$ cm.

(Second req.)

[b] \therefore The area of $\triangle ADC$ = the area of $\triangle AEB$

Subtracting the area of $\triangle ADE$ from both sides

\therefore The area of $\triangle CED$ = the area of $\triangle BDE$

and they have a common base \overline{DE} and on one side of it.

$\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)

5

[a] $\therefore \triangle ACD$, $\triangle BCD$ have a common base \overline{CD}

$\therefore \overline{AB} \parallel \overline{CD}$

\therefore The area of $\triangle ACD$ = the area of $\triangle BCD$ (1)

$\therefore \overline{ME}$ is a median in $\triangle CMD$

\therefore The area of $\triangle EMC$ = the area of $\triangle EMD$ (2)

Subtracting (2) from (1):

\therefore The area of the figure $ADEM$
= the area of the figure $BCEM$ (Q.E.D.)

[b] In $\triangle ABC$:

$\therefore m(\angle BAC) = 90^\circ$

$\therefore \overline{AD} \perp \overline{BC}$

$\therefore (AD)^2 = BD \times CD = 4.5 \times 8 = 36$

$\therefore AD = 6$ cm.

$\therefore (AB)^2 = BD \times BC = 4.5 \times 12.5 = 56.25$

$\therefore AB = 7.5$ cm.

$\therefore (AC)^2 = CD \times BC = 8 \times 12.5 = 100$

$\therefore AC = 10$ cm. (The req.)

5

Alexandria

- 1 1 (a) 2 (a) 3 (c)
4 (d) 5 (a)

- 2 1 24 2 equal in measure
3 16
4 parallelogram 5 42

3

[a] In $\triangle XYZ$:

$\therefore (YZ)^2 = (7)^2 = 49$

$\therefore (XY)^2 + (XZ)^2 = (4)^2 + (5)^2 = 41$

$\therefore (YZ)^2 > (XY)^2 + (XZ)^2$

$\therefore \angle X$ is obtuse. (The req.)

[b] The area = $50 \times 24 = 1200$ cm²

4

[a] In $\triangle XYZ$:

$$\therefore m(\angle XYZ) = 90^\circ, \overline{YL} \perp \overline{XZ}$$

$$\therefore (XZ)^2 = (XY)^2 + (YZ)^2 = (20)^2 + (15)^2 = 625$$

$$\therefore XZ = 25 \text{ cm.} \quad (\text{First req.})$$

$$\therefore YL = \frac{YX \times YZ}{XZ} = \frac{20 \times 15}{25} = 12 \text{ cm.} \quad (\text{Second req.})$$

[b] $\therefore \triangle BAD, \triangle CAD$ have the same base \overline{AD}

$$\therefore \overline{AD} \parallel \overline{BC}$$

$$\therefore \text{The area of } \triangle BAD = \text{the area of } \triangle CAD$$

Subtracting the area of $\triangle MAD$ from both sides

$$\therefore \text{The area of } \triangle BMA = \text{the area of } \triangle CMD \quad (1)$$

$\therefore \triangle MAX, \triangle MDY$ have equal bases in length and on one straight line and they are common in the vertex M

$$\therefore \text{The area of } \triangle MAX = \text{the area of } \triangle MDY \quad (2)$$

Adding (1) and (2):

$$\therefore \text{The area of the figure ABMX} \\ = \text{the area of the figure DCMY} \quad (\text{Q.E.D.})$$

5

[a] In $\triangle ABC, \triangle AED$:

$$\therefore m(\angle B) = m(\angle E) = 90^\circ$$

$$\therefore m(\angle BAC) = m(\angle EAD) \quad (\text{V.O.A.})$$

$$\therefore m(\angle C) = m(\angle D)$$

$$\therefore \triangle ABC \sim \triangle AED \quad (\text{First req.})$$

$$\therefore \frac{AB}{AE} = \frac{BC}{ED} = \frac{AC}{AD} \quad \therefore \frac{12}{3} = \frac{AB}{4}$$

$$\therefore AB = \frac{4 \times 12}{3} = 16 \text{ cm.}$$

$$\therefore BE = 4 + 16 = 20 \text{ cm.} \quad (\text{Second req.})$$

$$[b] \text{ The area} = \frac{1}{2} \times 8 \times 10 = 40 \text{ cm}^2$$

6

El-Kalyoubia

1 (b)

2 (b)

3 (c)

4 (c)

5 (b)

2 (1) 120°

(2) proportional

(3) 24

(4) equal in area

(5) congruent

3

$$[a] \text{ The length of the middle base} = \frac{1}{2} (8 + 10) = 9 \text{ cm.}$$

$$\therefore \text{the area of the trapezium} = 9 \times 5 = 45 \text{ cm}^2$$

[b] $\therefore \triangle ABC, \triangle DBC$ have a common base \overline{BC}
 $\therefore \overline{AD} \parallel \overline{BC}$

$$\therefore \text{The area of } \triangle ABC = \text{the area of } \triangle DBC$$

Subtracting the area of $\triangle MBC$ from both sides

$$\therefore \text{The area of } \triangle AMB = \text{the area of } \triangle DMC \quad (1)$$

$$\therefore \overline{MX} \text{ is a median in } \triangle MBC$$

$$\therefore \text{The area of } \triangle BMX = \text{the area of } \triangle CMX \quad (2)$$

Adding (1) and (2):

$$\therefore \text{The area of the figure ABXM} \\ = \text{the area of the figure DCXM} \quad (\text{Q.E.D.})$$

4

[a] In $\triangle ABC$:

$$\therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$$

$$\therefore (AD)^2 = DB \times DC = 9 \times 16 = 144$$

$$\therefore AD = 12 \text{ cm.}$$

$$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$$

$$\therefore AB = 15 \text{ cm.}$$

$$\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$$

$$\therefore AC = 20 \text{ cm.} \quad (\text{The req.})$$

[b] In $\triangle ABC, \triangle DBE$

$$\therefore \overline{AC} \parallel \overline{ED}, \overline{AD} \text{ is a transversal}$$

$$\therefore m(\angle A) = m(\angle D) \quad (\text{alternate angles}) \quad (1)$$

$$\therefore \overline{AC} \parallel \overline{ED}, \overline{CE} \text{ is a transversal}$$

$$\therefore m(\angle C) = m(\angle E) \quad (\text{alternate angles}) \quad (2)$$

$$\therefore m(\angle ABC) = m(\angle DBE) \quad (\text{V.O.A.}) \quad (3)$$

From (1), (2) and (3):

$$\therefore \triangle ABC \sim \triangle DBE \quad (\text{First req.})$$

$$\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{DE} \quad \therefore \frac{AB}{18} = \frac{5}{15} = \frac{3}{DE}$$

$$\therefore AB = \frac{18 \times 5}{15} = 6 \text{ cm.}$$

$$\therefore DE = \frac{3 \times 15}{5} = 9 \text{ cm.} \quad (\text{Second req.})$$

5

[a] In $\triangle ABC$:

$$\therefore m(\angle B) = 90^\circ$$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$$

$$\therefore AC = 5 \text{ cm.} \quad (\text{First req.})$$

In $\triangle ACD$:

$$\therefore (CD)^2 = (13)^2 = 169$$

$$\therefore (AD)^2 + (AC)^2 = (12)^2 + (5)^2 = 169$$

$$\therefore (CD)^2 = (AD)^2 + (AC)^2$$

$$\therefore m(\angle DAC) = 90^\circ \quad (\text{Second req.})$$

- [b] \therefore The area of $\triangle ABE$ = the area of $\triangle ACD$
 Subtracting the area of $\triangle ADE$ from both sides
 \therefore The area of $\triangle BED$ = the area of $\triangle CDE$
 and they have a common base \overline{ED} and on one side of it
 $\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)

7
El-Sharkia

- 1 1 5 2 C
 3 base length 4 X 5 equal
- 2 1 (c) 2 (d) 3 (c)
 4 (b) 5 (b)

3

- [a] $\therefore \triangle LYZ, XYZ$ have the common base \overline{YZ}
 $\therefore \overline{XL} \parallel \overline{YZ}$
 \therefore The area of $\triangle LYZ$ = the area of $\triangle XYZ$
 Subtracting the area of $\triangle MYZ$ from both sides.
 \therefore The area of $\triangle ZML$ = the area of $\triangle YMX$
 (Q.E.D.)

- [b] In $\triangle ADE, ACB$:
 $\therefore m(\angle AED) = m(\angle B)$
 $\therefore \angle A$ is a common angle
 $\therefore m(\angle ADE) = m(\angle C)$
 $\therefore \triangle ADE \sim \triangle ACB$ (First req.)
 $\therefore \frac{AD}{AC} = \frac{DE}{CB} = \frac{AE}{AB} \therefore \frac{3}{AC} = \frac{4.5}{9}$
 $\therefore AC = \frac{3 \times 9}{4.5} = 6 \text{ cm.}$
 $\therefore EC = 6 - 4.5 = 1.5 \text{ cm.}$ (Second req.)

4

- [a] In $\triangle ABC$:
 $\therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$
 $\therefore (AC)^2 = CD \times BC = 4.5 \times 12.5 = 56.25$
 $\therefore AC = 7.5 \text{ cm.}$ (First req.)
 $\therefore (AD)^2 = CD \times BD = 4.5 \times 8 = 36$
 $\therefore AD = 6 \text{ cm.}$
 \therefore The area of $\triangle ABC = \frac{1}{2} \times 12.5 \times 6 = 37.5 \text{ cm}^2$
 (Second req.)
- [b] In $\triangle ABD$:
 $\therefore m(\angle ABD) = 90^\circ$

- $\therefore (BD)^2 = (AD)^2 - (AB)^2 = (17)^2 - (8)^2 = 225$
 $\therefore BD = 15 \text{ cm.}$ (First req.)
- In $\triangle BCD$:
 $\therefore (BD)^2 = (15)^2 = 225$
 $\therefore (BC)^2 + (CD)^2 = (9)^2 + (12)^2 = 225$
 $\therefore (BD)^2 = (BC)^2 + (CD)^2$
 $\therefore m(\angle C) = 90^\circ$ (Second req.)

5

- [a] The area of the parallelogram $= 7 \times 4 = 28 \text{ cm}^2$
 the greater height $= 28 \div 5 = 5.6 \text{ cm.}$
- [b] In $\triangle XYZ$:
 $\therefore (YZ)^2 = (13)^2 = 169$
 $\therefore (XY)^2 + (XZ)^2 = (12)^2 + (4)^2 = 160$
 $\therefore (YZ)^2 > (XY)^2 + (XZ)^2$
 $\therefore \triangle XYZ$ is an obtuse-angled triangle. (The req.)

8
El-Monofia

- 1 1 10 cm. 2 equal in area
 3 A
 4 a common base lying on one of two parallel straight lines including them.
 5 a right-angled triangle.
- 2 1 (b) 2 (b) 3 (a)
 4 (a) 5 (a)

3

- [a] $\therefore \triangle BFC, \square ABCD$ have the common base \overline{BC}
 $\therefore F \in \overline{AD}$
 \therefore The area of $\triangle BFC = \frac{1}{2}$ the area of $\square ABCD$ (1)
 $\therefore \overline{FB}$ is a median in $\triangle FEC$
 \therefore The area of $\triangle BFC = \frac{1}{2}$ the area of $\triangle FEC$ (2)
 From (1) and (2) :
 \therefore The area of $\triangle FEC$ = the area of $\square ABCD$
 (Q.E.D.)
- [b] $\therefore \overline{CM}$ is a median in $\triangle CDE$
 \therefore The area of $\triangle CMD$ = the area of $\triangle CME$
 \therefore the area of $\triangle AMB$ = the area of $\triangle CME$
 \therefore The area of $\triangle AMB$ = the area of $\triangle CMD$

Adding the area of $\triangle ADM$ to both sides

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
and they have a common base \overline{AD} and on one side of it.

$\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4

[a] \therefore The area of the rhombus = $\frac{1}{2} \times 18 \times 24 = 216 \text{ m}^2$

\therefore The area of the trapezium = 216 m^2

\therefore The length of the middle base = $216 \div 12 = 18 \text{ m}$.

[b] \therefore The figure $ABCD \sim$ the figure $XYZL$

$\therefore m(\angle D) = m(\angle L) = 80^\circ$

From the figure $ABCD$:

$\therefore m(\angle BCD) = 360^\circ - (125^\circ + 70^\circ + 80^\circ) = 85^\circ$
(First req.)

$$\therefore \frac{AD}{XL} = \frac{BC}{YZ} \quad \therefore \frac{6}{XL} = \frac{8}{2.4}$$

$\therefore XL = \frac{6 \times 2.4}{8} = 1.8 \text{ cm}$. (Second req.)

$$\therefore \frac{\text{the perimeter of the figure } ABCD}{\text{the perimeter of the figure } XYZL} = \frac{BC}{YZ}$$

$$\therefore \frac{26}{\text{The perimeter of the figure } XYZL} = \frac{8}{2.4}$$

\therefore The perimeter of the figure $XYZL$
 $= \frac{26 \times 2.4}{8} = 7.8 \text{ cm}$. (Third req.)

5

[a] $\therefore \triangle ABD$ is right-angled at B

$$\therefore (BD)^2 = (AD)^2 - (AB)^2 = (10)^2 - (6)^2 = 64$$

$\therefore BD = 8 \text{ cm}$.

$$\therefore \text{The area of } \square ABCD = AB \times BD = 6 \times 8 = 48 \text{ cm}^2$$

(First req.)

$\therefore \overline{AB} \parallel \overline{DC}$ (Properties of parallelogram)

$\therefore \overline{BD}$ is a transversal.

$\therefore m(\angle ABD) = m(\angle CDB)$ (alternate angles)

$\therefore m(\angle CDB) = 90^\circ$

$\therefore AB = DC, AD = BC$

(properties of parallelogram)

$\therefore DC = 6 \text{ cm}, BC = 10 \text{ cm}$.

$\therefore \overline{BE}$ is the projection of \overline{DB} on \overline{BC}

$\therefore \triangle DBC$ is right-angled at D, $\overline{DE} \perp \overline{BC}$

$$\therefore (BD)^2 = BE \times BC \quad \therefore 64 = BE \times 10$$

$$\therefore BE = \frac{64}{10} = 6.4 \text{ cm}. \quad (\text{Second req.})$$

$$\therefore DE = \frac{DB \times DC}{BC} = \frac{8 \times 6}{10} = 4.8 \text{ cm}. \quad (\text{Third req.})$$

[b] In $\triangle ADE, \triangle ABC$:

$\therefore DE \parallel BC, \overline{AB}$ is a transversal

$\therefore m(\angle ADE) = m(\angle B)$ (corresponding angles) (1)

$\therefore DE \parallel BC, \overline{AC}$ is a transversal

$\therefore m(\angle AED) = m(\angle C)$ (corresponding angles) (2)

$\therefore \angle A$ is a common angle (3)

From (1), (2) and (3) :

$\therefore \triangle ADE \sim \triangle ABC$ (First req.)

$$\therefore \frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC} \quad \therefore \frac{3}{5} = \frac{DE}{6} = \frac{AE}{4}$$

$$\therefore DE = \frac{3 \times 6}{5} = 3.6 \text{ cm}.$$

$$\therefore AE = \frac{3 \times 4}{5} = 2.4 \text{ cm}. \quad (\text{Second req.})$$

9

El-Gharbia

1 10 cm.

2 similar

3 acute-angled

4 a point

5 135°

2 1 (d)

2 (b)

3 (b)

4 (d)

5 (d)

3

[a] \therefore The area of $\triangle AMB$ = the area of $\triangle DMC$

Adding the area of $\triangle AMD$ to both sides

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$

but they have a common base \overline{AD} and on one side of it

$\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)

[b] In $\triangle AED, \triangle ABC$:

$\therefore \overline{ED} \parallel \overline{BC}, \overline{AB}$ is a transversal

$\therefore m(\angle AED) = m(\angle B)$ (corresponding angles) (1)

$\therefore \overline{ED} \parallel \overline{BC}, \overline{AC}$ is a transversal

$\therefore m(\angle ADE) = m(\angle C)$ (corresponding angles) (2)

$\therefore \angle A$ is a common angle (3)

From (1), (2) and (3) :

$\therefore \triangle AED \sim \triangle ABC$:

Geometry

[b] \therefore The area of $\triangle ACD$ = the area of $\triangle ABE$
Subtracting the area of $\triangle ADE$ from both sides

\therefore The area of $\triangle CED$ = the area of $\triangle BDE$
and they have a common base \overline{DE} and on one side of it

$\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)

5

[a] In $\triangle ABC$:

$\therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore AB = 15 \text{ cm.}$

$\therefore (AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore AD = 12 \text{ cm.}$ (The req.)

[b] The area = $\left(\frac{8+10}{2}\right) \times 6 = 54 \text{ cm}^2$

11

Ismailia

1 1 (b)

2 (c)

3 (b)

4 (b)

5 (b)

2 1 90°

2 double

3 (0, 4)

4 equal in length 5 35

3

[a] $\therefore \triangle ADB, \triangle ADC$ have the same base \overline{AD}
 $\therefore \overline{BC} \parallel \overline{AD}$

\therefore The area of $\triangle ADB$ = the area of $\triangle ADC$

Subtracting the area of $\triangle AMD$ from both sides

\therefore The area of $\triangle ABM$ = the area of $\triangle DMC$ (1)

$\therefore \overline{MD}$ is a median in $\triangle EMC$

\therefore The area of $\triangle DME$ = the area of $\triangle DMC$ (2)

From (1) and (2):

\therefore The area of $\triangle ABM$ = the area of $\triangle DME$

(Q.E.D.)

[b] In $\triangle ABC$: $\therefore m(\angle B) = 90^\circ$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

$\therefore AC = 5 \text{ cm.}$

\therefore in $\triangle ACD$:

$\therefore (AD)^2 = (13)^2 = 169$

$\therefore (AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$

$\therefore (AD)^2 = (AC)^2 + (CD)^2$

$\therefore m(\angle ACD) = 90^\circ$ (Q.E.D.)

4

[a] The area = $\left(\frac{8+10}{2}\right) \times 6 = 54 \text{ cm}^2$

[b] In $\triangle ABE, \triangle CDE$:

$\therefore \overline{AB} \parallel \overline{CD}, \overline{AC}$ is a transversal

$\therefore m(\angle A) = m(\angle C)$ (alternate angles) (1)

$\therefore \overline{AB} \parallel \overline{CD}, \overline{BD}$ is a transversal

$\therefore m(\angle B) = m(\angle D)$ (alternate angles) (2)

$\therefore m(\angle AEB) = m(\angle DEC)$ (V.O.A.) (3)

From (1), (2) and (3):

$\therefore \triangle ABE \sim \triangle CDE$ (First req.)

$\therefore \frac{AB}{CD} = \frac{BE}{DE} = \frac{AE}{CE} \therefore \frac{3}{DE} = \frac{4}{6}$

$\therefore DE = \frac{3 \times 6}{4} = 4.5 \text{ cm.}$ (Second req.)

5

[a] \therefore The area of the figure ABCD
= the area of the figure ABCE

Subtracting the area of $\triangle ABC$ from both sides

\therefore The area of $\triangle ACD$ = the area of $\triangle ACE$

and they have a common base \overline{AC} and on one side of it

$\therefore \overline{AC} \parallel \overline{ED}$ (Q.E.D.)

[b] In $\triangle ABC$:

$\therefore m(\angle ABC) = 90^\circ, \overline{BD} \perp \overline{AC}$

$\therefore BD = \frac{BA \times BC}{AC} = \frac{6 \times 8}{10} = 4.8 \text{ cm.}$

$\therefore (BC)^2 = CD \times AC$

$\therefore (8)^2 = CD \times 10$

$\therefore CD = \frac{64}{10} = 6.4 \text{ cm.}$ (The req.)

12

Suez

1 1 (c)

2 (c)

3 (b)

4 (b)

5 (a)

2 1 100°

2 10

3 proportional 4 B

5 lying on one of two parallel straight lines including them.

3

[a] 1 6

[2] 12

[b] $\therefore \triangle ADB, \triangle ADC$ have the same base \overline{AD}
 $\therefore \overline{AD} \parallel \overline{BC}$

\therefore The area of $\triangle ADB$ = the area of $\triangle ADC$

Subtracting the area of $\triangle AMD$ from both sides

\therefore The area of $\triangle AMB$ = the area of $\triangle DMC$ (1)

$\therefore \overline{MD}$ is a median in $\triangle EMC$

\therefore The area of $\triangle MDE$ = the area of $\triangle DMC$ (2)

From (1) and (2):

\therefore The area of $\triangle AMB$ = the area of $\triangle DME$

(Q.E.D.)

4

[a] \therefore The area of $\triangle AMB$ = the area of $\triangle DMC$

Adding the area of $\triangle DMA$ to both sides

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
 and they have a common base \overline{AD} and on one side of it

$\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)

[b] In $\triangle ADE, \triangle ABC$:

$\therefore \overline{ED} \parallel \overline{BC}, \overline{AB}$ is a transversal

$\therefore m(\angle ADE) = m(\angle B)$ (corresponding angles) (1)

$\therefore \overline{ED} \parallel \overline{BC}, \overline{AC}$ is a transversal

$\therefore m(\angle AED) = m(\angle C)$ (corresponding angles) (2)

$\therefore \angle A$ is a common angle (3)

From (1), (2) and (3):

$\therefore \triangle ADE \sim \triangle ABC$ (First req.)

$$\frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC} \quad \therefore \frac{8}{BC} = \frac{6}{18}$$

$$\therefore BC = \frac{18 \times 8}{6} = 24 \text{ cm.} \quad (\text{Second req.})$$

5

[a] In $\triangle ABC$:

$\therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$

$$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$$

$$\therefore AB = 15 \text{ cm.}$$

$$\therefore (AD)^2 = DB \times DC = 9 \times 16 = 144$$

$$\therefore AD = 12 \text{ cm.}$$

$$\therefore (AC)^2 = CD \times CB = 16 \times 25 = 400$$

$$\therefore AC = 20 \text{ cm.} \quad (\text{The req.})$$

[b] In $\triangle BCD$:

$$\therefore m(\angle C) = 90^\circ$$

$$\therefore (BD)^2 = (BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$$

$$\therefore BD = 25 \text{ cm.} \quad (\text{First req.})$$

\therefore in $\triangle ABD$:

$$\therefore (BD)^2 = (25)^2 = 625$$

$$\therefore (AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$$

$$\therefore (BD)^2 = (AB)^2 + (AD)^2$$

$$\therefore m(\angle BAD) = 90^\circ \quad (\text{Second req.})$$

$\therefore \overline{AE} \perp \overline{BD}$

$$\therefore AE = \frac{AB \times AD}{BD} = \frac{15 \times 20}{25} = 12 \text{ cm.} \quad (\text{Third req.})$$

13

Damietta

1 1 (b)

2 (b)

3 (b)

4 (d)

5 (d)

2 1 the base length

2 3 : 4

3 C

4 70°

5 2

3

[a] In $\triangle ABC, \triangle ADE$:

$\therefore \overline{ED} \parallel \overline{BC}, \overline{AB}$ is a transversal

$\therefore m(\angle B) = m(\angle ADE)$ (corresponding angles) (1)

$\therefore \overline{ED} \parallel \overline{BC}, \overline{AC}$ is a transversal

$\therefore m(\angle C) = m(\angle AED)$ (corresponding angles) (2)

$\angle A$ is a common angle (3)

From (1), (2) and (3):

$\therefore \triangle ABC \sim \triangle ADE$ (First req.)

$$\frac{AB}{AD} = \frac{BC}{DE} = \frac{AC}{AE} \quad \therefore \frac{BC}{8} = \frac{21}{9}$$

$$\therefore BC = \frac{8 \times 21}{9} = 18 \frac{2}{3} \text{ cm.} \quad (\text{Second req.})$$

[b] \therefore The area of $\triangle AEB$ = The area of $\triangle DEC$

Adding the area of $\triangle AED$ to both sides

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$

and they have a common base \overline{AD} and on one side of it.

$\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4

[a] $\therefore \triangle ABC, \triangle DBC$ have a common base \overline{BC}

$\therefore \overline{AD} \parallel \overline{BC}$

\therefore The area of $\triangle ABC$ = the area of $\triangle DBC$

Subtracting the area of $\triangle MBC$ from both sides.

\therefore The area of $\triangle ABM$ = the area of $\triangle DCM$ (1)

$\therefore \overline{MX}$ is a median in the $\triangle ABC$

\therefore The area of $\triangle BMX$ = the area of $\triangle CMX$ (2)

Adding (1) and (2) :

\therefore The area of the figure $ABXM$ = the area of the figure $DCXM$ (Q.E.D.)

[b] $\therefore BC = 2 AD = 20$ cm.

$\therefore AD = 10$ cm.

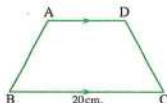
\therefore the area of the trapezium $ABCD$

$= \frac{1}{2} (BC + AD) \times \text{the height}$

$\therefore 180 = \frac{1}{2} (20 + 10) \times \text{the height}$

$\therefore 180 = 15 \times \text{the height}$

\therefore The height = $\frac{180}{15} = 12$ cm. (The req.)



5

[a] In $\triangle ABC$:

$\therefore m(\angle BAC) = 90^\circ$

$\therefore \overline{AD} \perp \overline{BC}$

$\therefore (AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore AD = 12$ cm.

$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore AB = 15$ cm.

$\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$

$\therefore AC = 20$ cm.

(The req.)

[b] In $\triangle ABC$:

$\therefore (AC)^2 = (9)^2 = 81$

$\therefore (AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore \triangle ABC$ is an acute-angle triangle. (The req.)

14

El-Fayoum

1 (d)

2 (b)

3 (d)

4 (c)

5 (b)

2 1 proportional, equal in measure

2 B

3 equal in area

4 5

5 BC

3

[a] $\therefore \triangle ADC$ is right-angled at D

$\therefore (AC)^2 = (AD)^2 + (DC)^2 = (4)^2 + (8)^2 = 80$

$\therefore \triangle ADB$ is a right-angled at D

$\therefore (AB)^2 = (AD)^2 + (BD)^2 = (4)^2 + (2)^2 = 20$

In $\triangle ABC$:

$\therefore (AC)^2 + (AB)^2 = 80 + 20 = 100$

$\therefore (BC)^2 = (10)^2 = 100$

$\therefore (BC)^2 = (AC)^2 + (AB)^2$

$\therefore m(\angle BAC) = 90^\circ$ (Q.E.D.)

[b] $\therefore \triangle XYZ \sim \triangle RYX$

$\therefore m(\angle YXZ) = m(\angle YRX) = 90^\circ$

$\therefore \overline{XR} \perp \overline{YZ}$ (First req.)

In $\triangle XYZ$: $\therefore m(\angle YXZ) = 90^\circ$

$\therefore (YZ)^2 = (XY)^2 + (XZ)^2 = 6^2 + 8^2 = 100$

$\therefore YZ = 10$ cm, $\therefore \overline{XR} \perp \overline{YZ}$

$\therefore (XZ)^2 = RZ \times YZ$

$\therefore 8^2 = RZ \times 10$

$\therefore RZ = \frac{64}{10} = 6.4$ (Second req.)

4

[a] $\therefore ABCD$ is a rectangle

$\therefore \overline{AB} \parallel \overline{CD}$

$\therefore M \in \overline{AB}, N \in \overline{AB}$

$\therefore \overline{MN} \parallel \overline{DC}$

$\therefore \overline{CN} \parallel \overline{DM}$

$\therefore MNCD$ is a parallelogram

\therefore the rectangle $ABCD$ and the parallelogram

$MNCD$ have the common base CD

$\therefore \overline{AB} \parallel \overline{CD}$

\therefore The area of $\square MNCD$ = the area of $\square ABCD$
 $= 18 \times 5 = 90 \text{ cm}^2$

(First req.)

\therefore The length of the perpendicular from M to \overline{CN}

$= \frac{\text{The area of } \square MNCD}{CN} = \frac{90}{20} = 4.5 \text{ cm.}$

(Second req.)

[b] $\therefore \triangle ABD, \triangle ACD$ have a common base \overline{AD}

$\therefore \overline{AD} \parallel \overline{BC}$

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$

Subtracting the area of $\triangle AMD$ from both sides

∴ The area of $\triangle AMB$ = the area of $\triangle DMC$

(Q.E.D.)

5

[a] ∴ \overline{MN} is a median in $\triangle BCM$

∴ The area of $\triangle BMN$ = the area of $\triangle CMN$ (1)

∴ the area of the figure $ABNM$ = the area of the figure $DCNM$ (2)

Subtracting (1) from (2) :

∴ The area of $\triangle ABM$ = the area of $\triangle DCM$

and the lengths of their bases are equal and on the same straight line and the two triangles are on the same side of the straight line.

∴ $\overline{CB} \parallel \overline{DA}$ (Q.E.D.)

[b] In $\triangle ABC$, $\angle AOL$:

∴ $\overline{BC} \parallel \overline{OL}$, \overline{AB} is a transversal

∴ $m(\angle B) = m(\angle AOL)$ (corresponding angles) (1)

∴ $\overline{BC} \parallel \overline{OL}$, \overline{AC} is a transversal

∴ $m(\angle C) = m(\angle ALO)$ (corresponding angles) (2)

∴ $\angle A$ is a common angle (3)

From (1), (2) and (3) :

∴ $\triangle ABC \sim \triangle AOL$ (First req.)

$$\frac{AB}{AO} = \frac{BC}{OL} = \frac{AC}{AL} \quad \therefore \frac{6}{4} = \frac{7.5}{OL} = \frac{AC}{6}$$

$$\therefore AC = \frac{6 \times 6}{4} = 9 \text{ cm.}$$

$$\therefore CL = 9 - 6 = 3 \text{ cm.}$$

$$\therefore OL = \frac{4 \times 7.5}{6} = 5 \text{ cm.} \quad (\text{Second req.})$$

15

Aswan

1 (b)

2 (d)

3 (a)

4 (c)

5 (b)

2 (b)

2 BC

3 120°

4 10

5 154

3

[a] ∴ $ABCD$ is a parallelogram

∴ $\overline{AB} \parallel \overline{CD}$ ∴ $\overline{BE} \parallel \overline{CD}$ (1)

∴ the area of $\triangle AME$ = the area of $\triangle ABC$

Subtracting the area of $\triangle AMB$ from both sides

∴ The area of $\triangle MBE$ = the area of $\triangle MBC$

and they have a common base \overline{MB} and on one side of it

∴ $\overline{CE} \parallel \overline{BD}$ (2)

From (1) and (2) :

∴ The figure $BECD$ is a parallelogram. (Q.E.D.)

[b] ∴ $\triangle ADC$ is right-angled at D

$$\therefore (AC)^2 = (AD)^2 + (DC)^2 = (4)^2 + (8)^2 = 80$$

∴ $\triangle ADB$ is right-angled at D

$$\therefore (AB)^2 = (AD)^2 + (BD)^2 = (4)^2 + (2)^2 = 20$$

In $\triangle ABC$:

$$\therefore (AC)^2 + (AB)^2 = 80 + 20 = 100$$

$$\therefore (BC)^2 = (10)^2 = 100$$

$$\therefore (BC)^2 = (AC)^2 + (AB)^2$$

$$\therefore m(\angle BAC) = 90^\circ \quad (\text{Q.E.D.})$$

4

[a] ∴ $\triangle ABF$ has a common base \overline{AB} with $\square ABCD$
∴ $F \in \overline{DC}$

∴ The area of $\triangle ABF = \frac{1}{2}$ the area of $\square ABCD$

∴ The area of $\triangle ADF$ + the area of $\triangle FBC$

$$= \frac{1}{2} \text{ the area of } \square ABCD \quad (1)$$

∴ $\triangle EBC$ has a common base \overline{BC} with $\square ABCD$
∴ $E \in \overline{AD}$

∴ The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABCD$ (2)

From (1) and (2)

∴ The area of $\triangle ADF$ + the area of $\triangle FBC$

$$= \text{the area of } \triangle EBC$$

Subtracting the area of $\triangle FBC$ from both sides

∴ The area of $\triangle AFD$ = the area of $\triangle EFC$

(Q.E.D.)

[b] In $\triangle XYZ$:

$$\therefore (YZ)^2 = (11)^2 = 121$$

$$\therefore (XY)^2 + (XZ)^2 = (8)^2 + (6)^2 = 100$$

$$\therefore (YZ)^2 > (XY)^2 + (XZ)^2$$

∴ $\triangle XYZ$ is an obtuse-angled triangle. (The req.)

5

[a] In $\triangle ABC$, EBD :

$\therefore \overline{AC} \parallel \overline{DE}$, \overleftrightarrow{AE} is a transversal

$\therefore m(\angle A) = m(\angle E)$ (alternate angles) (1)

$\therefore \overline{AC} \parallel \overline{DE}$, \overleftrightarrow{CD} is a transversal

$\therefore m(\angle C) = m(\angle D)$ (alternate angles) (2)

$\therefore m(\angle ABC) = m(\angle DBE)$ (V.O.A.) (3)

From (1), (2) and (3):

$\therefore \triangle ABC \sim \triangle EBD$ (First req.)

$$\frac{AB}{BE} = \frac{BC}{BD} = \frac{AC}{DE} \quad \therefore \frac{3}{BE} = \frac{4}{8}$$

$$\therefore BE = \frac{8 \times 3}{4} = 6 \text{ cm.} \quad \text{(Second req.)}$$

[b] $\therefore \triangle ABD$, ABC have a common base \overline{AB} , $\overline{AB} \parallel \overline{CD}$

\therefore The area of $\triangle ABD$ = the area of $\triangle ABC$

Subtracting the area of $\triangle ABM$ from both sides.

\therefore The area of $\triangle AMD$ = the area of $\triangle BMC$

But the area of $\triangle AMD$ = the area of $\triangle MCE$

\therefore The area of $\triangle BMC$ = the area of $\triangle MCE$

and they have a common base \overline{CM} and on one side of it

$\therefore \overline{MC} \parallel \overline{BE}$ (Q.E.D.)

1

Cairo Governorate

Heliopolis Directorate
Kalousdian-Nubarian Armenian School

Answer the following questions :

1 Choose the correct answer :

- 1 The area of the triangle is the area of the parallelogram which has a common base and its vertex lies on the straight line parallel to this base.
 (a) equal to (b) half (c) twice (d) quarter
- 2 If $\overline{AB} \parallel \overleftrightarrow{XY}$, then the length of the projection of \overline{AB} on \overleftrightarrow{XY} the length of \overline{AB}
 (a) < (b) > (c) = (d) ≤
- 3 In $\triangle ABC$, if $(AC)^2 > (AB)^2 + (BC)^2$, then the angle B is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 4 The height of the triangle whose area is 24 cm^2 and its corresponding base length is 8 cm. equals cm.
 (a) 3 (b) 4 (c) 6 (d) 8
- 5 If the ratio of enlargement between two triangles equals 1, then the two triangles are
 (a) congruent. (b) enlargement. (c) coincide. (d) reduction.
- 6 A rhombus its two diagonals are of lengths 8 cm. and 6 cm., its area equals cm^2 .
 (a) 14 (b) 20 (c) 24 (d) 48

2 Complete each of the following :

- 1 The median of a triangle divides its surface into two triangles
- 2 If the point $A \in$ the straight line L, then the projection of the point A on this straight line is
- 3 If two triangles are similar, then the lengths of their corresponding sides are
- 4 If the area of a trapezium is 75 cm^2 and the length of its middle base is 15 cm., then its height is cm.
- 5 If $\triangle ABC \sim \triangle XYZ$, $AB = 5 \text{ cm.}$, $XY = 10 \text{ cm.}$ and $YZ = 8 \text{ cm.}$, then $BC =$ cm.

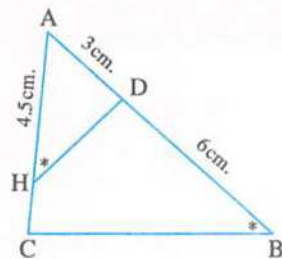
3 [a] In the opposite figure :

$$m(\angle AHD) = m(\angle B)$$

, $AD = 3$ cm. , $AH = 4.5$ cm. and $BD = 6$ cm.

1 Prove that : $\triangle ADH \sim \triangle ACB$

2 Find : the length of \overline{HC}



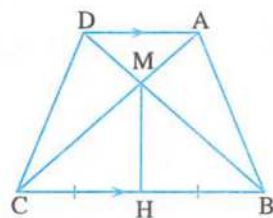
[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, H is the midpoint of \overline{BC}

Prove that :

1 The area of $\triangle AMB$ = the area of $\triangle DMC$

2 The area of the figure ABHM = the area of the figure DCHM



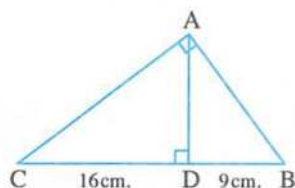
4 [a] In the opposite figure :

$$m(\angle BAC) = 90^\circ , \overline{AD} \perp \overline{BC}$$

, $BD = 9$ cm. , $DC = 16$ cm.

1 Find : the length of \overline{AB}

2 Find : the length of the projection of \overline{AC} on \overline{AD}



[b] A trapezium , its area is 6 cm^2 , the length of one of its two parallel bases equals 5 cm. and its height is 7 cm. Find the length of the other base.

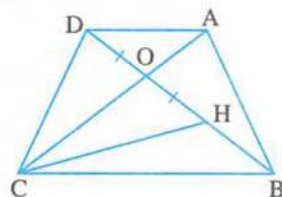
5 [a] In the opposite figure :

ABCD is a quadrilateral its diagonals intersect at the point O

, $H \in \overline{BO}$ where $OH = OD$

, the area of $\triangle ABO$ = the area of $\triangle HOC$

Prove that : $\overline{AD} \parallel \overline{BC}$



[b] Identify the type of $\triangle ABC$ according to the measures of its angles where $AB = 5$ cm. , $BC = 6$ cm. , $AC = 7$ cm.

2

Cairo Governorate

El-Nozha Directorate of Education
Modern Language Schools



Answer the following questions :

1 Choose the correct answer :

1 The area of the trapezium whose middle base is of length 7 cm. and its height is 6 cm. equals

(a) 21 cm^2

(b) 40 cm^2

(c) 42 cm^2

(d) 13 cm^2

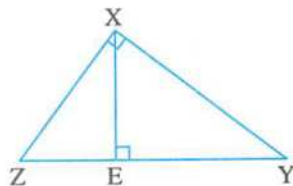
- 2 In $\triangle ABC$, if $m(\angle C) = 90^\circ$, $AB = 20$ cm. and $BC = 16$ cm., then $AC = \dots\dots\dots$ cm.

(a) 9 (b) 12 (c) $4\sqrt{41}$ (d) 25

- 3 In the opposite figure :

$EY \times EZ = \dots\dots\dots$

(a) $(XE)^2$ (b) $(XZ)^2$
(c) $(YZ)^2$ (d) $(XY)^2$



- 4 The triangle whose sides lengths are 5 cm. , 8 cm. and 7 cm. is $\dots\dots\dots$ -angled triangle.

(a) a right (b) an acute (c) an obtuse (d) a straight

- 5 If the triangle base length is 6 cm. and its area is 24 cm^2 , then its corresponding height is $\dots\dots\dots$

(a) 18 cm. (b) 8 cm. (c) 4 cm. (d) 10 cm.

- 6 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on $\overline{XY} \dots\dots\dots$ the length of \overline{AB}

(a) < (b) > (c) = (d) \geq

2 Complete :

- The two polygons are similar if their corresponding side lengths are $\dots\dots\dots$ and their corresponding angles are $\dots\dots\dots$
- If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) + m(\angle B) = 60^\circ$, then $m(\angle Z) = \dots\dots\dots^\circ$
- If $\triangle ABC$ is an obtuse-angled triangle at B, then $(AC)^2 \dots\dots\dots (AB)^2 + (BC)^2$
- If the length of the diagonal of a square is 10 cm. , then its area = $\dots\dots\dots \text{cm}^2$
- If the ratio between the lengths of two corresponding sides of two similar polygons is 2 : 5 and the perimeter of the smaller one is 12 cm. , then the perimeter of the other one is $\dots\dots\dots$

3 [a] In the opposite figure :

ABCD is a quadrilateral in which :

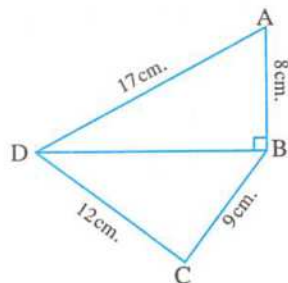
$AB = 8$ cm. , $BC = 9$ cm.

, $CD = 12$ cm. , $AD = 17$ cm.

and $\overline{DB} \perp \overline{AB}$

- 1 Find : the length of \overline{BD}

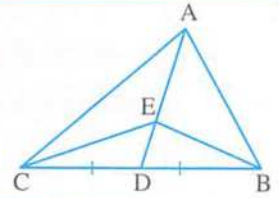
- 2 Prove that : $m(\angle C) = 90^\circ$



[b] In the opposite figure :

ABC is a triangle with a median \overline{AD} , $E \in \overline{AD}$

Prove that : the area of $\triangle ABE$ = the area of $\triangle ACE$

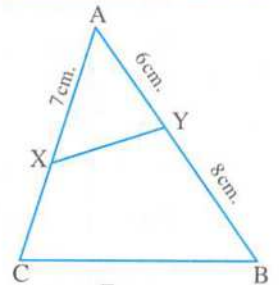


4 [a] In the opposite figure :

$\triangle AXY \sim \triangle ABC$, $AX = 7$ cm.

, $AY = 6$ cm. , $YB = 8$ cm.

Find : the length of \overline{XC}

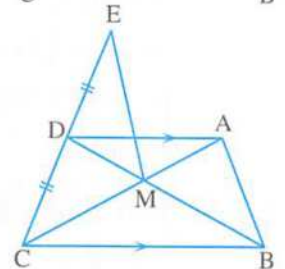


[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, D is the midpoint of \overline{EC}

Prove that : the area of $\triangle MDE$ = the area of $\triangle AMB$



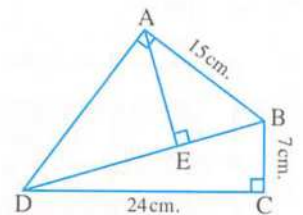
5 In the opposite figure :

ABCD is a quadrilateral , $m(\angle BCD) = m(\angle BAD) = 90^\circ$

, $\overline{AE} \perp \overline{BD}$

1 Find : the length of each of \overline{BD} and \overline{AD}

2 Find : the length of the projection of \overline{AB} on \overline{BD}



3

Cairo Governorate

El Zawia Educational Zone
Geel Almostakbal E.L.S.



Answer the following questions :

1 Complete each of the following :

- 1** The diagonal length of a square whose area is 50 cm^2 equals
- 2** The lengths of two adjacent sides in a parallelogram are 9 cm. , 6 cm. and the smallest height is 4 cm. , then the length of the other height is
- 3** The two polygons similar to a third are
- 4** The median of a triangle divides it into two triangles in area.
- 5** The area of the trapezium whose parallel bases are of lengths 6 cm. , 10 cm. and its height is 5 cm. equals

2 Choose the correct answer :

- 1 If the area of a rhombus is 24 cm^2 and the length of one of its diagonals is 6 cm. , then the length of the other diagonal is
- (a) 4 cm. (b) 8 cm. (c) 10 cm. (d) 12 cm.
- 2 The length of the projection of a given line segment the length of the original line segment.
- (a) \geq (b) $>$ (c) \leq (d) $=$
- 3 ABC is an obtuse-angled triangle at A in which $AB = 5 \text{ cm}$, $BC = 8 \text{ cm}$, then $AC = \dots\dots\dots \text{ cm}$.
- (a) 5 (b) 7 (c) 8 (d) 13
- 4 ABC is a triangle in which $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle A) = \dots\dots\dots$
- (a) 40° (b) 50° (c) 90° (d) 130°
- 5 The diagonals of an isosceles trapezium are
- (a) congruent. (b) perpendicular. (c) bisecting each other. (d) parallel.

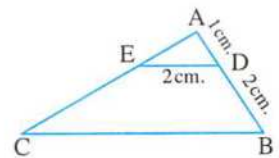
6 In the opposite figure :

If $\triangle ADE \sim \triangle ABC$

, then the length of

\overline{BC} in cm. equals cm.

- (a) 3 (b) 4 (c) 6 (d) 8


3 [a] In the opposite figure :

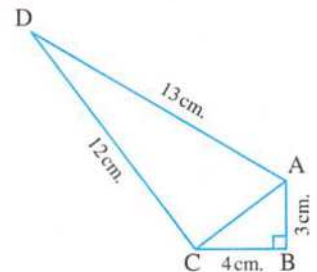
$AB = 3 \text{ cm}$, $BC = 4 \text{ cm}$.

, $AD = 13 \text{ cm}$, $CD = 12 \text{ cm}$.

, $m(\angle B) = 90^\circ$

Prove that :

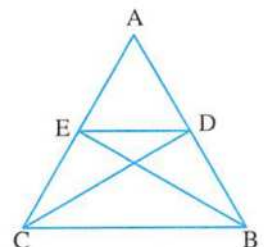
$m(\angle ACD) = 90^\circ$


[b] In the opposite figure :

If the area of $\triangle ADC =$ the area of $\triangle AEB$

Prove that :

$\overline{DE} \parallel \overline{BC}$



4 [a] In the opposite figure :

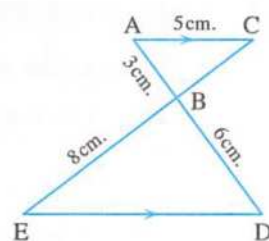
$$\overline{AC} \parallel \overline{DE}$$

$$\overline{AD} \cap \overline{CE} = \{B\}$$

, $AB = 3$ cm. , $AC = 5$ cm. , $BD = 6$ cm. , $EB = 8$ cm.

1 Prove that : $\triangle ABC \sim \triangle DBE$

2 Find the length of each of : \overline{BC} , \overline{DE}



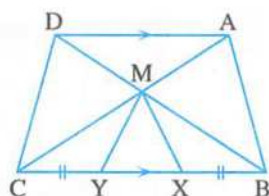
[b] In the opposite figure :

$$\overline{AD} \parallel \overline{BC} , \overline{AC} \cap \overline{BD} = \{M\}$$

, $X \in \overline{BC}$, $Y \in \overline{BC}$ such that $BX = CY$

Prove that :

The area of the shape $ABXM$ = the area of the shape $DCYM$



5 In the opposite figure :

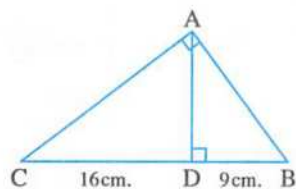
$\triangle ABC$ is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, $BD = 9$ cm. , $CD = 16$ cm. **Find :**

1 The length of \overline{AB}

2 The length of the projection of \overline{AC} on \overline{AD}

3 The area of $\triangle ABC$



4

Giza Governorate

Math Inspection



Answer the following questions :

1 Complete each of the following :

1 A square its diagonal length = 12 cm. , then its area = cm^2

2 If $\overline{AB} \perp \overline{CD}$, then the length of the projection of \overline{AB} on \overline{CD} equals

3 The two polygons are similar if their corresponding angles are and their corresponding sides are

4 The area of a triangle is equal to half of the area of a parallelogram if they have a common base and

5 $\triangle ABC$ is a triangle , $AB = 8$ cm. , $BC = 9$ cm. and $AC = 6$ cm. , then its type according to its angles is

2 Choose the correct answer :

- 1 The area of a parallelogram = 24 cm^2 and its base length is 6 cm. , then its corresponding height = cm.
 (a) 8 (b) 4 (c) 48 (d) 12
- 2 The median of a triangle divides its surface into two triangles
 (a) similar. (b) congruent. (c) equal in area. (d) equal in perimeter.
- 3 In $\triangle ABC$, if $(AC)^2 < (AB)^2 + (BC)^2$, then the type of $\angle B$ is
 (a) obtuse. (b) right. (c) acute. (d) straight.
- 4 The trapezium whose middle base length = 9 cm. and its height = 6 cm. , its area = cm^2 .
 (a) 27 (b) 54 (c) 15 (d) 108
- 5 $\overline{AB} \parallel \overline{CD}$, then the length of the projection of \overline{AB} on \overline{CD} the length of \overline{AB}
 (a) $>$ (b) $<$ (c) $=$ (d) \leq
- 6 A rhombus whose diagonal lengths are 12 cm. , 8 cm. its area = cm^2 .
 (a) 48 (b) 96 (c) 20 (d) 144

3 [a] In the opposite figure :

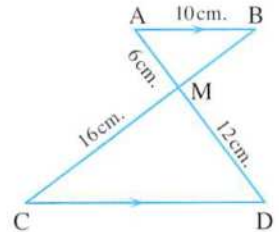
$$\overline{AB} \parallel \overline{DC} , \overline{AD} \cap \overline{BC} = \{M\}$$

, $AB = 10 \text{ cm}$, $AM = 6 \text{ cm}$.

, $MD = 12 \text{ cm}$, $MC = 16 \text{ cm}$.

1 Prove that : $\triangle AMB \sim \triangle DMC$

2 Find : the length of \overline{CD}



- [b] Find the height of the trapezium whose area = 450 cm^2 and the two base lengths are 24 cm. , 12 cm.

4 [a] In the opposite figure :

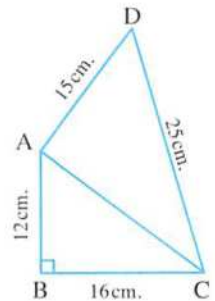
ABCD is a quadrilateral , $m(\angle B) = 90^\circ$, $AB = 12 \text{ cm}$.

, $BC = 16 \text{ cm}$, $CD = 25 \text{ cm}$ and $DA = 15 \text{ cm}$.

1 Find : AC

2 Prove that : $m(\angle DAC) = 90^\circ$

- [b] Determine the type of the triangle ABC according to its angles if $AB = 12 \text{ cm}$, $BC = 5 \text{ cm}$ and $AC = 13 \text{ cm}$, then find its area.

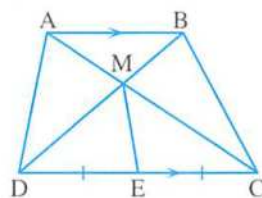


5 [a] In the opposite figure :

$$\overline{AB} \parallel \overline{DC}, \overline{AC} \cap \overline{BD} = \{M\}$$

, E is the midpoint of \overline{CD}

Prove that : the area of the figure ADEM
= the area of the figure BCEM



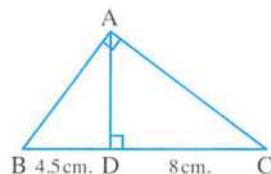
[b] In the opposite figure :

ABC is a triangle , $m(\angle BAC) = 90^\circ$

, $\overline{AD} \perp \overline{BC}$

, $BD = 4.5 \text{ cm.}$, $DC = 8 \text{ cm.}$

Find : AD , AB , AC



5

Giza Governorate

Omrana Directorate
El-Sadat Governmental Language School



Answer the following questions :

1 Choose the correct answer :

1 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

2 A rhombus whose diagonal lengths are 6 cm. , 10 cm. its area = cm^2

- (a) 60 (b) 30 (c) 15 (d) 10

3 If the length of the middle base of a trapezium is 8 cm. and its surface area is 56 cm^2 , then its height = cm.

- (a) 32 (b) 24 (c) 448 (d) 7

4 If the ratio of enlargement between two triangles equals 1 , then the two triangles are

- (a) congruent. (b) enlargement. (c) coincide. (d) reduction.

5 Any triangle has at least two angles.

- (a) right (b) obtuse (c) acute (d) straight

6 The isosceles triangle has axis of symmetry.

- (a) zero (b) one (c) two (d) three

2 Complete each of the following :

1 The median of a triangle divides it into two triangles in area.

2 Two triangles are similar if their corresponding side lengths are

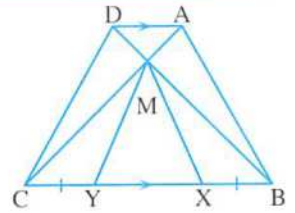
- 3 ABCD is a rectangle, the projection of \overline{AB} on \overline{BC} is
- 4 The surfaces of two parallelograms with common base and between two parallel straight lines one is carrying this base are
- 5 ABCD is a parallelogram its area = 36 cm^2 , $E \in \overline{AD}$, then the area of $\triangle EBC = \dots\dots\dots \text{cm}^2$

3 [a] In the opposite figure :

$$\overline{AD} \parallel \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}$$

$$, X \in \overline{BC}, Y \in \overline{BC} \text{ such that } BX = CY$$

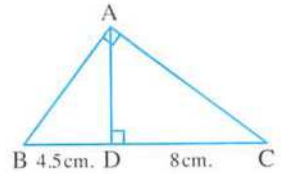
Prove that : the area of the shape ABXM
= the area of the shape DCYM



[b] In the opposite figure :

ABC is a triangle in which : $m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 $, BD = 4.5 \text{ cm.}, DC = 8 \text{ cm.}$

Find : the length of each of \overline{AC} , \overline{AB} , \overline{AD}



4 [a] In the opposite figure :

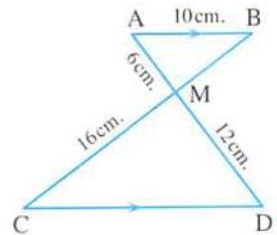
$$\overline{AB} \parallel \overline{DC}, \overline{AD} \cap \overline{BC} = \{M\}$$

$$, AB = 10 \text{ cm.}, AM = 6 \text{ cm.}$$

$$, MD = 12 \text{ cm.}, MC = 16 \text{ cm.}$$

1 **Prove that :** $\triangle AMB \sim \triangle DMC$

2 **Find :** the length of each of \overline{CD} , \overline{MB}



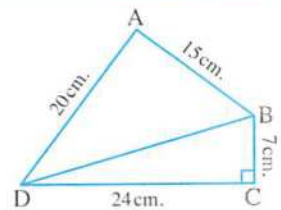
[b] Identify the type of $\triangle ABC$ according to the measures of its angles where
 $AB = 5 \text{ cm.}, BC = 6 \text{ cm.}, AC = 7 \text{ cm.}$

5 [a] In the opposite figure :

$$m(\angle BCD) = 90^\circ, AB = 15 \text{ cm.}$$

$$, BC = 7 \text{ cm.}, CD = 24 \text{ cm.}, AD = 20 \text{ cm.}$$

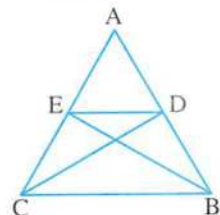
Prove that : $m(\angle BAD) = 90^\circ$



[b] In the opposite figure :

If the area of $\triangle ADC$ = the area of $\triangle AEB$

prove that : $\overline{DE} \parallel \overline{BC}$





Answer the following questions :

1 Choose the correct answer :

- 1 If the area of a parallelogram is 40 cm^2 and its base length is 5 cm. , then the corresponding height to this base is cm.
(a) 16 (b) 8 (c) 20 (d) 5
- 2 A triangle ABC in which $(AC)^2 - (AB)^2 = (BC)^2$, then $\angle B$ is
(a) acute. (b) right. (c) reflex. (d) obtuse.
- 3 If the area of a square is 72 cm^2 , then its diagonal length is cm.
(a) 6 (b) 8 (c) 36 (d) 12
- 4 ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, $D \in \overline{AC}$, then the projection of \overline{BD} on \overline{AC} is
(a) A (b) B (c) C (d) D
- 5 ABC is a triangle in which $(AB)^2 = (BC)^2 + (AC)^2$ and $m(\angle B) = 40^\circ$, then $m(\angle A) =$
(a) 40° (b) 50° (c) 90° (d) 130°
- 6 If \overline{XL} is a median in $\triangle XYZ$, then the area of $\triangle XYZ =$ the area of $\triangle XYL$
(a) 2 (b) 4 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

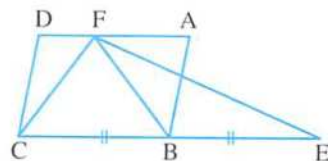
2 Complete each of the following :

- 1 If the ratio of enlargement between two triangles equals 1 , then the two triangles are
- 2 A trapezium whose base lengths are 8 cm. , 10 cm. , and its height is 5 cm. , then its area equals cm^2 .
- 3 ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$, $D \in \overline{BC}$, $DC = 9 \text{ cm.}$, $BD = 16 \text{ cm.}$, then the length of $\overline{AC} =$ cm.
- 4 A triangle whose side lengths are 6 cm. , 8 cm. , 11 cm. , then its type according to its angles is
- 5 If ABC is a triangle , $m(\angle A) = 3x^\circ$, $m(\angle B) = 5x^\circ$, $m(\angle C) = 4x^\circ$, then $m(\angle B) =$ $^\circ$

3 [a] In the opposite figure :

ABCD is a parallelogram
 , $E \in \overline{CB}$, where $BC = BE$

Prove that : The area of $\triangle EFC =$ The area of $\square ABCD$



[b] In the opposite figure :

ABCD is a quadrilateral ,

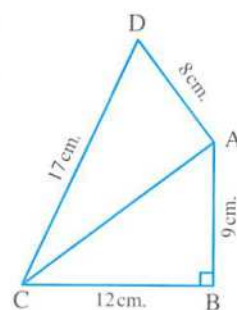
$$m(\angle B) = 90^\circ$$

$$, AB = 9 \text{ cm.}$$

$$, BC = 12 \text{ cm.}, DA = 8 \text{ cm.}, CD = 17 \text{ cm.}$$

Prove that :

$$m(\angle DAC) = 90^\circ$$



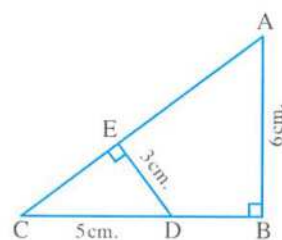
4 [a] In the opposite figure :

ABC is a right-angled triangle at B

$$, \overline{ED} \perp \overline{AC}, CD = 5 \text{ cm.}, AB = 6 \text{ cm.}, ED = 3 \text{ cm.}$$

1 Prove that : $\triangle CED \sim \triangle CBA$

2 Find : The length of \overline{AC}



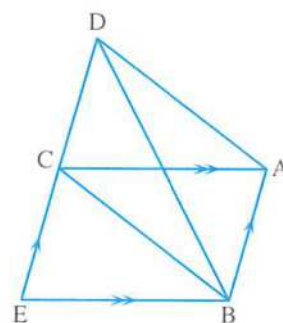
[b] In the opposite figure :

ABEC is a parallelogram

$$, D \in \overrightarrow{EC}$$

such that the area of $\triangle DBC =$ the area of $\triangle EBC$

Prove that : $\overline{AD} \parallel \overline{BC}$



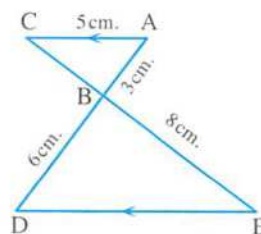
5 [a] In the opposite figure :

$$\overline{AC} \parallel \overline{ED}, \overline{AD} \cap \overline{CE} = \{B\}, AC = 5 \text{ cm.}$$

$$, AB = 3 \text{ cm.}, BD = 6 \text{ cm.}, BE = 8 \text{ cm.}$$

1 Prove that : $\triangle ABC \sim \triangle DBE$

2 Find : The perimeter of the triangle BED



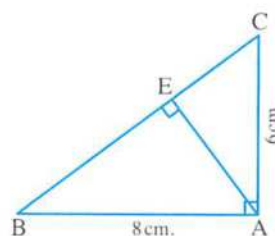
[b] In the opposite figure :

ABC is a triangle in which : $m(\angle BAC) = 90^\circ, \overline{AE} \perp \overline{BC}$

Find :

1 The length of the projection of \overline{AB} on \overrightarrow{BC}

2 The length of \overline{EC}





Answer the following questions :

1 Complete each of the following :

- 1 The area of the rhombus whose diagonal lengths are 12 cm. , 8 cm. equals cm^2
- 2 If $\overline{AD} \perp \overline{BC}$, then the length of the projection of \overline{AD} on \overline{BC} equals cm.
- 3 ABC is a right-angled triangle at B in which $AB = 5 \text{ cm.}$, $BC = 12 \text{ cm.}$
 , then $AC =$ cm.
- 4 In $\triangle ABC$, $AB = 8 \text{ cm.}$, $BC = 9 \text{ cm.}$ and $AC = 6 \text{ cm.}$, then the type of this triangle according to the measures of its angles is
- 5 The number of axes of symmetry of an isosceles triangle equals

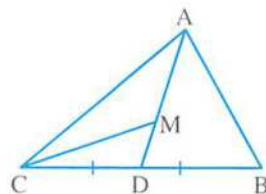
2 Choose the correct answer :

- 1 The diagonals of an isosceles trapezium are
 (a) congruent. (b) perpendicular.
 (c) bisecting each other. (d) parallel.
- 2 If the ratio between two corresponding sides of two similar triangles is 1 : 2 and the measure of an angle of the first triangle equals 60° , then the measure of its corresponding angle in the other triangle equals
 (a) 30° (b) 120° (c) 60° (d) 62°
- 3 The image of the point (2 , 0) is itself by reflection on
 (a) X-axis (b) y-axis
 (c) origin point. (d) X-axis followed by y-axis
- 4 The perpendicular segment drawn from the right angle of a triangle to the hypotenuse divides it into two triangles.
 (a) obtuse-angled (b) acute-angled
 (c) equilateral (d) similar
- 5 The measure of the complementary angle of an angle whose measure is X° equals
 (a) 90° (b) $90^\circ - X^\circ$ (c) $X^\circ - 90^\circ$ (d) $90 X^\circ$
- 6 ABCD is a parallelogram , $E \in \overline{BC}$, then the area of $\square ABCD =$ the area of $\triangle EAD$
 (a) same (b) half (c) twice (d) third

3 [a] In the opposite figure :

ABC is a triangle , M is the point of concurrence of its medians.

Prove that : the area of $\triangle AMC = \frac{1}{3}$ the area of $\triangle ABC$

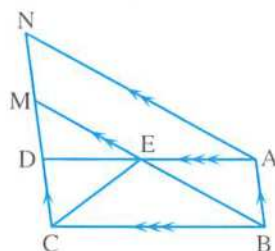


[b] In the opposite figure :

ABCD and ABMN are two parallelograms.

Prove that :

The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABMN$



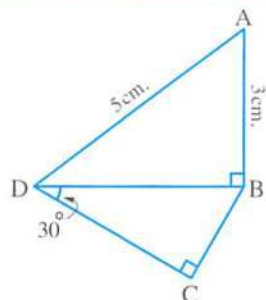
4 [a] In the opposite figure :

ABCD is a quadrilateral in which :

$m(\angle ABD) = 90^\circ$, $m(\angle BCD) = 90^\circ$

, $m(\angle BDC) = 30^\circ$, $AB = 3$ cm. , $AD = 5$ cm.

Find : the lengths of \overline{BD} and \overline{BC}



[b] In the opposite figure :

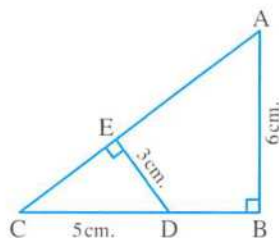
ABC is a right-angled triangle at B

, $\overline{DE} \perp \overline{AC}$, $AB = 6$ cm.

, $ED = 3$ cm. , $CD = 5$ cm.

1 Prove that : $\triangle ABC \sim \triangle DEC$

2 Find : the length of \overline{AC}



5 [a] The area of a trapezium is 88 cm^2 , its height is 8 cm. and the length of one of the two parallel bases is 10 cm. Find the length of the other base.

[b] In the opposite figure :

$m(\angle ABD) = 90^\circ$, $\overline{CE} \perp \overline{AB}$

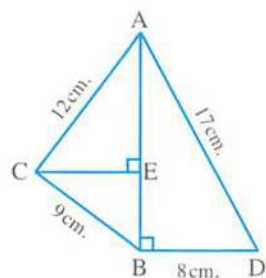
, $CB = 9$ cm. , $AD = 17$ cm.

, $BD = 8$ cm. , $AC = 12$ cm.

1 Find : the length of \overline{AB}

2 Prove that : $m(\angle ACB) = 90^\circ$

3 Find : the length of the projection of \overline{AC} on \overrightarrow{AB}





Answer the following questions :

1 Choose the correct answer :

- 1 Any triangle has at least two interior angles.
(a) right (b) obtuse (c) acute (d) straight
- 2 If the area of a trapezium is 100 cm^2 and its height is 5 cm. , then the length of its middle base is cm.
(a) 20 (b) 30 (c) 50 (d) 40
- 3 ABCD is a parallelogram , $E \in \overline{BC}$, then the area of $\square ABCD = \dots\dots\dots$ the area of $\triangle EAD$
(a) same (b) half (c) twice (d) third
- 4 If $\triangle XYZ$ is an obtuse-angled triangle at Y , then $(XZ)^2 \dots\dots\dots (XY)^2 + (YZ)^2$
(a) < (b) > (c) = (d) \geq
- 5 ABCD is a square , then the projection of \overline{AC} on \overline{BC} is
(a) \overline{AB} (b) \overline{BC} (c) \overline{CD} (d) \overline{AD}
- 6 A rhombus whose diagonal lengths are 6 cm. , 10 cm. has area cm^2 .
(a) 60 (b) 30 (c) 15 (d) 10

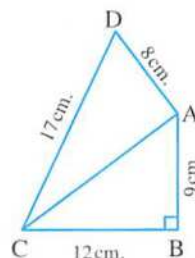
2 Complete each of the following :

- 1 If two straight lines intersect , then each two vertically opposite angles are
- 2 In the triangle ABC , if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$
- 3 $\triangle ABC \sim \triangle XYZ$, and $m(\angle B) + m(\angle C) = 70^\circ$, then $m(\angle X) = \dots\dots\dots^\circ$
- 4 The number of axes of symmetry of the rectangle is
- 5 The ratio between the perimeters of two similar polygons is 3 : 5 , then the ratio between the lengths of two corresponding sides is

3 [a] In the opposite figure :

ABCD is a quadrilateral
 , $m(\angle B) = 90^\circ$
 , $AB = 9 \text{ cm}$, $BC = 12 \text{ cm}$.
 , $CD = 17 \text{ cm}$ and $DA = 8 \text{ cm}$.

Prove that : $m(\angle DAC) = 90^\circ$

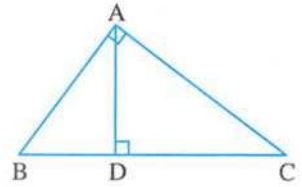


[b] In the opposite figure :

ABC is a triangle , $m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

Then complete :

- 1 The projection of \overline{AC} on \overline{BC} is
- 2 The projection of \overline{AD} on \overline{BC} is



4 [a] In the opposite figure :

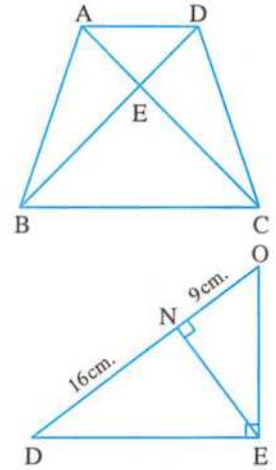
The area of $\triangle AEB$
= the area of $\triangle DEC$

Prove that : $\overline{AD} \parallel \overline{BC}$

[b] In the opposite figure :

OED is a right-angled triangle at E
 , $\overline{EN} \perp \overline{DO}$, $DN = 16$ cm.
and $ON = 9$ cm.

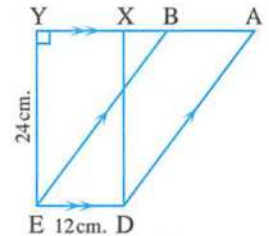
Find the length of each of : \overline{EN} , \overline{EO} , \overline{ED}



5 In the opposite figure :

$\overline{AB} \parallel \overline{DE}$, $X \in \overline{AB}$ and $Y \in \overline{AB}$
 , XDEY is a rectangle and $\overline{AD} \parallel \overline{BE}$

- 1 Prove that : the area of figure ABED = the area of rectangle XYED
- 2 Find : the area of the figure ABED
- 3 If $AD = 30$ cm. , find the length of the perpendicular from B to \overline{AD}



9

El-Kalyoubia Governorate

Math's Inspection



Answer the following questions :

1 Choose the correct answer from those given :

- 1 The sum of measures of the interior angles of a triangle equals °
(a) 90 (b) 180 (c) 80 (d) 360
- 2 The area of the rhombus whose diagonal lengths are 6 cm. and 8 cm. is cm^2 .
(a) 7 (b) 24 (c) 48 (d) 14
- 3 ABCD is a parallelogram in which $m(\angle A) = 120^\circ$, then $m(\angle B) =$ °
(a) 120 (b) 60 (c) 90 (d) 180

- 4 If $\triangle ABC \cong \triangle XYZ$ and $m(\angle X) = 70^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$
 (a) 70 (b) 55 (c) 50 (d) 80
- 5 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle B) = m(\angle \dots\dots\dots)$
 (a) C (b) Z (c) X (d) Y
- 6 ABC is a triangle in which $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is $\dots\dots\dots$
 (a) acute (b) right (c) obtuse (d) straight

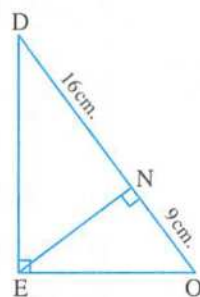
2 Complete each of the following :

- 1 The area of the parallelogram = the length of the base $\times \dots\dots\dots$
- 2 Two polygons are similar if $\dots\dots\dots$
- 3 If the point $A \in$ the line L , then the projection of the point A on the line L is $\dots\dots\dots$
- 4 In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$
- 5 The surfaces of two parallelograms with common base and between two parallel straight lines, one is carrying this base are $\dots\dots\dots$

3 [a] In the opposite figure :

DEO is a right-angled triangle at E
 $\overline{EN} \perp \overline{DO}$, $DN = 16$ cm.
 and $ON = 9$ cm.

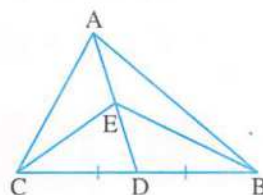
Find the length of each of : \overline{EN} , \overline{DE} , \overline{EO}



[b] In the opposite figure :

\overline{AD} is a median in $\triangle ABC$, $E \in \overline{AD}$
 and \overline{BE} , \overline{CE} are drawn.

Prove that : the area of $\triangle ABE$ = the area of $\triangle ACE$

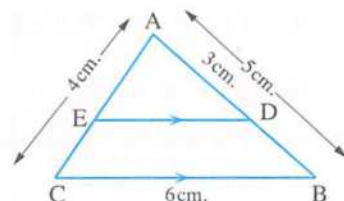


4 [a] In the opposite figure :

ABC is a triangle in which $AB = 5$ cm.
 $BC = 6$ cm., $AC = 4$ cm. and $D \in \overline{AB}$
 where $AD = 3$ cm., $\overline{DE} \parallel \overline{BC}$, $\overline{DE} \cap \overline{AC} = \{E\}$

1 Prove that : $\triangle ADE \sim \triangle ABC$

2 Find the length of each of : \overline{DE} and \overline{AE}

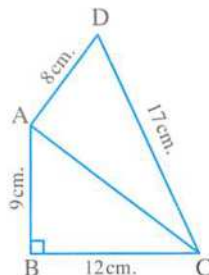


- [b] The area of a trapezium is 108 cm^2 and the length of one of its parallel bases is 15 cm.
 Find the length of the other base, if the height of the trapezium is 8 cm.

5 [a] In the opposite figure :

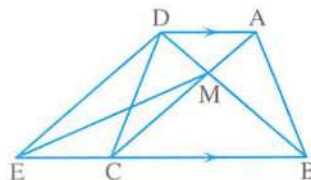
ABCD is a quadrilateral
 $m(\angle B) = 90^\circ$, $AB = 9$ cm.
 $BC = 12$ cm., $CD = 17$ cm.
 and $DA = 8$ cm.

Prove that : $m(\angle DAC) = 90^\circ$

**[b] In the opposite figure :**

ABCD is a quadrilateral, $\overline{AD} \parallel \overline{BC}$, $E \in \overline{BC}$
 $\overline{AC} \cap \overline{BD} = \{M\}$
 , the area of $\triangle ABM =$ the area of $\triangle ECM$

Prove that : $\overline{DE} \parallel \overline{AC}$

**10****El-Sharkia Governorate**
 Directorate of Education
 Dep. of Governmental L. Schools


Answer the following questions :

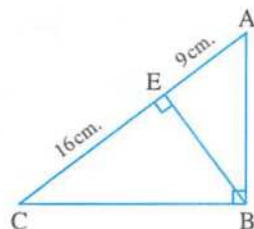
1 Choose the correct answer from those given :

- 1** ABCD is a parallelogram in which $AB = 5$ cm., $BC = 10$ cm. and its smaller height is 4 cm., then its area = cm^2
 (a) 40 (b) 20 (c) 10 (d) 50
- 2** The number of axes of symmetry of the square is
 (a) 1 (b) 2 (c) 3 (d) 4
- 3** In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is angle.
 (a) an acute (b) an obtuse (c) a right (d) a straight
- 4** If the projection of a line segment on a straight line is a point , then the line segment straight line.
 (a) \parallel (b) \perp (c) \equiv (d) \subset
- 5** If M is the midpoint of \overline{AB} , then $(AB)^2 = \dots\dots\dots (AM)^2$
 (a) 2 (b) $\frac{1}{2}$ (c) 4 (d) $\frac{1}{4}$
- 6** The area of the rhombus whose diagonal lengths are 16 cm., 18 cm. is cm^2
 (a) 144 (b) 148 (c) 128 (d) 288

2 Complete each of the following :
1 In the opposite figure :

$$m(\angle ABC) = 90^\circ, \overline{BE} \perp \overline{AC}$$

, EA = 9 cm. , EC = 16 cm. , then AB = cm.

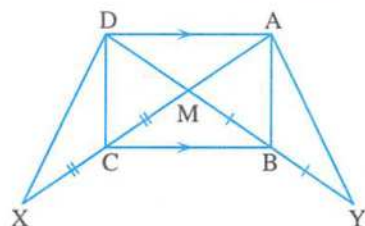
2 In $\triangle ABC$, if $(AB)^2 = (AC)^2 + (BC)^2$, then $m(\text{.....}) = 90^\circ$
3 The two triangles are similar if their corresponding side lengths are
4 The median of a triangle divides its surface into
5 The area of the rectangle =

3 [a] In the opposite figure :

$$\overline{AD} \parallel \overline{BC}, MB = BY$$

$$, MC = CX, \overline{AX} \cap \overline{DY} = \{M\}$$

Prove that : 1 the area of $\triangle MAB$ = the area of $\triangle MDC$

2 the area of $\triangle ABY$ = the area of $\triangle DCX$


[b] Determine the type of the triangle ABC according to its angles where AB = 7 cm. , BC = 6 cm. , AC = 9 cm.
4 [a] In the opposite figure :

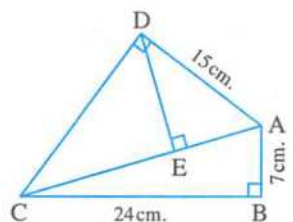
$$m(\angle ADC) = m(\angle ABC) = 90^\circ, \overline{DE} \perp \overline{AC}$$

, AB = 7 cm. , BC = 24 cm.

, AD = 15 cm.

Find : 1 The length of each of \overline{AC} and \overline{DC}

2 The length of the projection of \overline{AD} on \overline{AC}

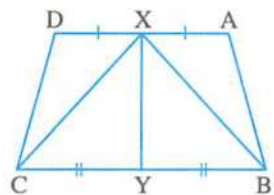

[b] Find the height of the a trapezium with area 450 cm^2 and its two bases lengths are 24 cm. , 12 cm.
5 [a] In the opposite figure :

ABCD is a quadrilateral , YC = YB

, X is the midpoint of \overline{AD} , Y is the midpoint of \overline{BC}

, the area of the figure ABYX = the area of the figure DCYX

Prove that : $\overline{AD} \parallel \overline{BC}$


[b] In the opposite figure :

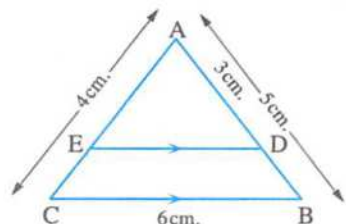
ABC is a triangle , AB = 5 cm.

, BC = 6 cm. , AC = 4 cm.

, AD = 3 cm. , $\overline{DE} \parallel \overline{BC}$

1 Prove that : $\triangle ADE \sim \triangle ABC$

2 Find the length of each of : \overline{DE} and \overline{EC}



11

El-Dakahlia Governorate

Directorate of Education
Maths Supervision

Answer the following questions :

1 Choose the correct answer :

- 1 The area of a rhombus whose diagonal lengths are 6 cm. and 10 cm. is cm^2
 (a) 60 (b) 120 (c) 30 (d) 15
- 2 In $\triangle XYZ$, if $(XZ)^2 = (XY)^2 - (ZY)^2$, then $\angle Z$ is angle.
 (a) an acute (b) a straight (c) an obtuse (d) a right
- 3 If the perimeter of a square is 20 cm. , then its area = cm^2
 (a) 400 (b) 10 (c) 25 (d) 12.5
- 4 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle ACB) = m(\angle \dots\dots\dots)$
 (a) XYZ (b) YXZ (c) ZYX (d) XZY
- 5 If the diameter length of a circle = 14 cm. , then its area = cm^2
 (a) 154 (b) 44 (c) 616 (d) 22
- 6 If ABC is a triangle , $m(\angle B) = 90^\circ$, $\overline{BD} \perp \overline{AC}$, then $(AB)^2 = AD \times \dots\dots\dots$
 (a) AC (b) CD (c) BC (d) AD

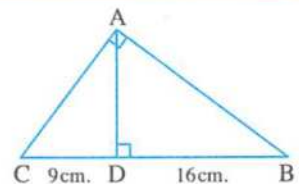
2 Complete each of the following :

- 1 If the area of a square is 50 cm^2 , then its diagonal length is
- 2 Two polygons are similar if the corresponding side lengths are
- 3 If $A \in$ the straight line L , then its projection on the straight line L is
- 4 ABCD is a parallelogram , if $m(\angle A) = 80^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
- 5 If the perimeter of an equilateral triangle is 30 cm. and its height is 5 cm. , then its area = cm^2

3 [a] In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 , $CD = 9 \text{ cm.}$ and $DB = 16 \text{ cm.}$

Find : AC and AD

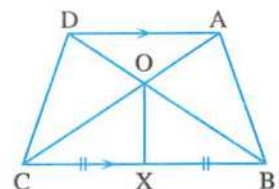


[b] In the opposite figure :

$\overline{DA} \parallel \overline{CB}$, $XB = XC$

Prove that :

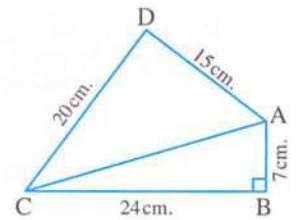
the area of the figure ABXO = the area of the figure DCXO



4 [a] In the opposite figure :

$m(\angle B) = 90^\circ$, $AB = 7$ cm.
 , $BC = 24$ cm. , $AD = 15$ cm.
 and $CD = 20$ cm.

Prove that : $m(\angle D) = 90^\circ$



[b] In $\triangle ABC$, $AB = 5$ cm. , $BC = 8$ cm. and $AC = 10$ cm.

What is the type of the triangle according to its angles ? (Write steps)

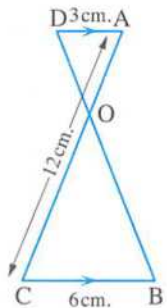
5 [a] A trapezium , the lengths of the two parallel bases are 4 cm. and 10 cm. If its height is 5 cm. , calculate its middle base length and its area.

[b] In the opposite figure :

$\overline{DA} \parallel \overline{CB}$, $AD = 3$ cm. , $BC = 6$ cm.
 and $AC = 12$ cm.

1 Prove that : $\triangle AOD \sim \triangle COB$

2 Find : the length of \overline{AO}



12

Suez Governorate

Directorate of Education
 Inspection of Mathematics



Answer the following questions :

1 Choose the correct answer :

1 ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots\dots\dots$

- (a) 70° (b) 110° (c) 180° (d) 540°

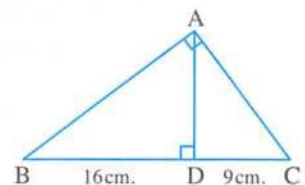
2 If ABC is a triangle , $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is $\dots\dots\dots$

- (a) acute. (b) right. (c) obtuse. (d) straight.

3 In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 , $DC = 9$ cm. , $DB = 16$ cm.
 , then $AD = \dots\dots\dots$ cm.

- (a) 144 (b) 25 (c) 50 (d) 12



- 4 The area of the square whose diagonal length is 10 cm. is
 (a) 100 cm^2 (b) 50 cm^2 (c) 40 cm^2 (d) 20 cm^2
- 5 A trapezium whose lengths of two parallel bases are 6 cm. and 8 cm. , then the length of its middle base equals cm.
 (a) 48 (b) 24 (c) 14 (d) 7
- 6 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is
 (a) 2 : 5 (b) 2 : 3 (c) 3 : 5 (d) 1 : 2

2 Complete each of the following :

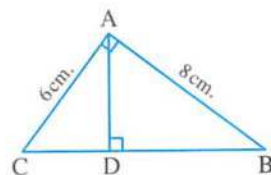
- 1 The median of a triangle divides its surface into two triangular surfaces equal
- 2 If ABC is a triangle , $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots) = 90^\circ$
- 3 All the regular polygons that have the same number of sides are
- 4 The area of a rhombus is 24 cm^2 , if the length of one of its diagonals is 8 cm. , then the length of the other diagonal is
- 5 If the point A \in the straight line L , then the projection of the point A on the line L is

3 [a] In the opposite figure :

$$m(\angle CAB) = 90^\circ, \overline{AD} \perp \overline{BC}$$

$$, AC = 6 \text{ cm.}, AB = 8 \text{ cm.}$$

Find : the length of the projection of \overline{AB} on \overrightarrow{BC}

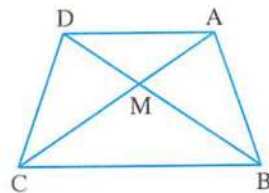


[b] In the opposite figure :

ABCD is a quadrilateral ,

the area of $\triangle AMB =$ the area of $\triangle DMC$

Prove that : $\overline{AD} \parallel \overline{BC}$



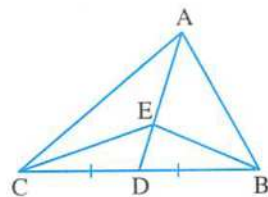
- 4 [a] Determine the type of the greatest angle in $\triangle ABC$ where $AB = 9 \text{ cm.}$, $BC = 10 \text{ cm.}$, $AC = 12 \text{ cm.}$

[b] In the opposite figure :

\overline{AD} is a median of $\triangle ABC$, $E \in \overline{AD}$

Prove that :

The area of $\triangle ABE =$ the area of $\triangle ACE$



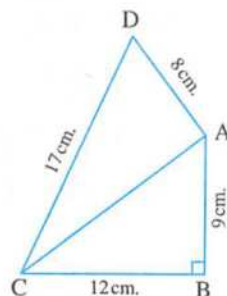
5 [a] In the opposite figure :

$m(\angle B) = 90^\circ$, $AB = 9$ cm.

, $BC = 12$ cm. , $AD = 8$ cm.

, $DC = 17$ cm.

Prove that : $m(\angle DAC) = 90^\circ$

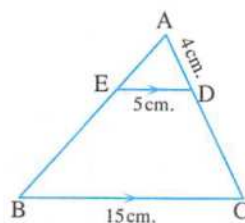


[b] In the opposite figure :

$\overline{ED} \parallel \overline{BC}$, $AD = 4$ cm.

, $ED = 5$ cm. , $BC = 15$ cm.

Find with proof : The length of \overline{DC}



13

Port Said Governorate

East Educational Directorate
Mathematics Inspection



Answer the following questions :

1 Choose the correct answer :

1 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is

- (a) acute. (b) right. (c) obtuse. (d) straight.

2 If the lengths of the diagonals of a rhombus are 6 cm. and 8 cm., then its perimeter = cm.

- (a) 24 (b) 28 (c) 14 (d) 20

3 If ABCD is a parallelogram of area 20 cm^2 and $E \in \overline{AD}$, then the area of $\triangle EBC$ = cm^2 .

- (a) 10 (b) 5 (c) 20 (d) 40

4 If the projection of a line segment on a straight line is a point, then the line segment the straight line.

- (a) $//$ (b) \perp (c) \equiv (d) \subset

5 The two triangles drawn on a common base and their vertices located on a straight line parallel to the base are

- (a) congruent. (b) similar.
(c) equal in perimeter. (d) equal in area.

6 ABCD is a parallelogram in which : $AB = 5$ cm. , $BC = 10$ cm. and its smaller height is 4 cm. , then its greater height is cm.

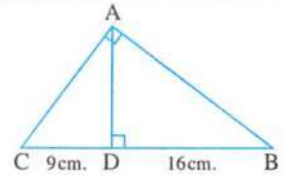
- (a) 2 (b) 4 (c) 8 (d) 10

2 Complete each of the following :

- 1 If $\angle A$ complements $\angle B$ and $\angle B$ supplements $\angle C$, $m(\angle A) = 30^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$
- 2 In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$
- 3 If two polygons are similar and the ratio between the lengths of two corresponding sides is $2 : 5$, then the ratio between their perimeters is $\dots\dots\dots$
- 4 A trapezium whose lengths of the two parallel bases are 4 cm. and 6 cm. , then the length of its middle base is $\dots\dots\dots$ cm.
- 5 The rectangle is a parallelogram in which one of its angles is $\dots\dots\dots$

3 [a] In the opposite figure :

Find : the length of each of \overline{AB} , \overline{AC} and \overline{AD}



- [b]** ABCD is a trapezium in which $\overline{AD} \parallel \overline{BC}$, if $BC = 2 AD = 20$ cm. and its area = 180 cm^2 , find its height.

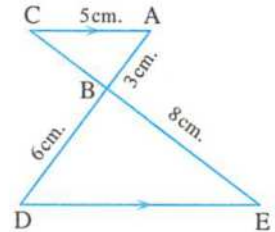
4 [a] In the opposite figure :

$\overline{AC} \parallel \overline{ED}$, $AB = 3$ cm. , $BD = 6$ cm.

, $AC = 5$ cm. , $BE = 8$ cm.

Prove that : $\triangle ABC \sim \triangle DBE$

, **then find :** the length of each of \overline{ED} , \overline{BC}

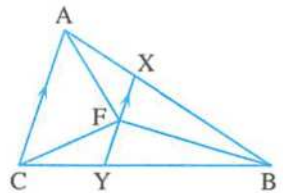


[b] In the opposite figure :

$\overline{AC} \parallel \overline{XY}$ and F is the midpoint of \overline{XY}

Prove that :

The area of $\triangle ABF =$ the area of $\triangle CBF$



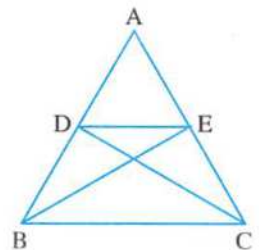
5 [a] In the opposite figure :

ABC is a triangle in which :

$D \in \overline{AB}$ and $E \in \overline{AC}$

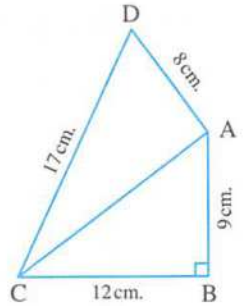
, such that the area of $\triangle ABE =$ the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$



[b] In the opposite figure :

ABCD is a quadrilateral
 $m(\angle B) = 90^\circ$, $AB = 9$ cm.
 $BC = 12$ cm. , $CD = 17$ cm.
 and $DA = 8$ cm.
Prove that : $m(\angle DAC) = 90^\circ$



14

El-Beheira Governorate

Bandar Damanhour Educational Zono
 Amr Ibn El-Aass G.I.S.



Answer the following questions :

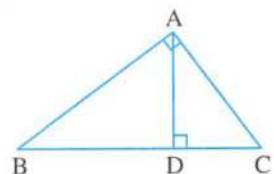
1 Choose the correct answer :

- 1 In $\triangle ABC$, if $(AB)^2 = (AC)^2 - (BC)^2$, then $\angle C$ is angle.
 (a) an acute (b) an obtuse (c) a right (d) a straight
- 2 If the lengths of two adjacent sides in a parallelogram are 9 cm. and 6 cm. and the length of the smaller height is 4 cm. , then its area is cm^2 .
 (a) 30 (b) 36 (c) 24 (d) 15
- 3 The diagonal length of a square whose area is 50 cm^2 equals cm.
 (a) 10 (b) 20 (c) 30 (d) 40
- 4 The median of a triangle divides its surface into two triangles
 (a) congruent. (b) equal in area. (c) similar. (d) coincide.
- 5 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}
 (a) $>$ (b) $<$ (c) $=$ (d) \equiv
- 6 The number of axes of symmetry of the rhombus equals
 (a) zero (b) 1 (c) 2 (d) 4

2 Complete each of the following :

- 1 In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, $m(\angle B) = 50^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$
- 2 In the two similar polygons , their corresponding angles are
- 3 The area of a rhombus is 24 cm^2 , the length of one of its diagonals 8 is cm. , then the length of the other diagonal is cm.
- 4 The sum of the measures of the exterior angles of a triangle equals $^\circ$
- 5 **In the opposite figure :**

$\triangle ABC$ is a right-angled triangle at A
 $\overline{AD} \perp \overline{BC}$
 $(AD)^2 = \dots\dots\dots \times \dots\dots\dots$



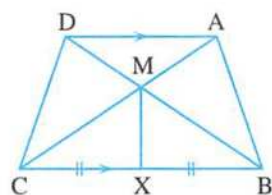
- 3 [a] The area of a trapezium is 180 cm^2 , its height is 9 cm. Find the lengths of its parallel bases if the ratio between them is 3 : 5

[b] In the opposite figure :

$$\overline{AD} \parallel \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}$$

, X is the midpoint of \overline{BC}

Prove that : the area of the shape ABXM
= the area of the shape DCXM



4 [a] In the opposite figure :

$$m(\angle AED) = m(\angle B)$$

, AD = 3 cm. , AE = 4.5 cm. , DB = 6 cm.

1 **Prove that :** $\triangle AED \sim \triangle ABC$

2 **Find :** the length of \overline{CE}

[b] In the opposite figure :

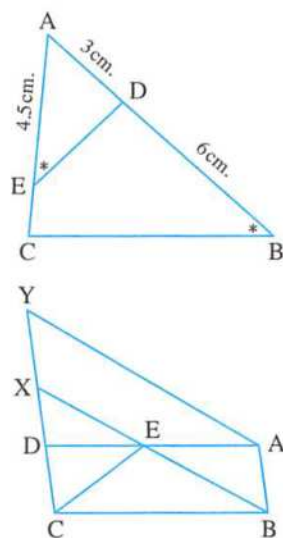
ABCD and ABXY

are two parallelograms.

Prove that :

the area of $\triangle EBC$

= $\frac{1}{2}$ the area of $\square ABXY$

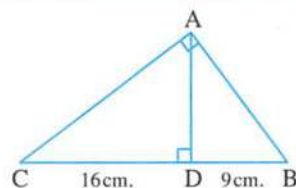


5 [a] In the opposite figure :

ABC is a right-angled triangle at A ,

$D \in \overline{CB}$, $\overline{AD} \perp \overline{CB}$, CD = 16 cm. , DB = 9 cm.

Find : the length of each of \overline{AC} , \overline{AB} , \overline{AD}



[b] ABC is a triangle in which , AB = 7 cm. , BC = 10 cm. , AC = 8 cm.

Determine the type of $\triangle ABC$ according to its angles.

15

Beni Suef Governorate

Directorate of Official Language Schools
Education Administration



Answer the following questions :

1 Choose the correct answer :

- 1 If the area of a parallelogram is 35 cm^2 and its height is 5 cm. , then the length of the corresponding base to this height is cm.

(a) 5

(b) 7

(c) 9

(d) 30

2 If the area of a trapezium is 32 cm^2 and its height is 4 cm. , then the length of its middle base equals cm.

- (a) 4 (b) 8 (c) 14 (d) 16

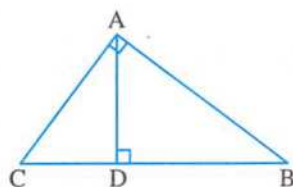
3 If two polygons are similar and the ratio between the lengths of two corresponding sides is 2 : 3 , then the ratio between their perimeters is

- (a) 1 : 2 (b) 4 : 9 (c) 2 : 3 (d) 9 : 4

4 In the opposite figure :

$\triangle ABC$ is right-angled at A
 $\overline{AD} \perp \overline{BC}$, then $(AB)^2 = \dots\dots\dots$

- (a) $BD \times BC$ (b) $DC \times BC$
 (c) $BD \times DC$ (d) $AD \times BC$



5 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}

- (a) = (b) > (c) < (d) \neq

6 The least number of the acute angles in any triangle is

- (a) zero (b) 1 (c) 2 (d) 3

2 Complete each of the following :

1 Triangles with congruent bases on one straight line and have a common vertex are

2 A triangle whose side lengths are 7 cm. , 14 cm. and 16 cm. , then its type according to its angles is

3 In $\triangle ABC$, if $(AC)^2 < (AB)^2 + (BC)^2$, then the type of the angle B is

4 The sum of the measures of the interior angles of a triangle equals $^\circ$

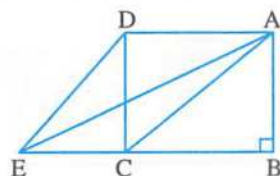
5 Each two opposite angles in a parallelogram are

3 [a] In the opposite figure :

ABCD is a rectangle and $E \in \overline{BC}$

Prove that :

The area of $\triangle DAE =$ the area of $\triangle ABC$



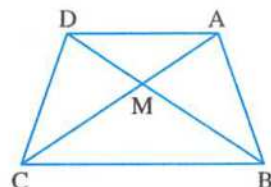
[b] In the opposite figure :

ABCD is a quadrilateral

, its diagonals intersect at M

and the area of $\triangle ABM =$ the area of $\triangle DCM$

Prove that : $\overline{AD} \parallel \overline{BC}$



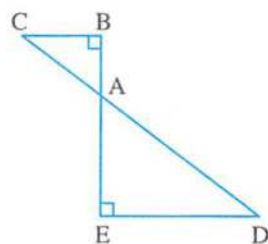
- 4 [a] Find the area of the rhombus whose diagonals lengths are 10 cm. and 8 cm.

[b] In the opposite figure :

$$\overline{BE} \cap \overline{DC} = \{A\} \text{ and}$$

$$m(\angle B) = m(\angle E) = 90^\circ$$

Prove that : $\triangle ABC \sim \triangle AED$

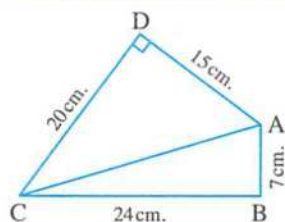


- 5 [a] In the opposite figure :

ABCD is a quadrilateral in which $m(\angle ADC) = 90^\circ$

, $AB = 7$ cm. , $BC = 24$ cm. , $CD = 20$ cm. , $DA = 15$ cm.

Prove that : $m(\angle ABC) = 90^\circ$



[b] In the opposite figure :

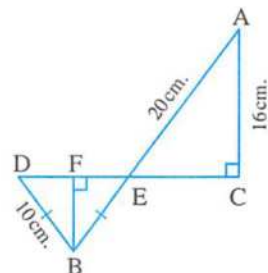
$$\overline{AB} \cap \overline{CD} = \{E\}$$

, E is the midpoint of \overline{CD} , $\overline{BF} \perp \overline{CD}$

, $AC = 16$ cm. , $AE = 20$ cm. and $BD = BE = 10$ cm.

Find the length of the projection

of \overline{BD} on \overleftrightarrow{CD}



Answers of schools examinations on Geometry

1

Cairo

1

- 1 (b) 2 (c) 3 (c)
4 (c) 5 (a) 6 (c)

2

- 1 equal in area 2 the point A 3 proportional
4 5 5 4

3

- [a] In $\triangle ADH$ & $\triangle ACB$ $\therefore m(\angle AHD) = m(\angle B)$
 $\therefore \angle A$ is a common angle
 $\therefore m(\angle ADH) = m(\angle C)$
 $\therefore \triangle ADH \sim \triangle ACB$ (First req.)
 $\therefore \frac{AD}{AC} = \frac{DH}{CB} = \frac{AH}{AB}$
 $\therefore \frac{3}{AC} = \frac{4.5}{9} \quad \therefore AC = \frac{3 \times 9}{4.5} = 6 \text{ cm.}$
 $\therefore HC = 6 - 4.5 = 1.5 \text{ cm.}$ (Second req.)

- [b] $\therefore \triangle ABC$ & $\triangle DBC$ have a common base \overline{BC}
 $\therefore \overline{AD} \parallel \overline{BC}$
 \therefore The area of $\triangle ABC$ = the area of $\triangle DBC$
 Subtracting the area of $\triangle MBC$ from both sides.
 \therefore The area of $\triangle AMB$ = the area of $\triangle DMC$ (1)
 (Q.E.D. 1)
 $\therefore \overline{MH}$ is a median in $\triangle BMC$
 \therefore The area of $\triangle BMH$ = the area of $\triangle CMH$ (2)
 adding (1) and (2):
 \therefore The area of the figure $ABHM$
 = the area of the figure $DCHM$ (Q.E.D. 2)

4

- [a] In $\triangle ABC$: $\therefore m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 $\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$
 $\therefore AB = 15 \text{ cm.}$ (First req.)
 $\therefore \overline{AD}$ is the projection of \overline{AC} on \overline{AD}
 $\therefore (AD)^2 = BD \times CD = 9 \times 16 = 144$
 $\therefore AD = 12 \text{ cm.}$ (Second req.)
- [b] Let the length of the other base be x cm.
 $\therefore \frac{1}{2} (5+x) \times 7 = 63 \quad \therefore \frac{1}{2} (5+x) = 9$
 $\therefore 5+x = 18$

$$\therefore x = 13$$

\therefore The length of the other base is 13 cm. (The req.)

5

- [a] $\therefore \overline{CO}$ is a median in $\triangle CDH$
 \therefore The area of $\triangle COD$ = the area of $\triangle HOC$
 \therefore the area of $\triangle ABO$ = the area of $\triangle HOC$
 \therefore The area of $\triangle ABO$ = the area of $\triangle COD$
 Adding area of $\triangle ADO$ to both sides
 \therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
 and they have a common base \overline{AD} and on one side of it
 $\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)
- [b] $\therefore (AC)^2 = (7)^2 = 49$
 $\therefore (AB)^2 + (BC)^2 = (5)^2 + (6)^2 = 61$
 $\therefore (AC)^2 < (AB)^2 + (BC)^2$
 $\therefore \triangle ABC$ is acute-angled triangle (The req.)

2

Cairo

1

- 1 (c) 2 (b) 3 (a)
4 (b) 5 (b) 6 (c)

2

- 1 proportional & equal in measure.
 2 120° 3 $>$
 4 50 5 30 cm.

3

- [a] In $\triangle ABD$: $\therefore \overline{DB} \perp \overline{AB}$
 $\therefore m(\angle ABD) = 90^\circ$
 $\therefore (BD)^2 = (AD)^2 - (AB)^2 = (17)^2 - (8)^2 = 225$
 $\therefore BD = 15 \text{ cm.}$ (First req.)
- In $\triangle BCD$:
 $\therefore (BD)^2 = (15)^2 = 225$
 $\therefore (BC)^2 + (CD)^2 = (9)^2 + (12)^2 = 225$
 $\therefore (BD)^2 = (BC)^2 + (CD)^2$
 $\therefore m(\angle C) = 90^\circ$ (Second req.)
- [b] $\therefore \overline{AD}$ is a median in $\triangle ABC$
 \therefore The area of $\triangle ABD$ = The area of $\triangle ACD$ (1)
 $\therefore \overline{ED}$ is a median in $\triangle EBC$
 \therefore The area of $\triangle EBD$ = The area of $\triangle ECD$ (2)

Subtracting (2) from (1) :

∴ The area of $\triangle ABE$ = The area of $\triangle ACE$

(Q.E.D.)

4

[a] ∴ $\triangle AXY \sim \triangle ABC$

$$\therefore \frac{AY}{AC} = \frac{AX}{AB} \quad \therefore \frac{6}{AC} = \frac{7}{14}$$

$$\therefore AC = \frac{6 \times 14}{7} = 12 \text{ cm.}$$

$$\therefore XC = 12 - 7 = 5 \text{ cm.} \quad (\text{The req.})$$

[b] ∴ $\triangle ADB, \triangle ADC$ have the same base \overline{AD}
 $\therefore \overline{BC} \parallel \overline{AD}$

∴ The area of $\triangle ADB$ = The area of $\triangle ADC$

Subtracting the area of $\triangle AMD$ from both sides

∴ The area of $\triangle AMB$ = The area of $\triangle DMC$ (1)

∴ \overline{MD} is median in $\triangle EMC$

∴ The area of $\triangle MDE$ = The area of $\triangle DMC$ (2)

From (1) and (2) :

∴ The area of $\triangle MDE$ = The area of $\triangle AMB$

(Q. E. D.)

5

In $\triangle BCD$: ∴ $m(\angle BCD) = 90^\circ$

$$\therefore (BD)^2 = (BC)^2 + (CD)^2 + (7)^2 + (24)^2 = 625$$

$$\therefore BD = 25 \text{ cm.}$$

∴ in $\triangle ABD$: ∴ $m(\angle BAD) = 90^\circ$

$$\therefore (AD)^2 = (BD)^2 - (AB)^2 = (25)^2 - (15)^2 = 400$$

$$\therefore AD = 20 \text{ cm.} \quad (\text{First req.})$$

∴ \overline{EB} is the projection \overline{AB} on \overline{BD}

$$\therefore (AB)^2 = EB \times BD \quad \therefore (15)^2 = EB \times 25$$

$$\therefore 225 = EB \times 25$$

$$\therefore EB = \frac{225}{25} = 9 \text{ cm.} \quad (\text{Second req.})$$

3

Cairo

1

1 10 cm.

2 6 cm.

3 similar

4 equal

5 40 cm²

2

1 (b)

2 (c)

3 (a)

4 (b)

5 (a)

6 (c)

3

[a] In $\triangle ABC$: ∴ $m(\angle B) = 90^\circ$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$$

$$\therefore AC = 5 \text{ cm.}$$

In $\triangle ACD$: ∴ $(AD)^2 = (13)^2 = 169$

$$\therefore (AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$$

$$\therefore (AD)^2 = (AC)^2 + (CD)^2$$

$$\therefore m(\angle ACD) = 90^\circ \quad (\text{Q.E.D.})$$

[b] ∴ The area of $\triangle ADC$ = the area of $\triangle AEB$
 subtracting the area of $\triangle ADE$ from both sides

∴ The area of $\triangle CDE$ = the area of $\triangle BDE$

but they have a common base \overline{DE} and on one side of it

$$\therefore \overline{DE} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

4

[a] In $\triangle ABC, \triangle DBE$

∴ $\overline{AC} \parallel \overline{ED}, \overline{AD}$ is a transversal

$$\therefore m(\angle A) = m(\angle D) \quad (\text{alternate angles}) \quad (1)$$

∴ $\overline{AC} \parallel \overline{ED}, \overline{CE}$ is a transversal

$$\therefore m(\angle C) = m(\angle E) \quad (\text{alternate angles}) \quad (2)$$

$$\therefore m(\angle ABC) = m(\angle DBE) \quad (\text{V.O.A.}) \quad (3)$$

From (1), (2) and (3)

$$\therefore \triangle ABC \sim \triangle DBE \quad (\text{First req.})$$

$$\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{DE}$$

$$\therefore \frac{3}{6} = \frac{BC}{8} = \frac{5}{DE}$$

$$\therefore BC = \frac{3 \times 8}{6} = 4 \text{ cm.}$$

$$\therefore DE = \frac{6 \times 5}{3} = 10 \text{ cm.}$$

(Second req.)

[b] ∴ $\triangle ABC, \triangle DBC$ have the same base \overline{BC}

$$\therefore \overline{BC} \parallel \overline{AD}$$

∴ The area of $\triangle ABC$ = the area of $\triangle DBC$
 subtracting the area of $\triangle MBC$ from both sides

$$\therefore \text{The area of } \triangle AMB = \text{the area of } \triangle DMC \quad (1)$$

∴ $\triangle MBX, \triangle MCY$ have equal bases in length and on one straight line and they are common in the vertex M

$$\therefore \text{The area of } \triangle MBX = \text{the area of } \triangle MCY \quad (2)$$

Adding (1) and (2) :

$$\therefore \text{The area of the shape } ABXM = \text{the area of the shape } DCYM \quad (\text{Q.E.D.})$$

5

- In $\triangle ABC : \because m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$
 $\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$
 $\therefore AB = 15 \text{ cm.}$ (first req.)
 $\therefore \overline{AD}$ is the projection of \overline{AC} on \overline{AD}
 $\therefore (AD)^2 = BD \times CD = 9 \times 16 = 144$
 $\therefore AD = 12 \text{ cm.}$ (Second req.)
 \therefore the area of $\triangle ABC = \frac{1}{2} \times BC \times AD$
 $= \frac{1}{2} \times 25 \times 12 = 150 \text{ cm}^2$
 (Third req.)

4

Giza

1

- 1 72 2 zero
 3 equal in measure & proportional
 4 lying on one of two parallel straight lines including them
 5 an acute-angled

2

- 1 (b) 2 (c) 3 (c)
 4 (b) 5 (c) 6 (a)

3

- [a] In $\triangle AMB, \triangle DMC$
 $\therefore \overline{AB} \parallel \overline{CD}, \overline{AD}$ is a transversal
 $\therefore m(\angle A) = m(\angle D)$ (alternate angles) (1)
 $\therefore \overline{AB} \parallel \overline{CD}, \overline{BC}$ is a transversal
 $\therefore m(\angle B) = m(\angle C)$ (alternate angles) (2)
 $\therefore m(\angle AMB) = m(\angle DMC)$ (V.O.A) (3)
 From (1) & (2) and (3):
 $\therefore \triangle AMB \sim \triangle DMC$ (First req.)
 $\therefore \frac{AM}{DM} = \frac{MB}{MC} = \frac{AB}{DC} \therefore \frac{6}{12} = \frac{10}{DC}$
 $\therefore DC = \frac{10 \times 12}{6} = 20 \text{ cm.}$ (Second req.)
 [b] Let the height of trapezium be $X \text{ cm.}$
 $\therefore \frac{1}{2} (24 + 12) \times X = 450 \therefore 18X = 450$
 $\therefore X = \frac{450}{18} = 25 \text{ cm.}$
 \therefore The height is : 25 cm. (The req.)

4

- [a] In $\triangle ABC : \because m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (12)^2 + (16)^2 = 400$
 $\therefore AC = 20 \text{ cm.}$ (First req.)
 In $\triangle ACD : \because (CD)^2 = (25)^2 = 625$
 $\therefore (AD)^2 + (AC)^2 = (15)^2 + (20)^2 = 625$
 $\therefore (CD)^2 = (AD)^2 + (AC)^2$
 $\therefore m(\angle DAC) = 90^\circ$ (Second req.)
 [b] In $\triangle ABC : \because (AC)^2 = (13)^2 = 169$
 $\therefore (AB)^2 + (BC)^2 = (12)^2 + (5)^2 = 169$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2$
 $\therefore \triangle ABC$ is right-angled triangle at B
 \therefore the area of $\triangle ABC = \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2$
 (The req.)

5

- [a] $\therefore \triangle ACD, \triangle BCD$ have a common base \overline{CD}
 $\therefore \overline{AB} \parallel \overline{CD}$
 \therefore The area of $\triangle ACD$ = the area of $\triangle BCD$ (1)
 $\therefore \overline{ME}$ is a median in $\triangle CMD$
 \therefore The area of $\triangle EMC$ = the area of $\triangle EMD$ (2)
 subtracting (2) From (1):
 \therefore The area of the figure ADEM
 = the area of the figure BCEM (Q.E.D.)
 [b] In $\triangle ABC : \because m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$
 $\therefore (AD)^2 = BD \times CD = 4.5 \times 8 = 36$
 $\therefore AD = 6 \text{ cm.}$
 $\therefore (AB)^2 = BD \times BC = 4.5 \times 12.5 = 56.25$
 $\therefore AB = 7.5 \text{ cm.}$
 $\therefore (AC)^2 = CD \times BC = 8 \times 12.5 = 100$
 $\therefore AC = 10 \text{ cm.}$ (The req.)

5

Giza

1

- 1 (c) 2 (b) 3 (d)
 4 (a) 5 (c) 6 (b)

2

- 1 equal 2 proportional
 3 The point B 4 equal in area
 5 18

3

- [a] $\therefore \Delta \triangle ABD, \triangle ACD$ have the same base \overline{AD}
 $\therefore \overline{BC} \parallel \overline{AD}$
 \therefore The area of ΔABD = the area of ΔACD
 Subtracting the area of ΔAMD from both sides
 \therefore The area of ΔAMB = the area of ΔDMC (1)
 $\therefore \Delta \triangle MBX, \triangle MCY$ have equal bases in length
 and on one straight line and they are common
 in the vertex M
 \therefore The area of ΔMBX = the area of ΔMCY (2)
 Adding (1) and (2):
 \therefore The area of the shape $ABXM$
 = The area of the shape $DCYM$ (Q.E.D.)
- [b] In ΔABC : $\therefore m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$
 $\therefore (AC)^2 = CD \times CB = 8 \times 12.5 = 100$
 $\therefore AC = 10$ cm.
 $\therefore (AB)^2 = BD \times BC = 4.5 \times 12.5 = 56.25$
 $\therefore AB = 7.5$ cm.
 $\therefore (AD)^2 = BD \times CD = 4.5 \times 8 = 36$
 $\therefore AD = 6$ cm. (The req.)

4

- [a] In $\Delta \triangle AMB, \triangle DMC$
 $\therefore \overline{AB} \parallel \overline{CD}, \overline{AD}$ is a transversal
 $\therefore m(\angle A) = m(\angle D)$ (alternate angles) (1)
 $\therefore \overline{AB} \parallel \overline{CD}, \overline{BC}$ is a transversal
 $\therefore m(\angle B) = m(\angle C)$ (alternate angles) (2)
 $\therefore m(\angle AMB) = m(\angle DMC)$ (V.O.A.) (3)
 From (1), (2) and (3):
 $\therefore \Delta AMB \sim \Delta DMC$ (First req.)
 $\therefore \frac{AM}{DM} = \frac{MB}{MC} = \frac{AB}{DC}$
 $\therefore \frac{6}{12} = \frac{MB}{16} = \frac{10}{DC}$
 $\therefore DC = \frac{10 \times 12}{6} = 20$ cm.
 $\therefore MB = \frac{6 \times 16}{12} = 8$ cm. (Second req.)
- [b] In ΔABC : $\therefore (AC)^2 = (7)^2 = 49$
 $\therefore (AB)^2 + (BC)^2 = (5)^2 + (6)^2 = 61$
 $\therefore (AC)^2 < (AB)^2 + (BC)^2$
 $\therefore \Delta ABC$ is an acute-angled triangle. (The req.)

5

- [a] In ΔBCD : $\therefore m(\angle BCD) = 90^\circ$
 $\therefore (BD)^2 = (BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$
 In ΔBAD : $\therefore (BD)^2 = 625$
 $\therefore (AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$
 $\therefore (BD)^2 = (AB)^2 + (AD)^2$
 $\therefore m(\angle BAD) = 90^\circ$ (Q.E.D.)
- [b] \therefore The area of ΔADC = the area of ΔAEB
 Subtracting the area of ΔADE from both sides
 \therefore The area of ΔCED = the area of ΔBDE
 and they have a common base \overline{DE} and on one
 side of it
 $\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)

6

Giza

1

- 1 (b) 2 (b) 3 (d)
 4 (d) 5 (b) 6 (a)

2

- 1 congruent 2 45 3 15
 4 an obtuse-angled
 5 75°

3

- [a] $\therefore \Delta BFC, \square ABCD$ have the common base \overline{BC}
 $\therefore F \in \overline{AD}$
 \therefore The area of $\Delta BFC = \frac{1}{2}$ the area of $\square ABCD$ (1)
 $\therefore \overline{FB}$ is a median in ΔFEC
 \therefore The area of $\Delta BFC = \frac{1}{2}$ the area of ΔFEC (2)
 From (1) and (2):
 \therefore The area of ΔFEC = The area of $\square ABCD$ (Q.E.D.)
- [b] In ΔABC : $\therefore m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$
 $\therefore AC = 15$ cm.
 In ΔADC : $\therefore (CD)^2 = (17)^2 = 289$
 $\therefore (AD)^2 + (AC)^2 = (8)^2 + (15)^2 = 289$
 $\therefore (CD)^2 = (AD)^2 + (AC)^2$
 $\therefore m(\angle DAC) = 90^\circ$ (Q.E.D.)

4

[a] In $\triangle CED \sim CBA$

$$\therefore m(\angle DEC) = m(\angle ABC) = 90^\circ$$

$\angle C$ is a common angle

$$\therefore m(\angle EDC) = m(\angle BAC)$$

$$\therefore \triangle CED \sim \triangle CBA \quad (\text{First req.})$$

$$\therefore \frac{ED}{AB} = \frac{CD}{AC} \quad \therefore \frac{3}{6} = \frac{5}{AC}$$

$$\therefore AC = \frac{5 \times 6}{3} = 10 \text{ cm.} \quad (\text{Second req.})$$

[b] $\therefore ABEC$ is a parallelogram, \overline{BC} is a diagonal of it

\therefore The area of $\triangle ABC$ = the area of $\triangle BEC$
but the area of $\triangle BEC$ = the area of $\triangle DBC$

\therefore The area of $\triangle ABC$ = the area of $\triangle DBC$
and they have the common base \overline{BC} and on one side of it.

$$\therefore \overline{AD} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

5

[a] In $\triangle ABC \sim DBE$

$$\therefore \overline{AC} \parallel \overline{ED}, \overline{AD} \text{ is a transversal}$$

$$\therefore m(\angle A) = m(\angle D) \quad (\text{alternate angles}) (1)$$

$$\therefore \overline{AC} \parallel \overline{ED}, \overline{CE} \text{ is a transversal}$$

$$\therefore m(\angle C) = m(\angle E) \quad (\text{alternate angles}) (2)$$

$$\therefore m(\angle ABC) = m(\angle DBE) \quad (\text{V.O.A.}) (3)$$

From (1), (2) and (3):

$$\therefore \triangle ABC \sim \triangle DBE \quad (\text{First req.})$$

$$\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{ED}$$

$$\therefore \frac{3}{6} = \frac{5}{ED} \quad \therefore ED = \frac{5 \times 6}{3} = 10 \text{ cm.}$$

$$\therefore \text{The perimeter of } \triangle BED = 6 + 8 + 10 = 24 \text{ cm.}$$

(Second req.)

[b] In $\triangle ABC : \therefore m(\angle BAC) = 90^\circ$

$$\therefore (BC)^2 = (AC)^2 + (AB)^2 = (6)^2 + (8)^2 = 100$$

$$\therefore BC = 10 \text{ cm.}$$

$$\therefore \overline{EB} \text{ is the projection of } \overline{AB} \text{ on } \overline{BC}$$

$$\therefore (AB)^2 = EB \times BC \quad \therefore 64 = EB \times 10$$

$$\therefore EB = 6.4 \text{ cm.} \quad (\text{First req.})$$

$$\therefore EC = 10 - 6.4 = 3.6 \text{ cm.} \quad (\text{Second req.})$$

7 Alexandria

1

$$1. 48$$

$$2. 0$$

$$3. 13$$

$$4. \text{ an acute-angled}$$

$$5. 1$$

2

$$1. (a)$$

$$2. (c)$$

$$3. (a)$$

$$4. (d)$$

$$5. (b)$$

$$6. (c)$$

3

[a] In $\triangle ABC : \therefore \overline{AD}$ is a median

$$\therefore \text{The area of } \triangle ADC = \frac{1}{2} \text{ the area of } \triangle ABC (1)$$

$\therefore M$ is the point of concurrence

$$\therefore AM = \frac{2}{3} AD$$

$$\therefore \text{The area of } \triangle AMC = \frac{2}{3} \text{ the area of } \triangle ADC (2)$$

From (1) and (2):

$$\therefore \text{The area of } \triangle AMC = \frac{2}{3} \left(\frac{1}{2} \text{ the area of } \triangle ABC \right)$$

$$\therefore \text{The area of } \triangle AMC = \frac{1}{3} \text{ the area of } \triangle ABC \quad (\text{Q. E. D.})$$

[b] $\therefore \triangle EBC$ has the common base \overline{BC} with the $\square ABCD, E \in \overline{AD}$

$$\therefore \text{The area of } \triangle EBC = \frac{1}{2} \text{ the area of } \square ABCD$$

but the area of $\square ABCD$ = the area of $\square ABMN$

(have a common base \overline{AB} and between two parallel straight lines $\overline{AB}, \overline{CN}$)

$$\therefore \text{The area of } \triangle EBC = \frac{1}{2} \text{ the area of } \square ABMN \quad (\text{Q. E. D.})$$

4

[a] In $\triangle ABD : \therefore m(\angle ABD) = 90^\circ$

$$\therefore (BD)^2 = (AD)^2 - (AB)^2$$

$$\therefore (BD)^2 = (5)^2 - (3)^2 = 16$$

$$\therefore BD = 4 \text{ cm.}$$

$$\therefore \text{in } \triangle BCD : \therefore m(\angle BCD) = 90^\circ$$

$$\therefore m(\angle BDC) = 30^\circ$$

$$\therefore BC = \frac{1}{2} BD = \frac{1}{2} \times 4 = 2 \text{ cm.} \quad (\text{The req.})$$

[b] In $\triangle ABC \sim DEC$

$$\therefore m(\angle ABC) = m(\angle DEC) = 90^\circ$$

$\angle C$ is common angle

$$\therefore m(\angle BAC) = m(\angle EDC)$$

$$\therefore \triangle ABC \sim \triangle DEC \quad (\text{First req.})$$

$$\therefore \frac{AB}{DE} = \frac{AC}{DC} \quad \therefore \frac{6}{3} = \frac{AC}{5}$$

$$\therefore AC = \frac{5 \times 6}{3} = 10 \text{ cm.} \quad (\text{Second req.})$$

5

[a] Let the length of the other base be x cm.

$$\therefore \frac{1}{2} (10 + x) \times 8 = 88 \quad \therefore \frac{1}{2} (10 + x) = 11$$

$$\therefore 10 + x = 22 \quad \therefore x = 12 \text{ cm.}$$

\therefore the length of the other base = 12 cm. (The req.)

[b] In $\triangle ABD$: $\therefore m(\angle ABD) = 90^\circ$

$$\therefore (AB)^2 = (AD)^2 - (BD)^2 = (17)^2 - (8)^2 = 225$$

$$\therefore AB = 15 \text{ cm.} \quad (\text{First req.})$$

$$\therefore \text{in } \triangle ABC: \therefore (AB)^2 = 225$$

$$\therefore (BC)^2 + (AC)^2 = (9)^2 + (12)^2 = 225$$

$$\therefore \therefore (AB)^2 = (BC)^2 + (AC)^2$$

$$\therefore m(\angle ACB) = 90 \quad (\text{Second req.})$$

$\therefore \therefore \overline{AE}$ is the projection of \overline{AC} on \overline{AB}

$$\therefore \therefore (AC)^2 = AE \times AB \quad \therefore 144 = AE \times 15$$

$$\therefore AE = \frac{144}{15} = 9.6 \text{ cm.} \quad (\text{Third req.})$$

8

Alexandria

1

1 (c)

2 (a)

3 (c)

4 (b)

5 (b)

6 (b)

2

1 equal in measure

2 C

3 110°

4 2

5 3 : 5

3

[a] In $\triangle ABC$: $\therefore m(\angle B) = 90^\circ$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$$

$$\therefore AC = 15 \text{ cm.}$$

$$\text{In } \triangle DAC: \therefore (DC)^2 = (17)^2 = 289$$

$$\therefore (AD)^2 + (AC)^2 = (8)^2 + (15)^2 = 289$$

$$\therefore (DC)^2 = (AD)^2 + (AC)^2$$

$$\therefore m(\angle DAC) = 90^\circ \quad (\text{Q.E.D.})$$

[b] 1 \overline{DC}

2 the point D

4

[a] \therefore The area of $\triangle AEB$ = the area of $\triangle DEC$

Adding the area of $\triangle ADE$ to both sides

\therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
and they have a common side \overline{AD} and on one side of it

$$\therefore \overline{AD} \parallel \overline{BC} \quad (\text{Q.E.D.})$$

[b] In $\triangle OED$: $\therefore m(\angle OED) = 90^\circ$, $\overline{EN} \perp \overline{OD}$

$$\therefore (EN)^2 = ON \times DN = 9 \times 16 = 144$$

$$\therefore EN = 12 \text{ cm.}$$

$$\therefore (EO)^2 = ON \times DO = 9 \times 25 = 225$$

$$\therefore EO = 15 \text{ cm.}$$

$$\therefore (ED)^2 = DN \times DO = 16 \times 25 = 400$$

$$\therefore ED = 20 \text{ cm.} \quad (\text{The req.})$$

5

$$\therefore \overline{AB} \parallel \overline{DE}, \overline{AD} \parallel \overline{BE}$$

\therefore ABED is a parallelogram

\therefore the rectangle XDEY and the parallelogram

ABED have the common base \overline{DE}

$$\therefore \overline{AY} \parallel \overline{DE}$$

\therefore the area of \square ABED = the area of the rectangle XDEY (First req.)

\therefore the area of the rectangle XDEY

$$= 12 \times 24 = 288 \text{ cm}^2$$

$$\therefore \text{The area of } \square \text{ ABED} = 288 \text{ cm}^2 \quad (\text{Second req.})$$

\therefore The length of the perpendicular from B to \overline{AD}

$$= \frac{\text{The area of } \square \text{ ABED}}{\overline{AD}} = \frac{288}{30} = 9.6 \text{ cm.}$$

(Third req.)

9

El-Kalyoubia

1

1 (b)

2 (b)

3 (b)

4 (a)

5 (d)

6 (c)

2

1 corresponding height

2 their corresponding side lengths are proportional

\therefore their corresponding angles are equal in measure

3 the point A

4 C

5 equal in area

3

- [a] In $\triangle DEO$: $\because m(\angle DEO) = 90^\circ$, $\overline{EN} \perp \overline{OD}$
 $\therefore (EN)^2 = ON \times DN = 9 \times 16 = 144$
 $\therefore EN = 12$ cm.
 $\therefore (ED)^2 = DN \times DO = 16 \times 25 = 400$
 $\therefore ED = 20$ cm.
 $\therefore (EO)^2 = ON \times DO = 9 \times 25 = 225$
 $\therefore EO = 15$ cm. (The req.)

- [b] $\because \overline{AD}$ is a median in $\triangle ABC$
 \therefore The area of $\triangle ABD$ = the area of $\triangle ACD$ (1)
 $\therefore \overline{ED}$ is a median in $\triangle EBC$
 \therefore The area of $\triangle EBD$ = the area of $\triangle ECD$ (2)
 Subtracting (2) from (1) :
 \therefore The area of $\triangle AEB$ = the area of $\triangle AEC$ (Q.E.D.)

4

- [a] In $\triangle ADE$, $\triangle ABC$
 $\because \overline{DE} \parallel \overline{BC}$, \overline{AB} is a transversal
 $\therefore m(\angle ADE) = m(\angle B)$
 (corresponding angles) (1)
 $\because \overline{DE} \parallel \overline{BC}$, \overline{AC} is a transversal
 $\therefore m(\angle AED) = m(\angle C)$
 (corresponding angles) (2)
 $\therefore \angle A$ is a common angle (3)
 From (1) , (2) and (3) :
 $\therefore \triangle ADE \sim \triangle ABC$ (First req.)
 $\therefore \frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$
 $\therefore \frac{3}{5} = \frac{DE}{6} = \frac{AE}{4}$ $\therefore DE = \frac{3 \times 6}{5} = 3.6$ cm.
 $\therefore AE = \frac{3 \times 4}{5} = 2.4$ cm. (Second req.)

- [b] Let the length of other base be X cm.
 $\therefore \frac{1}{2} (15 + X) \times 8 = 108$ $\therefore \frac{1}{2} (15 + X) = \frac{27}{2}$
 $\therefore 15 + X = 27$ $\therefore X = 12$ cm.
 \therefore The length of other base = 12 cm. (The req.)

5

- [a] In $\triangle ABC$: $\because m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$
 $\therefore AC = 15$ cm.

- In $\triangle ADC$: $\because (CD)^2 = (17)^2 = 289$
 $\therefore (AD)^2 + (AC)^2 = (8)^2 + (15)^2 = 289$
 $\therefore (CD)^2 = (AD)^2 + (AC)^2$
 $\therefore m(\angle DAC) = 90^\circ$ (Q.E.D.)

- [b] $\because \triangle ABD$, $\triangle ACD$ have a common base \overline{AD}
 $\therefore \overline{AD} \parallel \overline{BC}$
 \therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
 subtracting the area of $\triangle AMD$ from both sides
 \therefore The area of $\triangle ABM$ = the area of $\triangle DCM$
 \therefore the area of $\triangle ABM$ = the area of $\triangle ECM$
 \therefore The area of $\triangle DCM$ = the area of $\triangle ECM$
 and they have a common base \overline{CM} and on one side of it
 $\therefore \overline{DE} \parallel \overline{CM}$ $\therefore \overline{DE} \parallel \overline{AC}$ (Q.E.D.)

10

El-Sharkia

1

- 1 (a) 2 (d) 3 (b)
 4 (b) 5 (c) 6 (a)

2

- 1 15 2 $\angle C$ 3 proportional
 4 two triangles equal in area
 5 length \times width

3

- [a] $\because \triangle ABD$, $\triangle ACD$ have the same base \overline{AD}
 $\therefore \overline{AD} \parallel \overline{BC}$
 \therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
 subtracting the area of $\triangle AMD$ from both sides
 \therefore The area of $\triangle ABM$ = the area of $\triangle DCM$ (1)
 (Q.E.D.1)
 $\because \overline{AB}$ is a median in $\triangle AYM$
 \therefore The area of $\triangle AMB$ = the area of $\triangle AYM$ (2)
 $\because \overline{DC}$ is a median in $\triangle DMX$
 \therefore The area of $\triangle DMC$ = the area of $\triangle DCX$ (3)
 from (1) , (2) and (3) :
 \therefore The area of $\triangle AYM$ = the area of $\triangle DCX$ (Q.E.D.2)

- [b] In $\triangle ABC$: $\because (AC)^2 = (9)^2 = 81$
 $\therefore (AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$
 $\therefore (AC)^2 < (AB)^2 + (BC)^2$
 $\therefore \triangle ABC$ is an acute-angled triangle (The req.)

4

- [a] In $\triangle ABC$: $\because m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$
 $\therefore AC = 25$ cm.
 In $\triangle ADC$: $\because m(\angle ADC) = 90^\circ$
 $\therefore (DC)^2 = (AC)^2 - (AD)^2 = (25)^2 - (15)^2 = 400$
 $\therefore DC = 20$ cm. (First req.)
 $\therefore \overline{AE}$ is the projection of \overline{AD} on \overline{AC}
 $\therefore (AD)^2 = AE \times AC$
 $\therefore 225 = AE \times 25$
 $\therefore AE = \frac{225}{25} = 9$ cm. (Second req.)
 [b] $\therefore \frac{1}{2} (24 + 12) \times h = 450 \quad \therefore 18h = 450$
 $\therefore h = \frac{450}{18} = 25$ cm. (The req.)

5

- [a] $\because \overline{XY}$ is a median in $\triangle BCX$
 \therefore The area of $\triangle BXY$ = the area of $\triangle CXY$ (1)
 \therefore the area of the figure $ABYX$ = the area of the figure $DCYX$ (2)
 subtracting (1) from (2) :
 \therefore The area of $\triangle ABX$ = the area of $\triangle CDX$
 $\therefore AX = DX$
 $\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)
 [b] In $\triangle ADE$, $\triangle ABC$
 $\because \overline{DE} \parallel \overline{BC}$, \overline{AB} is a transversal
 $\therefore m(\angle ADE) = m(\angle B)$
 (corresponding angles) (1)
 $\because \overline{DE} \parallel \overline{BC}$, \overline{AC} is a transversal
 $\therefore m(\angle AED) = m(\angle C)$
 (corresponding angles) (2)
 $\therefore \angle A$ is a common angle (3)
 From (1) , (2) and (3) :
 $\therefore \triangle ADE \sim \triangle ABC$ (First req.)
 $\therefore \frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$
 $\therefore \frac{3}{5} = \frac{DE}{6} = \frac{AE}{4}$ $\therefore DE = \frac{3 \times 6}{5} = 3.6$ cm.
 $\therefore AE = \frac{3 \times 4}{5} = 2.4$ cm.
 $\therefore EC = 4 - 2.4 = 1.6$ cm. (Second req.)

11

El-Dakahlia

1

- 1 (c) 2 (d) 3 (c)
 4 (d) 5 (a) 6 (a)

2

- 1 10 cm. 2 proportional
 3 the point A 4 100° 5 25

3

- [a] In $\triangle ABC$: $\because m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 $\therefore (AC)^2 = CD \times CB = 9 \times 25 = 225$
 $\therefore AC = 15$ cm.
 $\therefore (AD)^2 = CD \times BD = 9 \times 16 = 144$
 $\therefore AD = 12$ cm. (The req.)
 [b] $\because \triangle ABC$, $\triangle DBC$ have a common base \overline{BC}
 $\therefore \overline{AD} \parallel \overline{BC}$
 \therefore The area of $\triangle ABC$ = the area of $\triangle DBC$
 Subtracting the area of $\triangle OBC$ from both sides.
 \therefore The area of $\triangle AOB$ = the area of $\triangle DOC$ (1)
 $\because \overline{OX}$ is a median in $\triangle OBC$
 \therefore The area of $\triangle BOX$ = the area of $\triangle COX$ (2)
 Adding (1) and (2) :
 \therefore The area of the figure $ABXO$ = the area of the figure $DCXO$ (Q. E. D.)

4

- [a] In $\triangle ABC$: $\because m(\angle B) = 90^\circ$
 $\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$
 In $\triangle ACD$: $\because (AC)^2 = 625$
 $\therefore (AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$
 $\therefore (AC)^2 = (AD)^2 + (CD)^2$
 $\therefore m(\angle D) = 90^\circ$ (Q.E.D.)
 [b] In $\triangle ABC$: $\because (AC)^2 = (10)^2 = 100$
 $\therefore (AB)^2 + (BC)^2 = (5)^2 + (8)^2 = 89$
 $\therefore (AC)^2 > (AB)^2 + (BC)^2$
 $\therefore \triangle ABC$ is an obtuse-angled triangle. (The req.)

5

- [a] The length of the middle base = $\frac{1}{2}(4 + 10) = 7$ cm.
 ∴ the area of the trapezium = $7 \times 5 = 35$ cm².
 (The req.)

[b] In $\triangle AOD$, $\triangle COB$

- ∴ $\overline{DA} \parallel \overline{CB}$, \overline{AC} is a transversal
 ∴ $m(\angle A) = m(\angle C)$ (alternate angles) (1)
 ∴ $\overline{DA} \parallel \overline{CB}$, \overline{DB} is a transversal
 ∴ $m(\angle D) = m(\angle B)$ (alternate angles) (2)
 ∴ $m(\angle AOD) = m(\angle BOC)$ (V. O. A.) (3)
 From (1), (2) and (3):
 ∴ $\triangle AOD \sim \triangle COB$ (First req.)

$$\begin{aligned} \therefore \frac{AO}{CO} &= \frac{AD}{CB} & \therefore \frac{AO}{12-AO} &= \frac{3}{6} \\ \therefore 6AO &= 36 - 3AO \\ \therefore 6AO + 3AO &= 36 & \therefore 9AO &= 36 \\ \therefore AO &= \frac{36}{9} = 4 \text{ cm.} & & \text{(Second req.)} \end{aligned}$$

12

Suez

1

- | | | |
|-------|-------|-------|
| 1 (b) | 2 (c) | 3 (d) |
| 4 (b) | 5 (d) | 6 (c) |

2

- | | |
|---------------|---------|
| 1 in area | 2 C |
| 3 similar | 4 6 cm. |
| 5 the point A | |

3

- [a] In $\triangle ABC$: ∴ $m(\angle CAB) = 90^\circ$
 ∴ $(BC)^2 = (AC)^2 + (AB)^2 = (6)^2 + (8)^2 = 100$
 ∴ $BC = 10$ cm.
 ∴ \overline{DB} is the projection of \overline{AB} on \overline{BC}
 ∴ $(AB)^2 = DB \times BC$
 ∴ $64 = DB \times 10$
 ∴ $DB = \frac{64}{10} = 6.4$ cm. (The req.)
- [b] ∴ The area of $\triangle AMB$ = the area of $\triangle DMC$
 Adding the area of $\triangle AMD$ to both sides
 ∴ The area of $\triangle ABD$ = the area of $\triangle ACD$
 but they have a common base \overline{AD} and on one side of it
 ∴ $\overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4

- [a] In $\triangle ABC$: ∴ $(AC)^2 = (12)^2 = 144$
 ∴ $(AB)^2 + (BC)^2 = (9)^2 + (10)^2 = 181$
 ∴ $(AC)^2 < (AB)^2 + (BC)^2$
 ∴ $\angle B$ is acute. (The req.)
- [b] ∴ \overline{AD} is a median in $\triangle ABC$
 ∴ The area of $\triangle ABD$ = the area of $\triangle ACD$ (1)
 ∴ \overline{ED} is a median in $\triangle EBC$
 ∴ The area of $\triangle EBD$ = the area of $\triangle ECD$ (2)
 Subtracting (2) from (1):
 ∴ The area of $\triangle ABE$ = the area of $\triangle ACE$
 (Q. E. D.)

5

- [a] In $\triangle ABC$: ∴ $m(\angle B) = 90^\circ$
 ∴ $(AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$
 ∴ $AC = 15$ cm.
 In $\triangle ACD$: ∴ $(CD)^2 = (17)^2 = 289$
 ∴ $(AC)^2 + (AD)^2 = (15)^2 + (8)^2 = 289$
 ∴ $(CD)^2 = (AC)^2 + (AD)^2$
 ∴ $m(\angle DAC) = 90^\circ$ (Q.E.D.)

[b] In $\triangle AED$, $\triangle ABC$

- ∴ $\overline{ED} \parallel \overline{BC}$, \overline{AB} is a transversal
 ∴ $m(\angle AED) = m(\angle B)$
 (corresponding angles) (1)
 ∴ $\overline{ED} \parallel \overline{BC}$, \overline{AC} is a transversal
 ∴ $m(\angle ADE) = m(\angle C)$
 (corresponding angles) (2)
 ∴ $\angle A$ is a common angle (3)
 From (1), (2) and (3):

$$\begin{aligned} \therefore \triangle AED &\sim \triangle ABC \\ \therefore \frac{AE}{AB} &= \frac{ED}{BC} = \frac{AD}{AC} & \therefore \frac{5}{15} &= \frac{4}{AC} \\ \therefore AC &= \frac{4 \times 15}{5} = 12 \text{ cm.} \\ \therefore DC &= 12 - 4 = 8 \text{ cm.} & & \text{(The req.)} \end{aligned}$$

13

Port Said

1

- 1 (c) 2 (d) 3 (a)
 4 (b) 5 (d) 6 (c)

2

- 1 120° 2 C 3 2 : 5
 4 5 5 a right

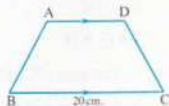
3

- [a]** In $\triangle ABC$: $\because m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 $\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$
 $\therefore AB = 20$ cm.
 $\therefore (AC)^2 = CD \times BC = 9 \times 25 = 225$
 $\therefore AC = 15$ cm.
 $\therefore (AD)^2 = CD \times BD = 9 \times 16 = 144$
 $\therefore AD = 12$ cm. (The req.)

- [b]** $\because BC = 2 AD = 20$ cm.

$$\therefore AD = 10$$
 cm.

- \therefore the area of the trapezium ABCD
 $= \frac{1}{2} (BC + AD) \times \text{the height}$
 $\therefore 180 = \frac{1}{2} (20 + 10) \times \text{the height}$
 $\therefore 180 = 15 \times \text{the height}$
 \therefore The height $= \frac{180}{15} = 12$ cm. (The req.)



4

- [a]** In $\triangle ABC$, $\triangle DBE$:
 $\because \overline{AC} \parallel \overline{ED}$, \overline{AD} is a transversal
 $\therefore m(\angle A) = m(\angle D)$ (alternate angles) (1)
 $\because \overline{AC} \parallel \overline{ED}$, \overline{CE} is a transversal
 $\therefore m(\angle C) = m(\angle E)$ (alternate angles) (2)
 $\therefore m(\angle ABC) = m(\angle DBE)$ (V. O. A.) (3)
 From (1), (2) and (3) :
 $\therefore \triangle ABC \sim \triangle DBE$ (First req.)
 $\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{DE}$
 $\therefore \frac{3}{6} = \frac{BC}{8} = \frac{5}{DE}$ $\therefore DE = \frac{5 \times 6}{3} = 10$ cm.
 $\therefore BC = \frac{3 \times 8}{6} = 4$ cm. (Second req.)

- [b]** $\because \triangle AXF$, $\triangle CYF$ have equal bases in lengths
 $\therefore \overline{AC} \parallel \overline{XY}$

$$\therefore \text{The area of } \triangle AXF = \text{the area of } \triangle CYF \quad (1)$$

$$\therefore \overline{BF} \text{ is a median in } \triangle BXY$$

$$\therefore \text{The area of } \triangle BXF = \text{the area of } \triangle BYF \quad (2)$$

Adding (1) and (2) :

$$\therefore \text{The area of } \triangle ABF = \text{the area of } \triangle CBF \quad (\text{Q.E.D.})$$

5

- [a]** \because The area of $\triangle ABE =$ the area of $\triangle ACD$
 Subtracting the area of $\triangle ADE$ from both sides
 \therefore The area of $\triangle BDE =$ the area of $\triangle CDE$ but they have a common base \overline{DE} and on one side of it
 $\therefore \overline{DE} \parallel \overline{BC}$ (Q.E.D.)

- [b]** In $\triangle ABC$: $\because m(\angle B) = 90^\circ$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$$

$$\therefore AC = 15$$
 cm.

$$\text{In } \triangle ACD : \because (CD)^2 = (17)^2 = 289$$

$$\therefore (AC)^2 + (AD)^2 = (15)^2 + (8)^2 = 289$$

$$\therefore (CD)^2 = (AC)^2 + (AD)^2$$

$$\therefore m(\angle DAC) = 90^\circ \quad (\text{Q.E.D.})$$

14

El-Beheira

1

- 1 (a) 2 (b) 3 (a)
 4 (b) 5 (c) 6 (c)

2

- 1 40° 2 equal in measure.
 3 6 4 360° 5 $CD \perp BD$

3

- [a]** Let the lengths of the parallel bases be :

$$3x \text{ cm.}, 5x \text{ cm.}$$

$$\therefore \frac{1}{2} (3x + 5x) \times 9 = 180 \quad \therefore \frac{1}{2} (8x) = 20$$

$$\therefore 4x = 20 \quad \therefore x = 5$$

\therefore The lengths of the parallel bases are :

$$15 \text{ cm.}, 25 \text{ cm.} \quad (\text{The req.})$$

- [b] $\therefore \triangle ABC$ & $\triangle DBC$ have the common base \overline{BC}
 $\therefore \overline{BC} \parallel \overline{AD}$
 \therefore The area of $\triangle ABC$ = the area of $\triangle DBC$ (1)
 $\therefore \overline{MX}$ is a median in $\triangle MBC$
 \therefore The area of $\triangle MCX$ = the area of $\triangle MBX$ (2)
 Subtracting (2) from (1):
 \therefore The area of the shape $ABXM$
 = the area of the shape $DCXM$ (Q.E.D.)

4

- [a] In $\triangle AED$ & $\triangle ABC$
 $\therefore m(\angle AED) = m(\angle B)$
 $\therefore \angle A$ is a common angle
 $\therefore m(\angle ADE) = m(\angle C)$
 $\therefore \triangle AED \sim \triangle ABC$ (First req.)
 $\therefore \frac{AE}{AB} = \frac{ED}{BC} = \frac{AD}{AC}$
 $\therefore \frac{4.5}{9} = \frac{3}{AC}$ $\therefore AC = \frac{3 \times 9}{4.5} = 6$ cm.
 $\therefore CE = 6 - 4.5 = 1.5$ cm. (Second req.)

- [b] $\therefore \triangle EBC$ & $\square ABCD$ have a common base \overline{BC}
 $\therefore E \in \overline{AD}$
 \therefore The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABCD$ (1)
 $\therefore \square ABXY$ & $\square ABCD$ have a common
 base \overline{AB} , $\overline{AB} \parallel \overline{CY}$
 \therefore The area of $\square ABXY$ = the area of $\square ABCD$ (2)
 From (1) and (2):
 \therefore The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABXY$ (Q.E.D.)

5

- [a] In $\triangle ABC$: $\therefore m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 $\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$
 $\therefore AC = 20$ cm.
 $\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$
 $\therefore AB = 15$ cm.
 $\therefore AD = \frac{AC \times AB}{BC} = \frac{20 \times 15}{25} = 12$ cm. (The req.)

- [b] In $\triangle ABC$: $\therefore (BC)^2 = (10)^2 = 100$
 $\therefore (AC)^2 + (AB)^2 = (8)^2 + (7)^2 = 113$
 $\therefore \therefore (BC)^2 < (AC)^2 + (AB)^2$
 $\therefore \triangle ABC$ is acute-angled triangle (The req.)

15

Beni Suf

1

1 (b)

2 (b)

3 (c)

4 (a)

5 (a)

6 (c)

2

1 equal in area

2 obtuse-angled triangle

3 acute

4 180°

5 equal in measure

3

- [a] $\therefore \triangle ABC$ & the rectangle $ABCD$ have a common
 base \overline{BC}
 $\therefore A \in \overline{AD}$
 \therefore The area of $\triangle ABC$
 $= \frac{1}{2}$ the area of the rectangle $ABCD$ (1)
 $\therefore \triangle DAE$ & the rectangle $ABCD$ have
 a common base \overline{AD}
 $\therefore \overline{AD} \parallel \overline{CE}$
 \therefore The area of $\triangle DAE$
 $= \frac{1}{2}$ the area of the rectangle $ABCD$ (2)
 From (1) and (2):
 \therefore The area of $\triangle DAE$ = the area of $\triangle ABC$ (Q.E.D.)

- [b] \therefore The area of $\triangle ABM$ = the area of $\triangle DCM$
 Adding the area of $\triangle ADM$ to both sides
 \therefore The area of $\triangle ABD$ = the area of $\triangle ACD$
 but they have a common base \overline{AD}
 and on one side of it
 $\therefore \overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4

- [a] The area = $\frac{1}{2} \times 10 \times 8 = 40$ cm². (The req.)

[b] In ΔABC , $\angle AED$

$$\therefore m(\angle B) = m(\angle E) = 90^\circ$$

$$\therefore m(\angle BAC) = m(\angle EAD) \quad (\text{V.O.A.})$$

$$\therefore m(\angle C) = m(\angle D)$$

$$\therefore \Delta ABC \sim \Delta AED \quad (\text{Q.E.D.})$$

5

[a] In ΔADC : $\therefore m(\angle D) = 90^\circ$

$$\therefore (AC)^2 = (AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$$

$$\text{In } \Delta ABC: \therefore (AC)^2 = 625$$

$$\therefore (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2$$

$$\therefore m(\angle ABC) = 90^\circ \quad (\text{Q.E.D.})$$

[b] \overline{FD} is the projection of \overline{BD} on \overline{CD}

$$\text{In } \Delta ACE: \therefore m(\angle C) = 90^\circ$$

$$\therefore (CE)^2 = (AE)^2 - (AC)^2 = (20)^2 - (16)^2 = 144$$

$$\therefore CE = 12 \text{ cm.} \quad \therefore DE = CE$$

$$\therefore DE = 12 \text{ cm.}$$

$$\therefore \Delta EBD \text{ is isosceles, } \overline{BF} \perp \overline{ED}$$

$$\therefore FD = \frac{1}{2} DE = \frac{1}{2} \times 12 = 6 \text{ cm.} \quad (\text{The req.})$$

Schools Examinations



on Geometry

1

Cairo Governorate

El-Nozha Directorate of Education
Modern Language Schools

Answer the following questions :

1 Choose the correct answer :

- [1] The area of the trapezium whose middle base is of length 7 cm. and its height is 6 cm. equals

(a) 21 cm^2 (b) 40 cm^2 (c) 42 cm^2 (d) 13 cm^2

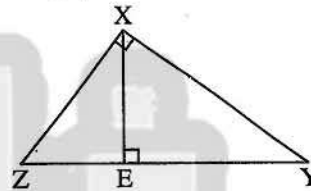
- [2] In $\triangle ABC$: if $m(\angle C) = 90^\circ$, $AB = 20 \text{ cm}$. and $BC = 16 \text{ cm}$. , then $AC = \dots\dots\dots \text{ cm}$.

(a) 9 (b) 12 (c) $4\sqrt{41}$ (d) 25

- [3] In the opposite figure :

$EY \times EZ = \dots\dots\dots$

(a) $(XE)^2$ (b) $(XZ)^2$
(c) $(YZ)^2$ (d) $(XY)^2$



- [4] The triangle whose sides lengths are 5 cm. , 8 cm. and 7 cm. is-angled triangle.

(a) right (b) acute (c) obtuse (d) straight

- [5] If the triangle base length is 6 cm. and its area is 24 cm^2 , then its corresponding height is

(a) 18 cm. (b) 8 cm. (c) 4 cm. (d) 10 cm.

- [6] If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}

(a) < (b) > (c) = (d) \geq

2 Complete :

- [1] The two polygons are similar if their corresponding side lengths are and their corresponding angle are

- [2] If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) + m(\angle B) = 60^\circ$, then $m(\angle Z) = \dots\dots\dots$

- [3] If $\triangle ABC$ is an obtuse-angled triangle at B , then $(AC)^2 \dots\dots\dots (AB)^2 + (BC)^2$

- [4] If the length of the diagonal of a square is 10 cm. , then its area = cm^2

- [5] If the ratio between the length of two corresponding sides of two similar polygons is 2 : 5 and the perimeter of the smaller one is 12 cm. , then the perimeter of the other one is

Geometry

3 [a] In the opposite figure :

ABCD is a quadrilateral in which :

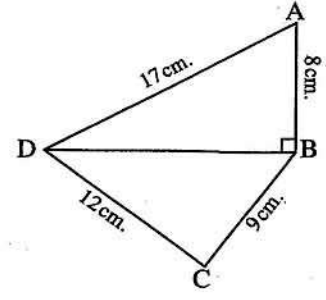
$AB = 8 \text{ cm.}$, $BC = 9 \text{ cm.}$

, $CD = 12 \text{ cm.}$, $AD = 17 \text{ cm.}$

and $\overline{DB} \perp \overline{AB}$

1 Find : the length of \overline{BD}

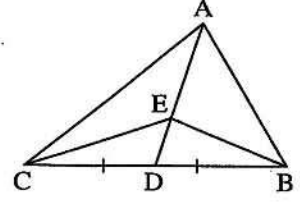
2 Prove that : $m(\angle C) = 90^\circ$



[b] In the opposite figure :

$\triangle ABC$ with a median \overline{AD} , $E \in \overline{AD}$

Prove that : the area of $\triangle ABE =$ the area of $\triangle ACE$

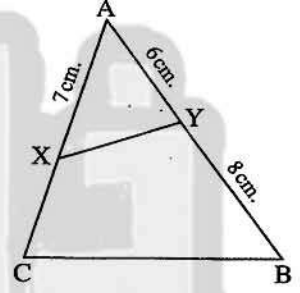


4 [a] In the opposite figure :

$\triangle AXY \sim \triangle ABC$, $AX = 7 \text{ cm.}$

, $AY = 6 \text{ cm.}$, $YB = 8 \text{ cm.}$

Find : the length of \overline{XC}

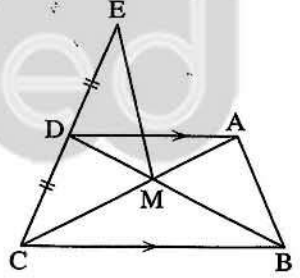


[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, D is the midpoint of \overline{EC}

Prove that : the area of $\triangle MDE =$ the area of $\triangle AMB$



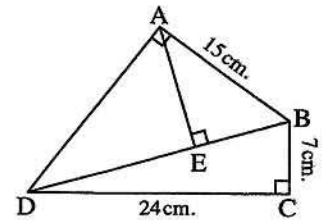
5 In the opposite figure :

ABCD is a quadrilateral , $m(\angle BCD) = m(\angle BAD) = 90^\circ$

, $\overline{AE} \perp \overline{BE}$

1 Find : the length of \overline{BD} and \overline{AD}

2 Find : the length of the projection of \overline{AB} on \overline{BD}



2

Cairo Governorate

Shoubra Educational Zone



Answer the following questions :

1 Choose the correct answer :

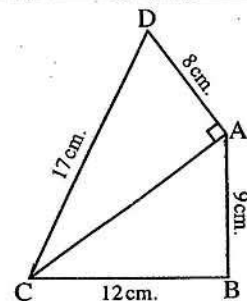
- 1 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $m(\angle C)$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 2 ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 70 (b) 110 (c) 180 (d) 360
- 3 The diagonals of isosceles trapezium are
 (a) parallel (b) perpendicular (c) congruent (d) not equal
- 4 A rhombus its two diagonals of lengths 8 cm. and 6 cm. , its area equals cm^2
 (a) 14 (b) 20 (c) 24 (d) 48
- 5 $\overline{AB} \parallel \overline{CD}$, then the length of the projection of \overline{AB} on \overline{CD} the length of \overline{AB}
 (a) > (b) < (c) = (d) \leq
- 6 Any triangle has at least two angles.
 (a) right. (b) obtuse. (c) acute. (d) straight.

2 Complete each of the following :

- 1 The square of diagonal length 12 cm. , then its area = cm^2
- 2 If each of two triangles is similar to a third triangle , then they are
- 3 The median of a triangle divides it into two triangles
- 4 If $\triangle ADE \sim \triangle ABC$, $AE : AC = 1 : 2$ and $DE = 5$ cm. , then $BC = \dots\dots\dots$ cm.
- 5 Each two opposite angles in a parallelogram are

3 [a] In the opposite figure :

$m(\angle DAC) = 90^\circ$, $AD = 8$ cm.
 , $DC = 17$ cm. , $AB = 9$ cm.
 , $BC = 12$ cm.

Prove that : $m(\angle B) = 90^\circ$ 

[b] Find the area of a trapezium :

Whose two parallel bases lengths are 12 cm. , 7 cm. and its height is 5 cm.

Geometry

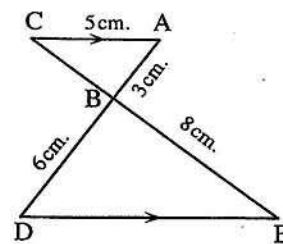
4 [a] In the opposite figure :

$\overline{AC} \parallel \overline{ED}$, $\overline{AD} \cap \overline{CE} = \{B\}$, $AC = 5$ cm.

, $AB = 3$ cm. and $BD = 6$ cm.

, $BE = 8$ cm.

Prove that : $\triangle ABC \sim \triangle DBE$



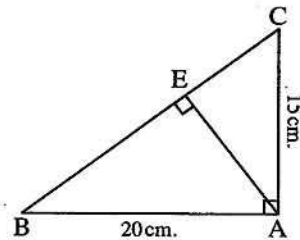
[b] In the opposite figure :

ABC is a right-angled triangle at A , $\overline{AE} \perp \overline{BC}$

Find :

[1] The length of the projection of \overline{AB} on \overline{BC}

[2] The length of \overline{EC}



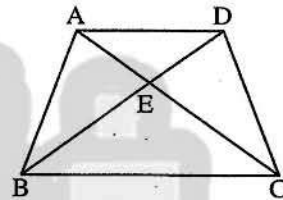
5 [a] Determine the type of triangle ABC according to its angles where

$AB = 7$ cm. , $BC = 6$ cm. , $AC = 9$ cm.

[b] In the opposite figure :

The area of $\triangle AEB =$ the area of $\triangle DEC$

Prove that : $\overline{AD} \parallel \overline{BC}$



3

Cairo Governorate

El-Zeiton Zone

Talea Gaber El Ansary Language School



Answer the following questions :

1 Choose the correct answer :

[1] The lengths of two adjacent sides in a parallelogram are 6 cm. , 7 cm. and the greater height is 5 cm. , then its area = cm².

(a) 30

(b) 35

(c) 42

(d) 49

[2] A trapezium whose middle base length is 8 cm. , then the lengths of the parallel bases may be

(a) 4 cm. , 4 cm.

(b) 3 cm. , 5 cm.

(c) 4 cm. , 6 cm.

(d) 6 cm. , 10 cm.

[3] A perimeter of a square is 20 cm. , then its area = cm.

(a) 400

(b) 80

(c) 25

(d) 20

[4] In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then angle C is

(a) acute.

(b) obtuse.

(c) right.

(d) straight.

- 5 ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, then the projection of \overline{BD} on \overline{AC} is
- (a) A (b) B (c) C (d) D
- 6 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is
- (a) 3 : 5 (b) 5 : 3 (c) 2 : 5 (d) 9 : 25

2 Complete the following :

- 1 The two polygons are similar , if their corresponding side lengths are and their corresponding angles are
- 2 The area of rhombus is 12 cm^2 , if the length of one of its diagonals is 4 cm. , then the length of the other diagonal = cm.
- 3 The complement of an angle of measure 25° equals
- 4 XYZ is a triangle in which $(XY)^2 = (XZ)^2 - (ZY)^2$, then $m(\angle \dots) = 90^\circ$
- 5 A rectangle whose perimeter is 28 cm. , and its length is 8 cm. , then the length of its diagonal = cm.

3 [a] In the opposite figure :

$$m(\angle BAC) = 90^\circ , \overline{AD} \perp \overline{BC}$$

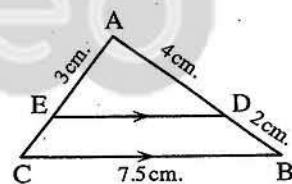
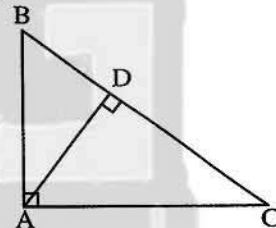
Complete :

- 1 $(AB)^2 = \dots \times \dots$
- 2 $(AD)^2 = \dots \times \dots$

[b] In the opposite figure :

$\overline{DE} \parallel \overline{BC}$, $AD = 4 \text{ cm.}$, $AE = 3 \text{ cm.}$
 , $BD = 2 \text{ cm.}$ and $BC = 7.5 \text{ cm.}$

- 1 Prove that : $\triangle ADE \sim \triangle ABC$
- 2 Find : the length of \overline{ED}



4 [a] In the opposite figure :

$$\overline{AD} \parallel \overline{BC} , \overline{AE} \cap \overline{BD} = \{M\}$$

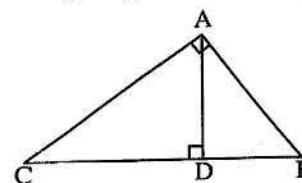
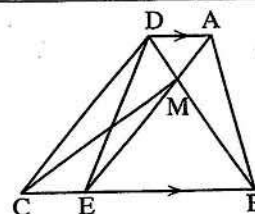
, the area of $\triangle AMB =$ the area of $\triangle EMC$

Prove that : $\overline{ME} \parallel \overline{DC}$

[b] In the opposite figure :

$$\overline{AD} \perp \overline{CB} , \overline{AC} \perp \overline{AB}$$

Prove that : $\triangle ABC \sim \triangle DBA \sim \triangle DAC$



Geometry

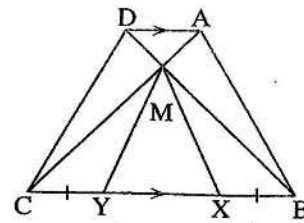
5 [a] In the opposite figure :

$$\overline{AD} \parallel \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}$$

$$, BX = CY$$

Prove that :

The area of the figure ABXM = The area of a figure DCYM



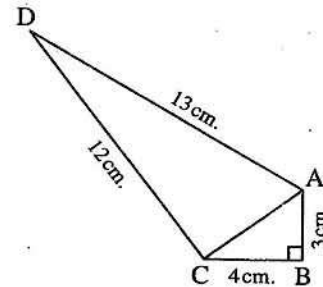
[b] In the opposite figure :

$$BC = 4 \text{ cm.}, AD = 13 \text{ cm.}$$

$$, AB = 3 \text{ cm.}, DC = 12 \text{ cm.}, m(\angle B) = 90^\circ$$

[1] Find : The length of \overline{AC}

[2] Prove that : $m(\angle ACD) = 90^\circ$



4

Giza Governorate

Omrana Directorate
El-Sadat Governmental Language School



Answer the following questions :

[1] Choose the correct answer :

[1] In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

[2] A rhombus whose diagonal lengths are 6 cm. , 10 cm. its area = cm^2

- (a) 60 (b) 30 (c) 15 (d) 10

[3] If the length of the middle base of a trapezium is 8 cm. and its surface area is 56 cm^2 , then its height = cm.

- (a) 32 (b) 24 (c) 448 (d) 7

[4] If the ratio of an enlargement between two triangles equals 1 , then the two triangles are

- (a) congruent. (b) enlargement. (c) coincide. (d) reduction.

[5] Any triangle has at least two angles.

- (a) right. (b) obtuse. (c) acute. (d) straight.

[6] The isosceles triangle has axis of symmetry.

- (a) zero (b) one (c) two (d) three

[2] Complete each of the following :

[1] The median of a triangle divides it into two triangles in area.

[2] Two triangles are similar if their corresponding side lengths are

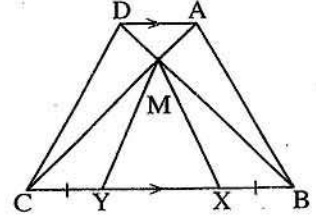
- [3] ABCD is a rectangle , the projection of \overline{AB} on \overline{BC} is
- [4] Surfaces of two parallelograms with common base and between two parallel straight lines one is carrying this base are
- [5] ABCD is a parallelogram its area = 36 cm^2 , $E \in \overline{AD}$
 , then the area of $\Delta EBC = \dots\dots\dots \text{ cm}^2$

[3] [a] In the opposite figure :

$$\overline{AD} \parallel \overline{BC} , \overline{AC} \cap \overline{BD} = \{M\}$$

$$, X \in \overline{BC} , Y \in \overline{BC} \text{ such that } BX = CY$$

Prove that : the area of shape ABXM = the area of shape DCYM

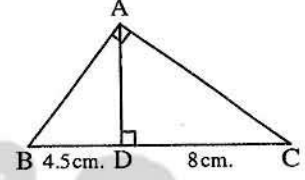


[b] In the opposite figure :

ABC is a triangle in which : $m(\angle A) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

$$, BD = 4.5 \text{ cm} , DC = 8 \text{ cm} .$$

Find : the length of each of \overline{AC} , \overline{AB} , \overline{AD}



[4] [a] In the opposite figure :

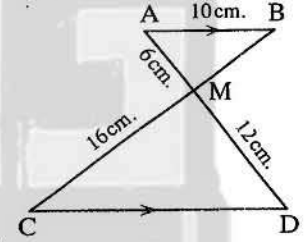
$$\overline{AB} \parallel \overline{DC} , \overline{AD} \cap \overline{BC} = \{M\}$$

$$, AB = 10 \text{ cm} , AM = 6 \text{ cm} .$$

$$, MD = 12 \text{ cm} , MC = 16 \text{ cm} .$$

[1] **Prove that :** $\Delta AMB \sim \Delta DMC$

[2] **Find :** the length of \overline{CD} , \overline{MB}



[b] Identify the type of ΔABC according to the measures of its angles where

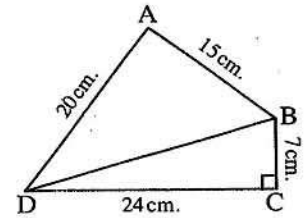
$$AB = 5 \text{ cm} , BC = 6 \text{ cm} , AC = 7 \text{ cm} .$$

[5] [a] In the opposite figure :

$$m(\angle BCD) = 90^\circ , AB = 15 \text{ cm} .$$

$$, BC = 7 \text{ cm} , CD = 24 \text{ cm} , AD = 20 \text{ cm} .$$

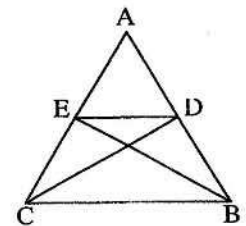
Prove that : $m(\angle BAD) = 90^\circ$



[b] In the opposite figure :

If the area of ΔADC = the area of ΔAEB

Prove that : $\overline{DE} \parallel \overline{BC}$



5

Giza Governorate

Abo El-Nomros Directorate
Inspection of maths

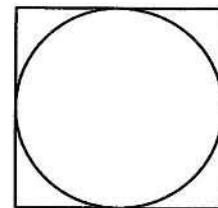
Answer the following questions :

1 Complete each of the following :

- 1 The two triangles are similar if their corresponding sides are
- 2 In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots) = 90^\circ$
- 3 A square its side length is 5 cm. , then its diagonal length = cm.
- 4 If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AB} on \overline{BC} is
- 5 A rhombus its diagonal lengths are 8 cm. and 7 cm. , then its area = cm^2

2 Choose the correct answer :

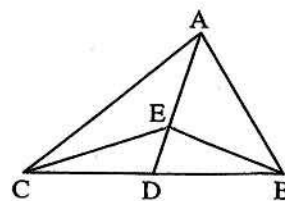
- 1 If the two similar triangles are congruent , then the ratio of enlargement =
(a) 1 (b) 2 (c) 0.5 (d) 0.25
- 2 A triangle its side lengths are 3 cm. , 4 cm. and 5 cm. , then its area = cm^2
(a) 12 (b) 6 (c) 10 (d) 15
- 3 A parallelogram its area is 27 cm^2 , if its base length three times its height , then its height = cm.
(a) 27 (b) 9 (c) 3 (d) 6
- 4 If the measure of the smallest angle of a triangle is 20° , then the possible measure of the greatest angle in this triangle =
(a) 90 (b) 140 (c) 159 (d) 160
- 5 The suitable unit to measure the height of a house is
(a) cm. (b) dm. (c) m. (d) km.
- 6 If the area of the opposite square = 36 cm^2
 , then the area of the circle = cm^2
(a) 6π (b) 9π
(c) 36π (d) 9



3 [a] In the opposite figure :

ABC is a triangle in which
 , \overline{AD} is median , $E \in \overline{AD}$

Prove that : the area of $\triangle ABE$ = the area of $\triangle ACE$



- [b] Determine the type of $\triangle ABC$ according to its angles if
 $AB = 7$ cm. , $BC = 3$ cm. and $AC = 5$ cm.

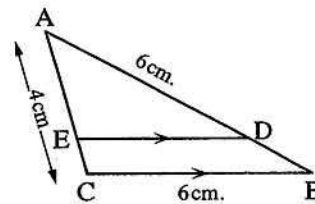
4 [a] In the opposite figure :

$\overline{DE} \parallel \overline{BC}$, $AD = BC = 6$ cm.

, $AB = 8$ cm. , $AC = 4$ cm.

[1] Prove that : $\triangle ADE \sim \triangle ABC$

[2] Find : the lengths of \overline{AE} and \overline{DE}



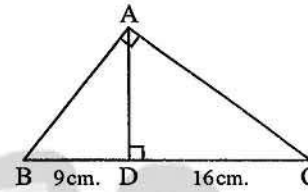
- [b] Find the area of a trapezium if the lengths of its parallel bases are 5 cm. , 9 cm.
 and its height is 4 cm.

5 [a] In the opposite figure :

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, $BD = 9$ cm. , $CD = 16$ cm.

Find : the length of \overline{AC} , \overline{AB} and \overline{AD}

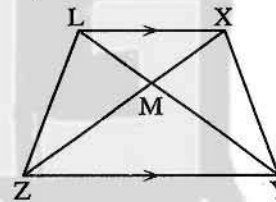


[b] In the opposite figure :

XYZL is a trapezium in which

, $\overline{XL} \parallel \overline{YZ}$, $\overline{XZ} \cap \overline{LY} = \{M\}$

Prove that : the area of $\triangle XMY$ = the area of $\triangle LMZ$



6

Alexandria Governorate

West Educational zone
 Inspectorate of Mathematics



Answer the following questions :

1 Complete each of the following :

- [1] The area of the rhombus whose diagonal lengths are 12 cm. , 8 cm. equals cm^2
- [2] If $\overline{AD} \perp \overline{BC}$, then the length of projection of \overline{AD} on \overline{BC} equals cm.
- [3] $\triangle ABC$ is a right-angled triangle at B in which $AB = 5$ cm. , $BC = 12$ cm.
 , then $AC =$ cm.
- [4] In $\triangle ABC$: $AB = 8$ cm. , $BC = 9$ cm. and $AC = 6$ cm. , then the type of this
 triangle according to its angles is
- [5] The number of axes of symmetry of an isosceles triangle equals

Geometry

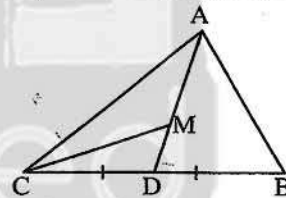
2 Choose the correct answer :

- 1 The diagonals of an isosceles trapezium are
 (a) congruent. (b) perpendicular.
 (c) bisect each other. (d) parallel.
- 2 If the ratio between two corresponding sides of two similar triangles is $1 : 2$, and the measure of an angle of the first triangle equals 60° , then the measure of its corresponding angle in the other triangle equals
 (a) 30° (b) 120° (c) 60° (d) 62°
- 3 The image of point $(2, 0)$ is itself by reflection on
 (a) X-axis (b) y-axis
 (c) origin point. (d) X-axis followed by y-axis
- 4 The perpendicular segment drawn from the right angle of a triangle to the hypotenuse divides it into two triangles.
 (a) obtuse angle (b) acute angle
 (c) equilateral (d) similar
- 5 The measure of the complementary angle of an angle whose measure X° equals
 (a) 90° (b) $90^\circ - X^\circ$ (c) $X^\circ - 90^\circ$ (d) $90 X^\circ$
- 6 ABCD is a parallelogram, $E \in BC$, then the area of $\square ABCD = \dots\dots\dots$ area of $\triangle EAD$
 (a) the same (b) half (c) twice (d) third

3 [a] In the opposite figure :

$\triangle ABC$, M is the point of concurrence

Prove that : the area of $\triangle AMC = \frac{1}{3}$ the area of $\triangle ABC$

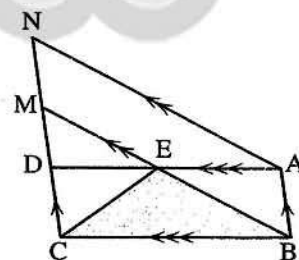


[b] In the opposite figure :

ABCD and ABMN are two parallelograms

Prove that :

The area of $\triangle EBC = \frac{1}{2}$ the area of $\square ABMN$



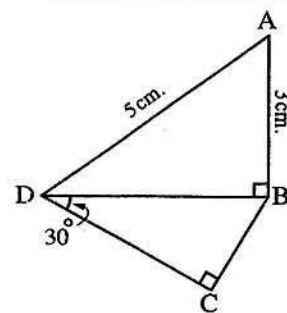
4 [a] In the opposite figure :

ABCD is a quadrilateral in which :

$m(\angle ABD) = 90^\circ$, $m(\angle BCD) = 90^\circ$

, $m(\angle BDC) = 30^\circ$, $AB = 3$ cm., $AD = 5$ cm.

Find : the lengths of \overline{BD} and \overline{BC}



[b] In the opposite figure :

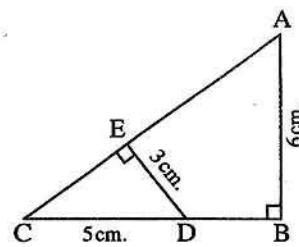
ABC is a right-angled triangle at B

, $\overline{DE} \perp \overline{AC}$, $AB = 6$ cm.

, $ED = 3$ cm. , $CD = 5$ cm.

[1] Prove that : $\triangle ABC \sim \triangle DEC$

[2] Find : the length of \overline{AC}



- [5] [a] The area of a trapezium is 88 cm^2 , its height is 8 cm. and the length of one of the two parallel bases is 10 cm. find the length of the other base.

[b] In the opposite figure :

$m(\angle ABD) = 90^\circ$, $\overline{CE} \perp \overline{AB}$

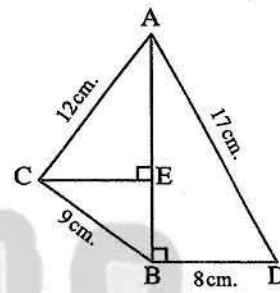
, $CB = 9$ cm. , $AD = 17$ cm.

, $BD = 8$ cm. , $AC = 12$ cm.

[1] Find : the length of \overline{AB}

[2] Prove that : $m(\angle ACB) = 90^\circ$

[3] Find : the length of the projection of \overline{AC} on \overrightarrow{AB}



7

Alexandria Governorate

El Montazah Directorate
Brilliance Language School



Answer the following questions :

[1] Complete each of the following :

- [1] If the area of a rhombus equals 30 cm^2 and the length of one of its diagonals equals 6 cm. , then the length of the other diagonal equals cm.
- [2] Surface area of two parallelograms with common base and between two parallel straight lines , one is carrying this base , are
- [3] If $\overline{AB} \perp \overline{CD}$, then the length of the projection of \overline{AB} on \overline{CD} equals cm.
- [4] In $\triangle ABC$, $AB = 8$ cm. , $BC = 9$ cm. and $AC = 6$ cm. , then its type according to its angles is
- [5] If two straight lines intersect , then each two vertically opposite angles are

[2] Choose the correct answer :

- [1] The median of triangle divides its surface into two triangles
(a) congruent. (b) equal in area. (c) similar. (d) coincident.

Geometry

- [2] The isosceles trapezium has axis of symmetry.
 (a) 1 (b) 2 (c) 3 (d) 0
- [3] Area of a parallelogram = 24 cm^2 and its base length is 6 cm.
 , then its corresponding height = cm.
 (a) 8 (b) 4 (c) 48 (d) 12
- [4] If the ratio of enlargement between two similar triangles equals 1 , then the two triangles are
 (a) congruent. (b) different. (c) right-angled. (d) parallel.
- [5] The number of diagonals of any triangle =
 (a) 4 (b) 0 (c) 2 (d) 1
- [6] If $\triangle ABC \sim \triangle XYZ$, then $m(\angle B) = m(\angle \dots\dots\dots)$
 (a) C (b) Z (c) X (d) Y

[3] [a] In the opposite figure :

$$\overline{AB} \parallel \overline{DC}, \overline{AD} \cap \overline{BC} = \{M\}$$

$$, AB = 10 \text{ cm.}, AM = 6 \text{ cm.}$$

$$, MD = 12 \text{ cm.}, MC = 16 \text{ cm.}$$

[1] Prove that : $\triangle AMB \sim \triangle DMC$

[2] Find : the length of \overline{CD}

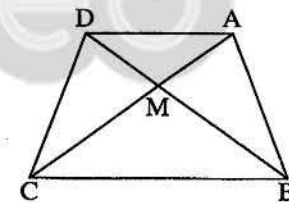
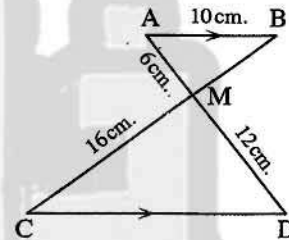
[b] In the opposite figure :

ABCD is a quadrilateral

, its diagonals intersect at M

and the area of $\triangle ABM =$ the area of $\triangle DCM$

Prove that : $\overline{AD} \parallel \overline{BC}$



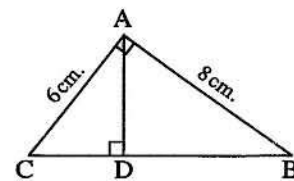
[4] [a] In the opposite figure :

ABC is a triangle in which :

$$m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$$

$$, AB = 8 \text{ cm. and } AC = 6 \text{ cm.}$$

Find : the lengths of \overline{CB} , \overline{CD} and \overline{AD}

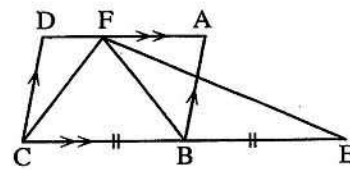


[b] In the opposite figure :

ABCD is a parallelogram

, $E \in \overrightarrow{CB}$ where $BC = BE$

Prove that : the area of $\triangle FEC$ = the area of $\square ABCD$



- 5 [a] Find the height of a trapezium with area of 450 cm^2 and the two parallel base lengths are 24 cm. and 12 cm.

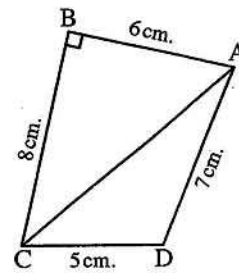
[b] In the opposite figure :

ABCD is a quadrilateral in which : $m(\angle B) = 90^\circ$

, $AB = 6 \text{ cm.}$, $BC = 8 \text{ cm.}$, $AD = 7 \text{ cm.}$

and $DC = 5 \text{ cm.}$

Determine the type of the angle which has the greatest measure in $\triangle ACD$



8

El-Kalyoubia Governorate

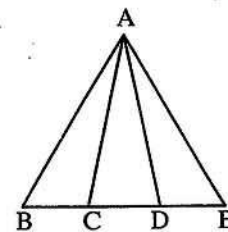
Math's Inspection



Answer the following questions :

1 Choose the correct answer :

- 1 ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 70 (b) 110 (c) 180 (d) 360
- 2 A rhombus whose diagonal lengths are 6 cm. and 10 cm. and its area = $\dots\dots\dots \text{ cm}^2$
 (a) 60 (b) 30 (c) 15 (d) 10
- 3 A square of perimeter 20 cm. , then its area = $\dots\dots\dots \text{ cm}^2$
 (a) 20 (b) 25 (c) 50 (d) 100
- 4 The number of the triangles in the opposite figure = $\dots\dots\dots$
 (a) 3 (b) 4
 (c) 5 (d) 6
- 5 All the $\dots\dots\dots$ are similar.
 (a) squares (b) triangles (c) rectangles (d) parallelograms
- 6 If $\triangle ABC \sim \triangle XYZ$, then $m(\angle Y) = m(\angle \dots\dots\dots)$
 (a) A (b) B (c) C (d) X

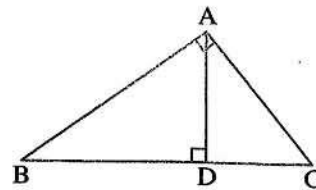


Geometry

2 Complete each of the following :

1 In the opposite figure

$$AB \times \dots\dots\dots = BC \times AD$$

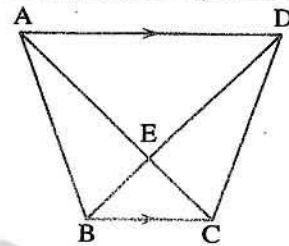
2 In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$ 3 If the point $A \in$ the straight line L , then the projection of the point A on the straight line L is4 The area of the triangle = $\frac{1}{2} \times \dots\dots\dots \times$ the corresponding height.

5 The diagonals of an isosceles trapezium are in the length.

3 [a] In the opposite figure :

ABCD is a quadrilateral in which

$$\overline{AD} \parallel \overline{BC} , \overline{AC} \cap \overline{BD} = \{E\}$$

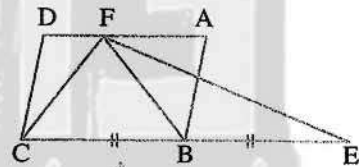
Prove that : the area of $\triangle ABE$ = the area of $\triangle DCE$ 

[b] The side lengths of one of two similar triangles are 3 cm. , 4 cm. , 5 cm. and the perimeter of the other triangle is 36 cm. Find the side lengths of the other triangle.

4 [a] In the opposite figure :

ABCD is a parallelogram , $E \in \overline{CB}$, where $BC = BE$

Prove that :

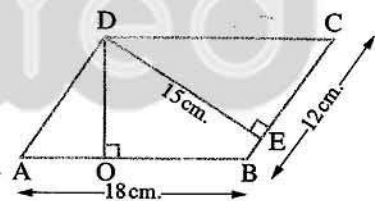
The area of $\triangle FCE$ = the area of parallelogram ABCD

[b] In the opposite figure :

ABCD is a parallelogram in which :

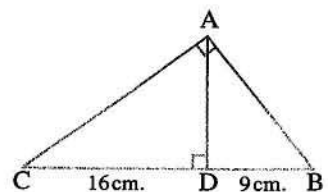
AB = 18 cm. , DE = 15 cm. , and BC = 12 cm.

$$\overline{DE} \perp \overline{BC} , \overline{DO} \perp \overline{AB}$$

Calculate the area of \square ABCD , and find the length of \overline{DO} 

5 [a] In the opposite figure :

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, if $BD = 9$ cm. and $DC = 16$ cm.Find : the lengths of \overline{AB} and \overline{AD} [b] In $\triangle ABC$, if $AB = 3$ cm. , $BC = 7$ cm. , $AC = 5$ cm.
Determine the type of $\triangle ABC$ according to its angles.

9

El-Sharkia Governorate

Dep. of formal L. Schools



Answer the following questions :

1 Complete each of the following :

- 1 The median of a triangle divides its surface into
- 2 The area of a trapezium whose parallel base lengths are 10 cm. , 6 cm. and its height is 5 cm. is cm^2
- 3 Area of parallelogram = \times
- 4 The area of the rhombus of perimeter 20 cm. and height 3 cm. =
- 5 The area of a triangle is equal to the area of a parallelogram if they have a common base lying on one of two parallel straight lines including them.

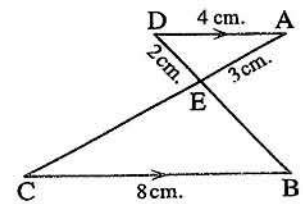
2 Choose the correct answer :

- 1 ABC is a triangle in which $(AB)^2 > (AC)^2 + (BC)^2$, then $\angle C$ is
(a) acute. (b) right. (c) obtuse. (d) straight.
- 2 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} length of \overline{AB}
(a) < (b) > (c) = (d) \geq
- 3 A square of diagonal length 12 cm. , then its area = cm^2
(a) 24 (b) 36 (c) 48 (d) 72
- 4 The two base angles of the isosceles trapezium are
(a) congruent. (b) complementary. (c) supplementary. (d) parallel.
- 5 The ratio between the lengths of corresponding sides of two similar triangles is 3 : 5 , if the perimeter of the greater triangle is 60 cm. , then the perimeter of the smaller triangle is
(a) 24 (b) 36 (c) 40 (d) 100
- 6 A triangle whose area is 15 cm^2 and its height is 3 cm. , then its base length = cm.
(a) 5 (b) 10 (c) 15 (d) 3

3 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AD = 4 \text{ cm.}$, $BC = 8 \text{ cm.}$
 $AE = 3 \text{ cm.}$ and $ED = 2 \text{ cm.}$

- 1 Prove that : $\triangle AED \sim \triangle CEB$
- 2 Find : The perimeter of $\triangle EBC$



Geometry

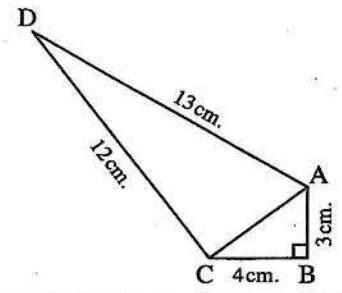
[b] In the opposite figure :

$AB = 3 \text{ cm.}$, $BC = 4 \text{ cm.}$

, $AD = 13 \text{ cm.}$, $CD = 12 \text{ cm.}$

, $m(\angle B) = 90^\circ$

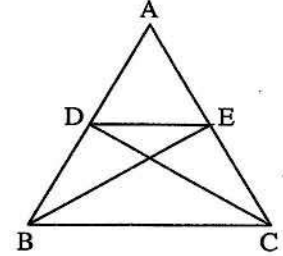
Prove that : $m(\angle ACD) = 90^\circ$



4 [a] In the opposite figure :

If the area of $\triangle ACD =$ the area of $\triangle ABE$

Prove that : $\overline{ED} \parallel \overline{BC}$



[b] In $\triangle ABC$, if $AB = 8 \text{ cm.}$, $BC = 10 \text{ cm.}$ and $CA = 7 \text{ cm.}$

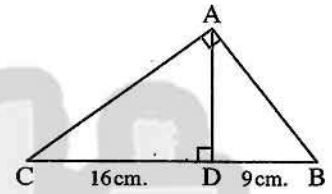
What is the type of $\triangle ABC$ according to its angles ?

5 [a] In the opposite figure :

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, $BD = 9 \text{ cm.}$, $CD = 16 \text{ cm.}$

Find: The length of each of \overline{AB} , \overline{AC} , \overline{AD}

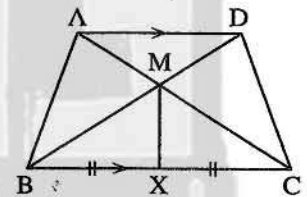


[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, X is the midpoint of \overline{BC}

Prove that :

The area of the figure $ABXM =$ the area of the figure $DCXM$



10 El-Dakahlia Governorate

Directorate of Education
Maths Supervision



Answer the following questions :

1 Choose the correct answer :

[1] The area of a rhombus whose diagonal lengths are 6 cm. and 10 cm. is cm^2

(a) 60 (b) 120 (c) 30 (d) 15

[2] In $\triangle XYZ$, if $(XZ)^2 = (XY)^2 - (ZY)^2$, then $\angle Z$ is angle.

(a) an acute. (b) a straight. (c) an obtuse. (d) a right.

[3] If the perimeter of a square is 20 cm. , then its area = cm^2

(a) 400 (b) 10 (c) 25 (d) 12.5

[4] If $\triangle ABC \sim \triangle XYZ$, then $m(\angle ACB) = m(\angle \dots\dots\dots)$

(a) XYZ (b) YXZ (c) ZYX (d) XZY

- 5 If the diameter length of a circle = 14 cm. , then its area = cm^2
 (a) 154 (b) 44 (c) 616 (d) 22
- 6 In $\triangle ABC$, $m(\angle B) = 90^\circ$, $\overline{BD} \perp \overline{AC}$, then $(AB)^2 = AD \times$
 (a) AC (b) CD (c) BC (d) AD

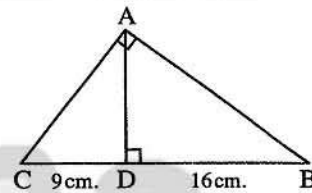
2 Complete each of the following :

- 1 If the area of a square is 50 cm^2 , then its diagonal length =
- 2 Two polygons are similar if the corresponding sides are
- 3 If $A \in$ straight line L , then its projection on straight line L is
- 4 ABCD is a parallelogram , if $m(\angle A) = 80^\circ$, then $m(\angle B) =$
- 5 If the perimeter of an equilateral triangle is 30 cm. and its height is 5 cm. , then its area = cm^2

3 [a] In the opposite figure :

$m(\angle A) = 90^\circ$, $\overline{AD} \perp \overline{BC}$
 $CD = 9 \text{ cm.}$ and $DB = 16 \text{ cm.}$

Find : AC and AD

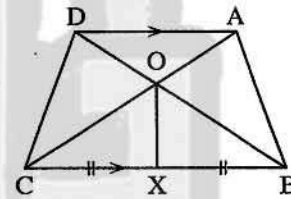


[b] In the opposite figure :

$\overline{DA} \parallel \overline{CB}$, $XB = XC$

Prove that :

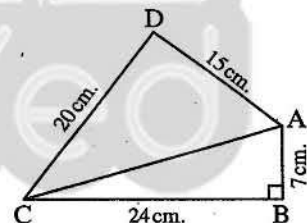
the area of the figure ABXO = the area of the figure DCXO



4 [a] In the opposite figure :

$m(\angle B) = 90^\circ$, $AB = 7 \text{ cm.}$
 $BC = 24 \text{ cm.}$ and $AD = 15 \text{ cm.}$
 $CD = 20 \text{ cm.}$

Prove that : $m(\angle D) = 90^\circ$



- [b] In $\triangle ABC$, $AB = 5 \text{ cm.}$, $BC = 8 \text{ cm.}$ and $AC = 10 \text{ cm.}$

What is the type of the triangle according to its angles ? (write steps)

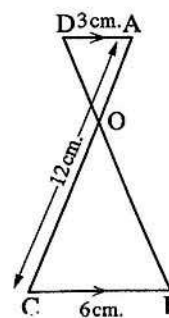
- 5 [a] A trapezium , the lengths of the two parallel bases are 4 cm. and 10 cm. , if its height is 5 cm. Calculate its middle base and its area.

[b] In the opposite figure :

$\overline{DA} \parallel \overline{CB}$, $AD = 3 \text{ cm.}$ and $BC = 6 \text{ cm.}$
 $AC = 12 \text{ cm.}$

- 1 **Prove that :** $\triangle AOD \sim \triangle COB$

- 2 **Find :** the length of \overline{AO}



11

Suez Governorate

Directorate of Education
Inspection of Mathematics

Answer the following questions :

1 Choose the correct answer :

1 ABCD is a parallelogram in which $m(\angle A) = 70^\circ$, then $m(\angle B) = \dots\dots\dots$

- (a) 70° (b) 110° (c) 180° (d) 540°

2 In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then angle C is $\dots\dots\dots$

- (a) acute. (b) right. (c) obtuse. (d) straight.

3 In the opposite figure :

 $m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$, $DC = 9$ cm. , $DB = 16$ cm., then $AD = \dots\dots\dots$ cm.

- (a) 144 (b) 25 (c) 50 (d) 12

4 The area of the square whose diagonal length is 10 cm. = $\dots\dots\dots$

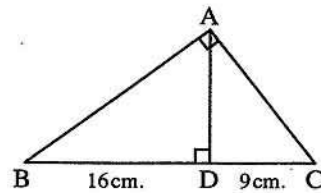
- (a) 100 cm^2 (b) 50 cm^2 (c) 40 cm^2 (d) 20 cm^2

5 A trapezium whose lengths of two parallel bases are 6 cm. and 8 cm. , then the length of its middle base equals $\dots\dots\dots$ cm.

- (a) 48 (b) 24 (c) 14 (d) 7

6 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is $\dots\dots\dots$

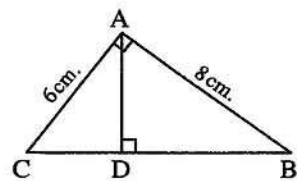
- (a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2



2 Complete each of the following :

1 The median of a triangle divides its surface into two triangular surfaces equals $\dots\dots\dots$ 2 In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$ 3 All the regular polygons that have the same number of sides are $\dots\dots\dots$ 4 The area of rhombus is 24 cm^2 , if the length of one of its diagonals 8 cm. , then the length of the other diagonal is $\dots\dots\dots$ 5 If the point $A \in$ the straight line L , then the projection of the point A on the line L is $\dots\dots\dots$

3 [a] In the opposite figure :

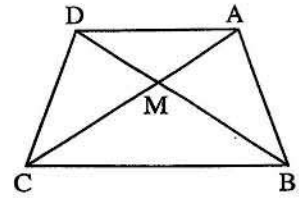
 $m(\angle CAB) = 90^\circ$, $\overline{AD} \perp \overline{BC}$, $AC = 6$ cm. , $AB = 8$ cm.Find : the length of the projection of \overline{AB} on \overline{BC} 

[b] In the opposite figure :

ABCD is a quadrilateral ,

the area of $\Delta AMB =$ the area of ΔDMC

Prove that : $\overline{AD} \parallel \overline{BC}$



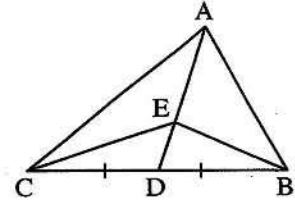
- 4 [a] Determine the type of the greatest angle in ΔABC where $AB = 9$ cm. , $BC = 10$ cm. , $AC = 12$ cm.

[b] In the opposite figure :

\overline{AD} is the median of ΔABC , $E \in \overline{AD}$

Prove that :

The area of $\Delta ABE =$ the area of ΔACE



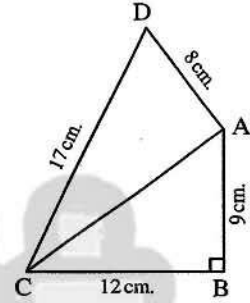
- 5 [a] In the opposite figure :

$m(\angle B) = 90^\circ$, $AB = 9$ cm.

, $BC = 12$ cm. , $AD = 8$ cm.

, $DC = 17$ cm.

Prove that : $m(\angle DAC) = 90^\circ$

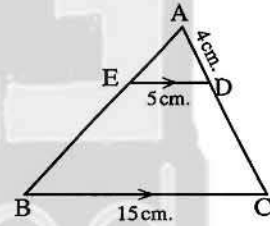


[b] In the opposite figure :

$\overline{ED} \parallel \overline{BC}$, $AD = 4$ cm.

, $ED = 5$ cm. , $BC = 15$ cm.

Find with proof : The length of \overline{DC}



12 Port Said Governorate

East Educational Directorate
mathematics inspection



Answer the following questions :

- 1 Choose the correct answer :

1 In ΔABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is

(a) acute.

(b) right.

(c) obtuse.

(d) straight.

2 If the lengths of the diagonals of a rhombus are 6 cm. and 8 cm.

, then its perimeter = cm.

(a) 24

(b) 28

(c) 14

(d) 20

3 If ABCD is a parallelogram of area 20 cm^2 and $E \in \overline{AD}$

, then the area of $\Delta EBC = \dots \text{ cm}^2$

(a) 10

(b) 5

(c) 20

(d) 40

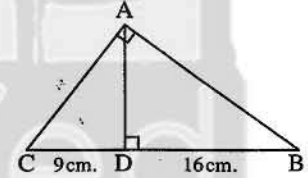
Geometry

- [4] If the projection of a line segment on a straight line is a point , then the line segment straight line.
 (a) \parallel (b) \perp (c) \equiv (d) \subset
- [5] The two triangles drawn on a common base and their vertices located on straight line parallel to the base are
 (a) congruent. (b) similar.
 (c) equal in perimeter. (d) equal in area.
- [6] ABCD is a parallelogram in which , $AB = 5$ cm. , $BC = 10$ cm. and its smaller height is 4 cm. , then its greater height = cm.
 (a) 2 (b) 4 (c) 8 (d) 10

[2] Complete each of the following :

- [1] If $\angle A$ complements $\angle B$ and $\angle B$ supplements $\angle C$, if $m(\angle A) = 30^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$
- [2] In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$
- [3] If two polygons are similar and the ratio between the lengths of two corresponding sides is 2 : 5 , then the ratio between their perimeters is
- [4] A trapezium whose base lengths are 4 cm. and 6 cm. , then the length of its middle base = cm.
- [5] The rectangle is a parallelogram in which one of its angles is

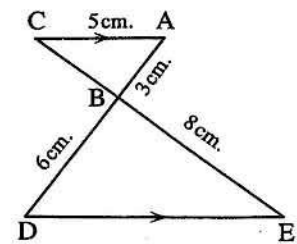
[3] [a] In the opposite figure :

Find : the length of \overline{AB} , \overline{AC} and \overline{AD} 

- [b] ABCD is a trapezium in which $\overline{AD} \parallel \overline{BC}$, if $BC = 2AD = 20$ cm. and its area = 180 cm^2 . Find its height.

[4] [a] In the opposite figure :

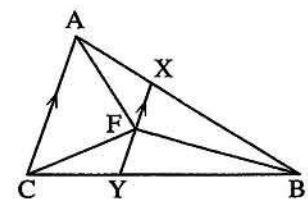
$\overline{AC} \parallel \overline{ED}$, $AB = 3$ cm. , $BD = 6$ cm.
 , $AC = 5$ cm. , $BE = 8$ cm.

Prove that : $\triangle ABC \sim \triangle DBE$, then find : the length of \overline{ED} , \overline{BC} 

[b] In the opposite figure :

 $\overline{AC} \parallel \overline{XY}$ and F is the midpoint of \overline{XY}

Prove that :

The area of $\triangle ABF$ = the area of $\triangle CBF$ 

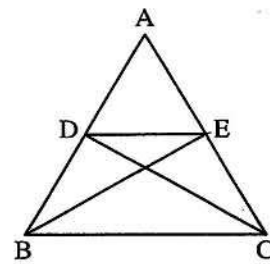
5 [a] In the opposite figure :

ABC is a triangle in which :

$D \in \overline{AB}$ and $E \in \overline{AC}$

, such that the area of $\triangle ABE$ = the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$

**[b] In the opposite figure :**

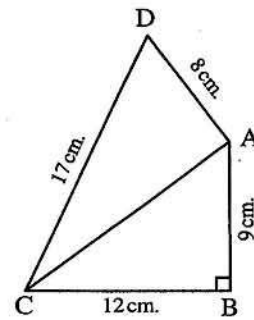
ABCD is a quadrilateral

, $m(\angle B) = 90^\circ$, $AB = 9$ cm.

, $BC = 12$ cm., $CD = 17$ cm.

and $DA = 8$ cm.

Prove that : $m(\angle DAC) = 90^\circ$

**13****Damietta Governorate**

Damietta Inspection of Mathematic
Official Language Schools



Answer the following questions :

1 Choose the correct answer :

- 1 If the lengths of two adjacent sides in a parallelogram are 8 cm. and 10 cm. and the smaller height is 5 cm., then its area is cm^2

(a) 40 (b) 50 (c) 80 (d) 20

- 2 If the area of a square is 72 cm^2 , then its diagonal length = cm.

(a) 6 (b) 8 (c) 12 (d) 36

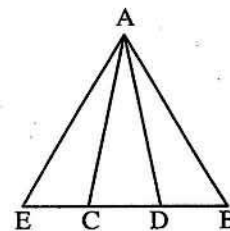
- 3 All are similar.

(a) squares (b) triangles (c) rectangles (d) parallelograms

4 In the opposite figure :

The number of the triangles =

(a) 3 (b) 4
(c) 5 (d) 6



- 5 In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2 - 5$, then $\angle C$ is angle.

(a) acute (b) right (c) obtuse (d) straight

- 6 If the projection of a line segment on a straight line is a point, then the line segment straight line.

(a) \parallel (b) \perp (c) \equiv (d) \subset

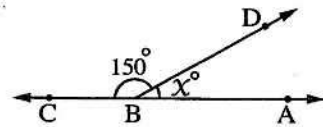
Geometry

2 Complete each of the following :

- [1] The area of a triangle is equal to the area of the parallelogram if they have a common base lying on one of two parallel straight lines including them.
- [2] If $\triangle ABC \sim \triangle DEH$ where $m(\angle A) = 70^\circ$, $m(\angle E) = 50^\circ$, then $m(\angle C) = \dots\dots\dots^\circ$
- [3] ABCD is a parallelogram in which $m(\angle A) + m(\angle C) = 140^\circ$, then $(\angle B) = \dots\dots\dots^\circ$
- [4] The length of the projection of a line segment parallel to a given straight line on this straight line is the length of the original line segment.
- [5] In the opposite figure :

If $B \in \overleftrightarrow{AC}$

, then $X = \dots\dots\dots^\circ$



- [3] [a] Find the height of a trapezium with area of 450 cm^2 and the two parallel bases lengths are 24 cm. and 12 cm.

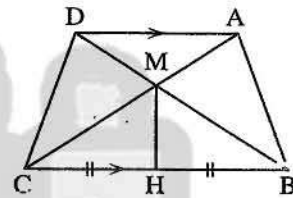
[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

and H is the midpoint of \overline{BC}

Prove that :

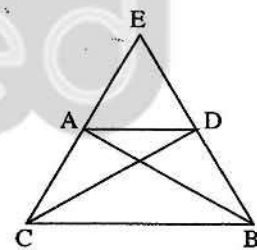
- [1] The area of $\triangle AMB =$ the area of $\triangle DMC$
- [2] The area of the figure ABHM = The area of the figure DCHM



[4] [a] In the opposite figure :

The area of $\triangle EAB =$ the area of $\triangle EDC$

Prove that : $\overline{AD} \parallel \overline{BC}$



- [b] Determine the type of $\triangle ABC$ according to its angles if
 $AB = 7 \text{ cm.}$, $BC = 3 \text{ cm.}$, $AC = 6 \text{ cm.}$

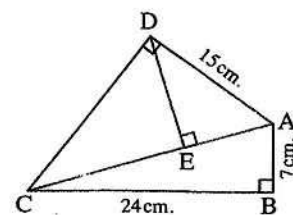
[5] [a] In the opposite figure :

$m(\angle ADC) = m(\angle ABC) = 90^\circ$, $AB = 7 \text{ cm.}$

, $BC = 24 \text{ cm.}$, $AD = 15 \text{ cm.}$

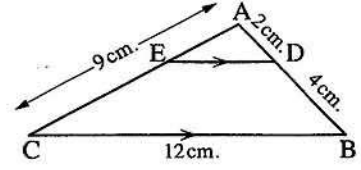
Find : [1] The length of \overline{AC} and \overline{DC}

[2] The length of the projection of \overline{AD} on \overleftrightarrow{AC}



[b] In the opposite figure :

ABC is a triangle , AD = 2 cm. , DB = 4 cm.
 , BC = 12 cm. , AC = 9 cm. and $\overline{DE} \parallel \overline{BC}$



1 Prove that : $\triangle ADE \sim \triangle ABC$

2 Find : The length of \overline{DE} and \overline{AE}

14

Beni Suef Governorate

Directorate of official Language Schools
 Education administration



Answer the following questions :

1 Choose the correct answer :

- 1 If the lengths of two adjacent sides of a parallelogram are 8 cm. and 10 cm. and its greater height is 5 cm. , then its area equals cm^2
 (a) 18 (b) 40 (c) 50 (d) 80
- 2 The median of the triangle divides its surface into two triangles
 (a) congruent. (b) equal in area. (c) isosceles. (d) right-angled.
- 3 If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}
 (a) < (b) > (c) = (d) \leq
- 4 In $\triangle ABC$, $(AC)^2 = (BC)^2 - (AB)^2$, then $\angle A$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- 5 Any triangle has at least two angles.
 (a) acute (b) obtuse (c) right (d) reflex
- 6 The number of axes of symmetry of an isosceles triangle =
 (a) zero (b) 1 (c) 2 (d) 3

2 Complete each of the following :

- 1 If two triangles are equal in area and drawn on the same base and on one side of it , then their vertices
- 2 If two polygons are similar , then the corresponding are equal in measure.
- 3 A triangle whose side lengths are 9 cm. , 12 cm. and 16 cm. , then its type according to its angles is
- 4 In $\triangle XYZ$, if $(XZ)^2 + (YZ)^2 > (XY)^2$, then the type of the angle Z is
- 5 If a straight line intersects two parallel straight lines , then every two alternate angles are

Geometry

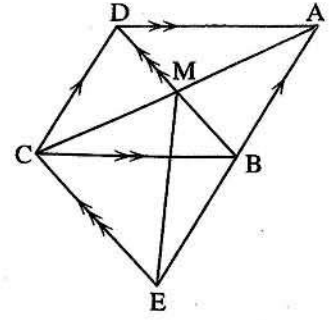
3 [a] In the opposite figure :

ABCD and BECD are two parallelograms

where $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that :

The area of $\triangle ABD$ = the area of $\triangle MEC$



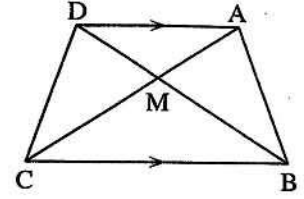
[b] In the opposite figure :

ABCD is a quadrilateral, $\overline{AD} \parallel \overline{BC}$

and $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that :

The area of $\triangle ABM$ = the area of $\triangle DCM$



- 4 [a] Two pieces of land have equal areas, one of them has the shape of a rhombus whose diagonals lengths are 18 m. and 24 m., and the other one has the shape of a trapezium whose height is 12 m. Find the length of its middle base.

[b] In the opposite figure :

$\triangle ABC$, $D \in \overline{AB}$, $E \in \overline{AC}$

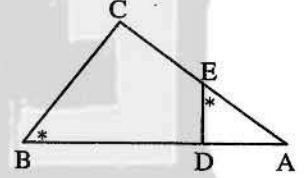
, $AE = 4$ cm., $EC = 5$ cm.

, $BC = 7.5$ cm., $AD = 3$ cm.

and $m(\angle AED) = m(\angle B)$

1 **Prove that :** $\triangle AED \sim \triangle ABC$

2 **Find the length of :** \overline{BD}



5 In the opposite figure :

$\overline{DE} \perp \overline{AB}$, $m(\angle ABC) = 90^\circ$

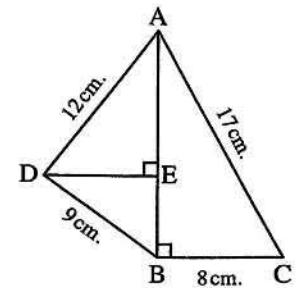
, $AD = 12$ cm., $AC = 17$ cm.

, $BC = 8$ cm., $DB = 9$ cm.

1 **Prove that :** $m(\angle ADB) = 90^\circ$

2 **Find :** the length of \overline{DE}

3 **Find :** the length of the projection of \overline{AD} on \overrightarrow{AB}



15

Qena Governorate

Qena Directorate
Governmental Language Schools Department

Answer the following questions :

1 Choose the correct answer :

- 1 If ABC is a right-angled triangle at A and $\overline{AD} \perp \overline{BC}$, then $(AC)^2 = \dots\dots\dots$
 (a) $AB \times BC$ (b) $BD \times DC$ (c) $BD \times BC$ (d) $CD \times BC$
- 2 If $\triangle ABC \sim \triangle XYZ$ and $AB : XY = 2 : 3$, the perimeter of $\triangle ABC = 14$ cm., then the perimeter of $\triangle XYZ = \dots\dots\dots$ cm.
 (a) 14 (b) 21 (c) 7 (d) 30
- 3 If the area of a square is 50 cm^2 , then its diagonal length = $\dots\dots\dots$ cm.
 (a) 10 (b) 5 (c) 15 (d) 25
- 4 The length of the projection of a line segment $\dots\dots\dots$ the length of the line segment.
 (a) $>$ (b) $=$ (c) \leq (d) \geq
- 5 If ABCD is a parallelogram in which $AB = 7$ cm., $BC = 8$ cm. and its smaller height is 5 cm., then its area = $\dots\dots\dots \text{ cm}^2$.
 (a) 28 (b) 40 (c) 35 (d) 56
- 6 The number of axes of symmetry of the isosceles triangle is $\dots\dots\dots$
 (a) 0 (b) 1 (c) 2 (d) 4

2 Complete each of the following :

- 1 If two triangles drawn on a common base and their vertices on a straight line parallel to this base, then they are $\dots\dots\dots$
- 2 If two polygons are similar to a third polygon, then they are $\dots\dots\dots$
- 3 If area of a trapezium is 24 cm^2 and its height is 4 cm., then the length of the middle base is $\dots\dots\dots$ cm.
- 4 In the triangle ABC, if $(AC)^2 - (BC)^2 > (AB)^2$, then $\angle B$ is $\dots\dots\dots$ angle.
- 5 Two triangles are similar if their corresponding side lengths are $\dots\dots\dots$

- 3 [a] A rhombus with diagonal lengths are 12 cm. and 10 cm. and its height 8 cm. find its perimeter.

Geometry

[b] In the opposite figure :

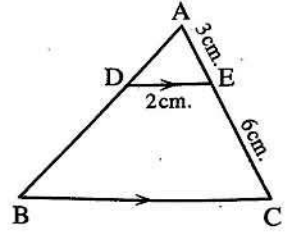
ABC is a triangle in which $D \in \overline{AB}$

, $E \in \overline{AC}$, where $\overline{DE} \parallel \overline{BC}$

, $AE = 3 \text{ cm.}$, $EC = 6 \text{ cm.}$, $DE = 2 \text{ cm.}$

[1] Prove that : $\triangle ADE \sim \triangle ABC$

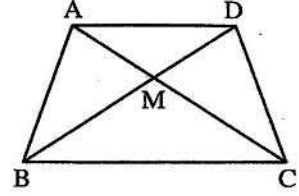
[2] Find : The length of \overline{BC}



4 [a] In the opposite figure :

If the area of $\triangle AMB =$ the area of $\triangle CMD$

Prove that : $\overline{AD} \parallel \overline{BC}$



[b] In the opposite figure :

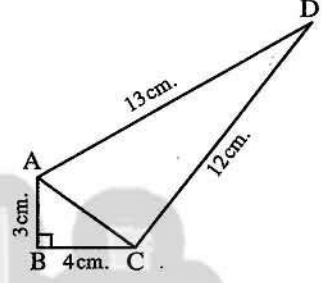
ABCD is a quadrilateral in which $m(\angle B) = 90^\circ$

, $AB = 3 \text{ cm.}$, $BC = 4 \text{ cm.}$

, $CD = 12 \text{ cm.}$, $AD = 13 \text{ cm.}$

[1] Prove that : $m(\angle ACD) = 90^\circ$

[2] Find : the area of the figure ABCD



5 [a] In the opposite figure :

ABC is a triangle in which :

D is the midpoint of \overline{BC} , $E \in \overline{AD}$

Prove that : the area of $\triangle ABE =$ the area of $\triangle ACE$

[b] In the opposite figure :

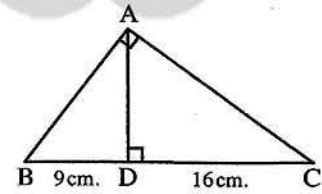
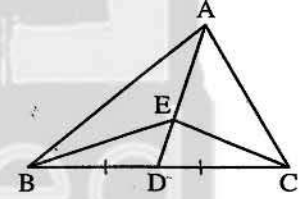
ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, $BD = 9 \text{ cm.}$

, $CD = 16 \text{ cm.}$

Find : [1] The perimeter of the triangle ABC

[2] The area of the triangle ABC



Some Schools Examinations on Geometry

1

Cairo Governorate

El-Nozha Educational Zone
Math's Inspection



Answer the following questions :

1 Complete each of the following :

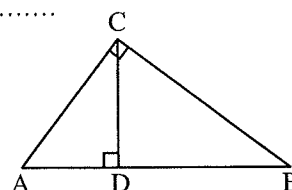
(1) In $\triangle ABC$, if $(AB)^2 + (BC)^2 < (AC)^2$, then $\angle B$ is

(2) The two triangles are similar if the corresponding angles are

(3) From the opposite figure :

(a) The projection of \overline{CD} on \overrightarrow{AB} is

(b) The projection of \overline{BC} on \overrightarrow{AB} is



(4) A rhombus whose diagonal lengths are 6 cm. , 10 cm. has area cm^2 .

2 Choose the correct answer :

(1) A square of diagonal length 12 cm. , then its area = cm^2

(a) 24 (b) 36 (c) 48 (d) 72

(2) In $\triangle ABC$ if $(AC)^2 = (AB)^2 + (BC)^2$, then \angle is right.

(a) A (b) B (c) C (d) otherwise

(3) ABC is a triangle where $AB = 2$ cm. , $BC = 6$ cm. and $CA = 5$ cm. , then $m(\angle A)$ 90°

(a) < (b) > (c) = (d) \geq

(4) If $\triangle ABC \sim \triangle XYZ$, $m(\angle B) = 50^\circ$, then $m(\angle Y) =$

(a) 30° (b) 40° (c) 50° (d) 60°

(5) If the ratio between the length of two corresponding sides in two similar triangles is equal to 1 , then the two triangles are

(a) congruent. (b) different. (c) parallel. (d) otherwise.

(6) * If the lengths of two adjacent sides of a parallelogram are 8 cm. and 10 cm. and its greater height is 5 cm. , then its area = cm^2

(a) 80 (b) 50 (c) 40 (d) 18

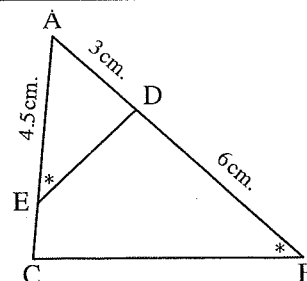
3 [a] In the opposite figure :

$m(\angle AED) = m(\angle B)$, $AD = 3$ cm.

, $AE = 4.5$ cm. and $BD = 6$ cm.

(1) Prove that : $\triangle ADE \sim \triangle ACB$

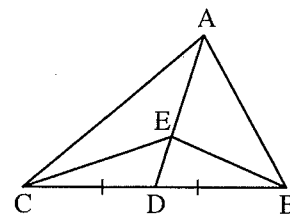
(2) Find : The length of \overline{EC}



[b] * In the opposite figure :

ABC is a triangle with a median \overline{AD}
 $E \in \overline{AD}$, draw \overline{BE} and \overline{CE}

Prove that : The area of $\triangle ABE$ = the area of $\triangle ACE$

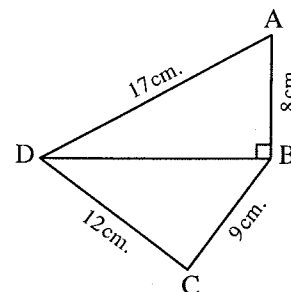


4 [a] In the opposite figure :

ABCD is a quadrilateral in which
 $AB = 8$ cm. , $BC = 9$ cm. and $CD = 12$ cm.
 $AD = 17$ cm. and $\overline{DB} \perp \overline{AB}$

① Find : The length of \overline{BD}

② Prove that : $m(\angle C) = 90^\circ$



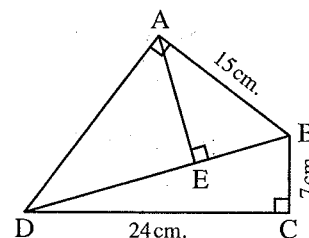
[b] If the lengths of the two parallel bases of a trapezium are 5 cm. , 7 cm. and if the length of its height 4 cm. , find its area

5 In the opposite figure :

ABCD is a quadrilateral , where $m(\angle BCD) = m(\angle BAD) = 90^\circ$
 $\overline{AE} \perp \overline{BD}$, $BC = 7$ cm. , $CD = 24$ cm. and $AB = 15$ cm.

Find : ① The length of \overline{BD} and \overline{AD}

② The length of the projection of \overline{AB} on \overline{BD}



2 Cairo Governorate

Abdine Educational Directorate
 Sahara Language Schools



Answer the following questions :

1 Choose the correct answer :

① The length of the two adjacent sides in a parallelogram are 7 cm. , 5 cm.
 and the length of its smallest height is 4 cm.

, then the area of the parallelogram equals cm^2

(a) 35 (b) 25 (c) 28 (d) 49

② If the ratio of enlargement between two similar triangles equals
 , then the two triangles are congruent.

(a) 1 (b) 2 (c) 0.5 (d) 0.25

③ If $\triangle ABC$ in which $(AB)^2 + (BC)^2 < (AC)^2$, then $(\angle B)$ is

(a) acute. (b) right. (c) reflex. (d) obtuse.

- (4) If the projection of a line segment on a straight line is a point, then the line segment the straight line.
 (a) \parallel (b) \perp (c) \equiv (d) \subset
- (5) If $\triangle ABC \sim \triangle DEO$, $AB = \frac{1}{3} DE$, then the perimeter of $\triangle ABC$ equals the perimeter of $\triangle DEO$
 (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 3 (d) 9
- (6) * The ratio between the area of the parallelogram and the area of the triangle whose base is common and are included between two parallel straight lines =
 (a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3

2 Complete the following questions :

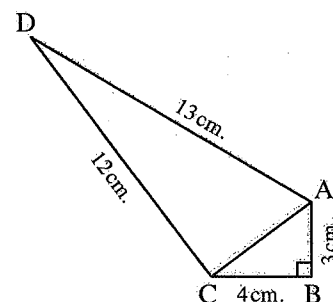
- (1) If $\triangle ABC \sim \triangle XYZ$, $m(\angle A) + m(\angle B) = 60^\circ$, then $m(\angle Z) = \dots\dots\dots$
- (2) The area of the trapezium whose parallel bases 6 cm., 10 cm. and height 5 cm. equals
- (3) The two polygons are similar to a third are
- (4) The area of rhombus whose perimeter is 20 cm. and height 4 cm. =
- (5) The projection of a point which belong to a straight line on this line is

- 3 [a]** The ratio between the length of corresponding sides of two similar triangle is 3 : 5 and if the perimeter of the greater is 60 cm., find the perimeter of the smaller triangles.

[b] In the opposite figure :

$AB = 3$ cm., $BC = 4$ cm., $AD = 13$ cm.,
 $CD = 12$ cm., $m(\angle B) = 90^\circ$

- (1) **Find :** The length of : \overline{AC}
 (2) **Prove that :** $m(\angle ACD) = 90^\circ$

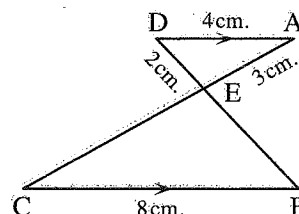


- 4 [a]** $\triangle ABC$ where $AB = 6$ cm., $BC = 8$ cm., $AC = 4$ cm., determine the type of the angle BAC

[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AD = 4$ cm., $AE = 3$ cm.,
 $DE = 2$ cm., $BC = 8$ cm.

- (1) **Prove that :** $\triangle AED \sim \triangle CED$
 (2) **Find :** The perimeter of $\triangle EBC$

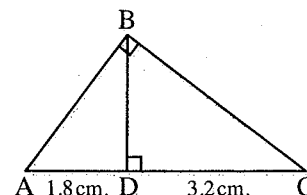


5 [a] In the opposite figure :

$$m(\angle ABC) = 90^\circ, \overline{BD} \perp \overline{AC}$$

$$, AD = 1.8 \text{ cm.}, DC = 3.2 \text{ cm.}$$

Find : The length of each : \overline{BD} , \overline{AB}



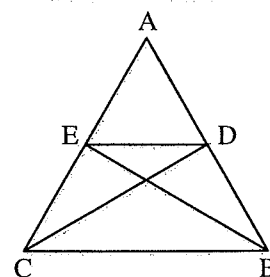
[b] * In the opposite figure :

ABC is a triangle in which

$$D \in \overline{AB} \text{ and } E \in \overline{AC}$$

such that the area of $\triangle ABE$ = the area of $\triangle ACD$

Prove that : $\overline{DE} \parallel \overline{BC}$



3 Cairo Governorate

Rod El-Farag Educational Zone
St. Mary's School



Answer the following questions :

1 Choose the correct answer between brackets :

- ① The length of the base of a triangle whose area 36 cm^2 and height 8 cm , is cm.
(a) 6 (b) 9 (c) 18 (d) 20
- ② If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} length of \overline{AB}
(a) < (b) > (c) = (d) \geq
- ③ The area of the trapezium whose middle bases 7 cm. , and height 6 cm. = cm^2
(a) 21 (b) 42 (c) 40 (d) 13
- ④ If the area of a parallelogram is 80 cm^2 and one of its bases length 10 cm. , then the length of the corresponding height of this base = cm.
(a) 8 (b) 6 (c) 7 (d) 20
- ⑤ $\triangle ABC$ in which $AB = 4 \text{ cm.}$, $BC = 6 \text{ cm.}$, $AC = 8 \text{ cm.}$, then $m(\angle B)$ 90°
(a) > (b) < (c) = (d) twice
- ⑥ * The length of the base of a triangle whose area 30 cm^2 and height 6 cm. is cm.
(a) 5 (b) 10 (c) 15 (d) 20

2 Complete each of the following :

- ① The two polygons are similar if the corresponding sides and their corresponding angles
- ② The area of the rhombus whose diagonals 6 cm. , 8 cm. equals cm^2
- ③ The diagonal of a square whose area 50 cm^2 equals cm.

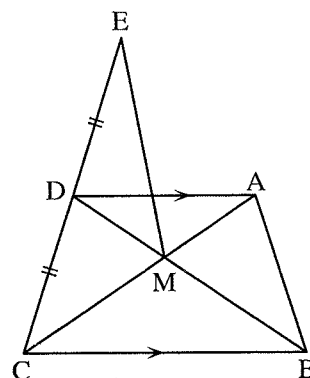
- (4) If two polygons are similar and the ratio between the lengths of two corresponding side is 1 : 3 and the perimeter of smaller polygons is 12 cm. , then the perimeter of the greater polygon is

3 [a] * In the opposite figure :

$$\overline{AD} \parallel \overline{BC} \text{ and } \overline{AC} \cap \overline{BD} = \{M\}$$

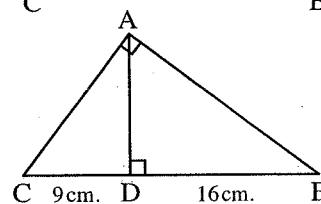
, D is the midpoint of \overline{EC}

Prove that : The area of $\triangle MDE$ = the area of $\triangle AMB$



[b] In the opposite figure :

Find : The length of \overline{AB} , \overline{AC} , and \overline{AD}



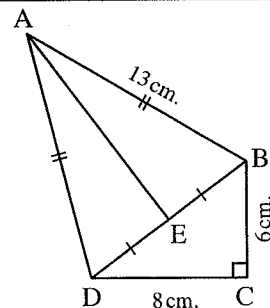
4 [a] In the opposite figure :

ABCD is a quadrilateral in which $m(\angle C) = 90^\circ$

$AB = AD = 13 \text{ cm.}$, $BC = 6 \text{ cm.}$

, $CD = 8 \text{ cm.}$, E is midpoint of \overline{BD}

Find : The area of the shape ABCD



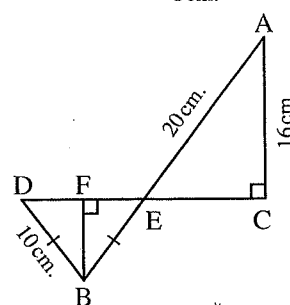
[b] In the opposite figure :

$\overline{AB} \cap \overline{CD} = \{E\}$, E is the midpoint of \overline{CD}

, $AC = 16 \text{ cm.}$, $AE = 20 \text{ cm.}$

, $BD = BE = 10 \text{ cm.}$

Find : The length of the projection of \overline{AB} on \overleftrightarrow{CD}



- 5 [a]** The length of the middle base of a trapezium is 30 cm. and the ratio between the length of its two parallel bases is 2 : 3

Find the length of each of them and if its height = 24 cm. , find its area.

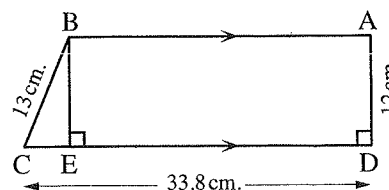
[b] In the opposite figure :

ABCD is a trapezium in which $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \perp \overline{DC}$, $AD = 12 \text{ cm.}$, $BC = 13 \text{ cm.}$, $DC = 33.8 \text{ cm.}$, $\overline{BE} \perp \overline{DC}$

① **Find :** The length of \overline{CE} , \overline{AB} , \overline{DB}

② **Find :** The length of the projection of \overline{DC} on \overleftrightarrow{AB}

③ **Prove that :** $m(\angle DBC) = 90^\circ$



4

Giza Governorate

El-Haram Directorate
Al-Omran Language School

Answer the following questions :

1 Choose the correct answer :

- ① In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then angle C is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- ② If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}
 (a) $>$ (b) \leq (c) $=$ (d) $<$
- ③ A rhombus whose diagonal lengths 12 cm. , 9 cm. , then its area = cm^2
 (a) 18 (b) 54 (c) 45 (d) 108
- ④ Area of the trapezium whose base lengths are 6 cm. , 8 cm. and its height 10 cm. = cm^2
 (a) 140 (b) 480 (c) 70 (d) 120
- ⑤ ABC is a triangle in which $(AB)^2 = (BC)^2 + (AC)^2$ and $m(\angle B) = 40^\circ$, then $m(\angle A) =$
 (a) 40° (b) 50° (c) 90° (d) 130°
- ⑥ * The median of a triangle divides its surface into two
 (a) congruent triangles. (b) triangles equal in area.
 (c) isosceles triangle. (d) right-angled triangle.

2 Complete each of the following :

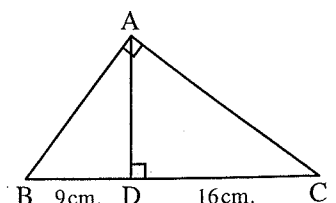
- ① The ratio between the length of two corresponding sides of two similar polygon is 3 : 5 , then the ratio between their perimeter =
- ② If $\overline{AD} \perp \overline{BC}$, then the projection of \overline{AD} on \overline{BC} is
- ③ A square of diagonal length 12 cm. , then its area = cm^2
- ④ A triangle whose side lengths 6 cm. , 8 cm. , 11 cm. , then its type according to its angle is
- ⑤ If $\triangle ABC \sim \triangle DEF$ and $m(\angle B) + m(\angle C) = 70^\circ$, then $m(\angle D) =$ $^\circ$

3 [a] In the opposite figure :

In $\triangle ABC$, $BD = 9$ cm.

, $DC = 16$ cm.

Find : Lengths of each of : \overline{AD} , \overline{AB} , \overline{AC}



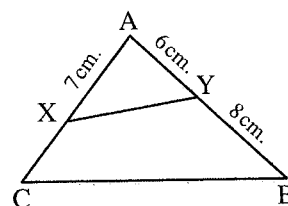
[b] ABCD is trapezium in which $\overline{AD} \parallel \overline{BC}$, if $BC = 2 AD = 20$ cm. and its area = 180 cm^2 , find the length of its height.

4 [a] In the opposite figure :

If $\triangle AXY \sim \triangle ABC$, $AX = 7$ cm. , $AY = 6$ cm. , $YB = 8$ cm.

(1) Find : The length of \overline{XC}

(2) Find : $\frac{XY}{BC}$



[b] $\triangle EFD \sim \triangle ABC$, $AB = 4$ cm. , $BC = 5$ cm. , $AC = 6$ cm. , if the perimeter of $\triangle EFD = 60$ cm. , find the length of sides $\triangle EFD$

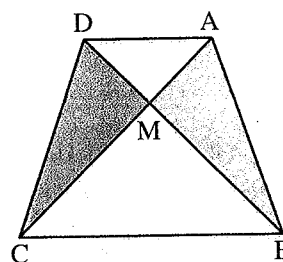
5 [a] * In the opposite figure :

ABCD is a quadrilateral

, its diagonals intersect at M

and the area of $\triangle ABM =$ the area of $\triangle DCM$

Prove that : $\overline{AD} \parallel \overline{BC}$



[b] In the opposite figure :

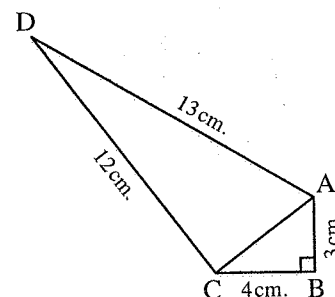
$AB = 3$ cm. , $BC = 4$ cm.

, $AD = 13$ cm.

, $CD = 12$ cm.

and $m(\angle ABC) = 90^\circ$

Prove that : $m(\angle ACD) = 90^\circ$



5

Giza Governorate

6th October Directorate
Om El-Mo'mneen Language School



Answer the following questions :

1 Complete each of the following :

(1) The ratio between the lengths of corresponding sides of two similar triangle is 3 : 5 if the perimeter of the greater triangle is 60 cm. , then the perimeter of the smaller triangle is

(2) The triangle whose side lengths are 5 cm. , 8 cm. , 7 cm. is angled triangle.

(3) If the length of middle base of a trapezium is 15 cm. and its area equal 75 cm^2 , then the length of its height = cm.

(4) In $\triangle ABC$, if $(AB)^2 = (AC)^2 - (BC)^2$, then $m(\angle B) = \dots\dots\dots^\circ$

(5) The projection of a straight line on a straight line is a point of intersection of two straight lines.

2 Choose the correct answer :

① The area of the triangle whose side length are 3 cm. , 4 cm. , 5 cm. is cm^2

- (a) 6 (b) 8 (c) 12 (d) 60

② If $\triangle ABC$ is an obtuse-angled triangle at A , $AB = 5 \text{ cm.}$, $BC = 8 \text{ cm.}$, then $AC = \dots\dots\dots \text{cm.}$

- (a) 5 (b) 7 (c) 8 (d) 9

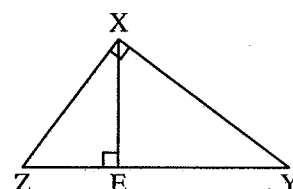
③ If the ratio of enlargement between two triangle equals , then the two triangles are congruent.

- (a) 0.5 (b) 1 (c) 2 (d) 4

④ In the opposite figure :

$EY \times EZ = \dots\dots\dots$

- (a) $(XY)^2$ (b) $(XZ)^2$
(c) $(XE)^2$ (d) $(YZ)^2$



⑤ The length of the projection of a line segment on a straight line parallel to it the length of the main line segment.

- (a) \geq (b) \leq (c) $>$ (d) $=$

⑥ * The area of the triangle is the area of the parallelogram which has a common base with it and its vertex lies on the straight line parallel to this base.

- (a) equal to (b) half (c) twice (d) quarter

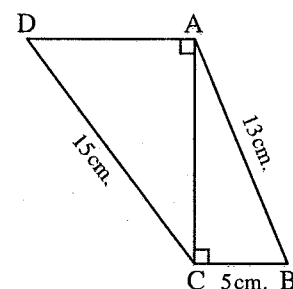
3 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AB = 13 \text{ cm.}$, $BC = 5 \text{ cm.}$

, $CD = 15 \text{ cm.}$, $m(\angle ACB) = m(\angle DAC) = 90^\circ$

Find : ① The length of the projection of \overline{AB} on \overline{AC}

② The length of the projection of \overline{CD} on \overline{AD}



[b] * In the opposite figure :

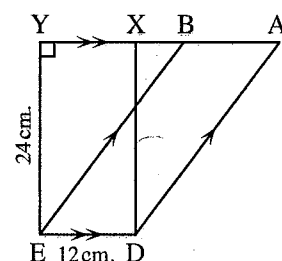
$\overline{AB} \parallel \overline{DE}$, X and $Y \in \overline{AB}$

, $XDEY$ is a rectangle and $\overline{AD} \parallel \overline{BE}$

① Find : The area of the figure ABED

② If $AD = 30 \text{ cm.}$

, find the length of the perpendicular from B to \overline{AD}



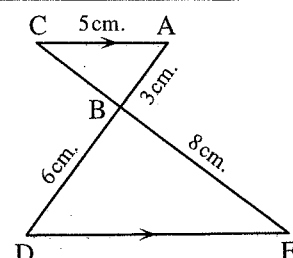
4 [a] In the opposite figure :

$\overline{AC} \parallel \overline{ED}$, $AB = 3 \text{ cm.}$, $BD = 6 \text{ cm.}$

, $AC = 5 \text{ cm.}$, $BE = 8 \text{ cm.}$

Prove that : $\triangle ABC \sim \triangle DBE$

, then find the length of : \overline{ED} , \overline{BC}



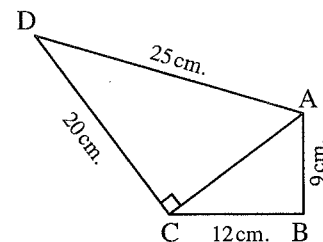
[b] In the opposite figure :

$m(\angle ACD) = 90^\circ$, $AB = 9$ cm.

, $BC = 12$ cm. , $AD = 25$ cm.

, $DC = 20$ cm.

Prove that : $m(\angle ABC) = 90^\circ$



5 In the opposite figure :

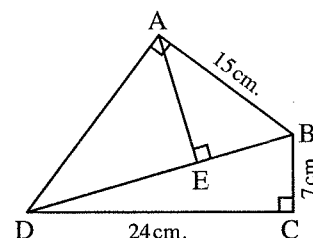
ABCD is a quadrilateral where : $m(\angle BCD) = m(\angle BAD) = 90^\circ$

$\overline{AE} \perp \overline{BD}$, $BC = 7$ cm. , $CD = 24$ cm. and $AB = 15$ cm.

Find : ① The length of each of \overline{BD} and \overline{AD}

② The length of the projection of \overline{AB} on \overline{BD}

③ The length of the projection of \overline{AD} on \overline{AE}



6 Alexandria Governorate

El-Montaza Educational Zone
victory college for boys



Answer the following questions :

1 Complete each of the following :

① $\triangle ABC$ is a right-angled triangle at B , $AB = 6$ cm. , $BC = 8$ cm.
 , then $AC = \dots\dots\dots$ cm.

② If $\overline{AD} \perp \overline{BC}$, then the projection of \overline{AD} on \overline{CB} is $\dots\dots\dots$

③ In $\triangle ABC$: If $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots\dots\dots) = 90^\circ$

④ The two triangles are similar if their corresponding angles are $\dots\dots\dots$ in measure.

⑤ The rectangle is parallelogram in which one of its angles is $\dots\dots\dots$

2 Choose the correct answer :

① The two angles of measures 130° and 50° are $\dots\dots\dots$

(a) complementary. (b) supplementary. (c) adjacent. (d) reflex.

② In $\triangle ABC$: if $(AB)^2 > (BC)^2 + (AC)^2$, then angle C is $\dots\dots\dots$

(a) acute. (b) right. (c) obtuse. (d) straight.

③ If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} $\dots\dots\dots$ the length of \overline{AB} .

(a) = (b) < (c) > (d) \leq

④ $\triangle ABC$ in which $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle A) = \dots\dots\dots$

(a) 130° (b) 50° (c) 90° (d) 40°

⑤ If the ratio of enlargement between two similar triangles equals 1

, then the two triangles are $\dots\dots\dots$

(a) congruent. (b) different. (c) right-angle. (d) coincide.

- ⑥ * The area of a right-angled triangle in which the lengths of the sides of the right angle are 6 cm. and 9 cm. equals

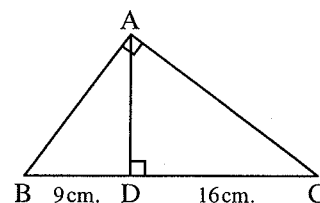
(a) 54 cm^2 (b) 60 cm^2 (c) 27 cm^2 (d) 15 cm^2

- ③ [a] Determine the type of angle C in $\triangle ABC$ in which $AB = 7 \text{ cm}$, $BC = 3 \text{ cm}$, and $AC = 5 \text{ cm}$.

[b] In the opposite figure :

$\triangle ABC$ is right-angled triangle at A, in which $\overline{AD} \perp \overline{BC}$, $BD = 9 \text{ cm}$. and $CD = 16 \text{ cm}$.

Find : The length of each of : \overline{AB} , \overline{AC} and \overline{AD}



- ④ [a] * In the opposite figure :

$\overline{AC} \parallel \overline{XY}$ and F is the midpoint of \overline{XY}

Prove that : The area of $\triangle ABF =$ the area of $\triangle CBF$

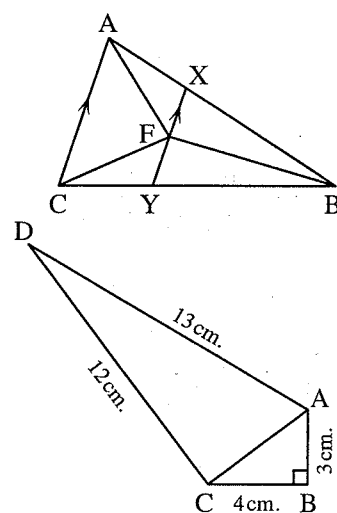
[b] In the opposite figure :

$AB = 3 \text{ cm}$, $BC = 4 \text{ cm}$.

$AD = 13 \text{ cm}$, $CD = 12 \text{ cm}$.

$m(\angle B) = 90^\circ$

Prove that : $m(\angle ACD) = 90^\circ$



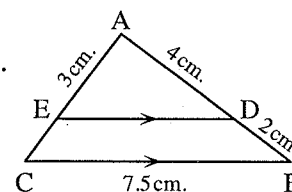
- ⑤ In the opposite figure :

$\overline{DE} \parallel \overline{BC}$, $AD = 4 \text{ cm}$, $AE = 3 \text{ cm}$, $BD = 2 \text{ cm}$. and $BC = 7.5 \text{ cm}$.

① Prove that : $\triangle ADE \sim \triangle ABC$

② Find : The length of \overline{ED}

③ Find : The perimeter of $\triangle ADE$



7 Alexandria Governorate

East Educational Zone
Mathematics Directing



Answer the following questions : (Allows the use of a calculator)

- ① Complete each of the following :

① The square is a rectangle in which

② If the triangle ABC is right-angled at $\angle B$ and the projection of \overline{AB} on \overline{AC} is \overline{DA} , then $(AB)^2 = \dots \times \dots$

③ If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AB} on \overline{BC} is

④ In $\triangle ABC$ if : $(AB)^2 > (BC)^2 + (AC)^2$, then $m(\angle \dots) > 90^\circ$

⑤ The triangles are similar if the corresponding angles are

2 Choose the correct answer from those given :

- (1) The sum of the measure of the interior angles of a triangle =
 (a) 90° (b) 180° (c) 270° (d) 360°
- (2) $(AB)^2 - (BC)^2 = (AC)^2$, then
 (a) $m(\angle A) > 90^\circ$ (b) $m(\angle B) = 90^\circ$ (c) $m(\angle A) = 90^\circ$ (d) $m(\angle C) = 90^\circ$
- (3) If $\triangle ABC \sim \triangle DEF$ and $AB = \frac{1}{2} DE$, then the perimeter of $\triangle ABC$ = the perimeter of $\triangle DEF$
 (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) 2 (d) 4
- (4) In $\triangle ABC$ if $m(\angle C) = 90^\circ$, $AB = 20$ cm. and $BC = 16$ cm. , then AC = cm.
 (a) 9 (b) 12 (c) $4\sqrt{41}$ (d) 25
- (5) If $\overline{AB} \parallel \overline{CD}$ and the projection of \overline{AB} on \overline{CD} is \overline{XY} , then XY AB
 (a) $>$ (b) $<$ (c) $=$ (d) $//$
- (6) * If the base length of a parallelogram is 7 cm. and the corresponding height is 4 cm. , then its area cm^2
 (a) 11 (b) 14 (c) 22 (d) 28

3 [a] In the opposite figure :

$AB = 15$ cm. , $BC = 24$ cm. , $CD = 7$ cm.

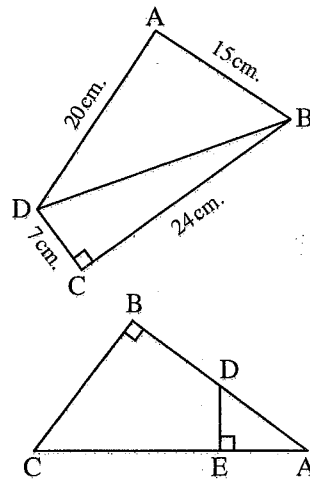
, $DA = 20$ cm. and $m(\angle C) = 90^\circ$

Prove that : $m(\angle A) = 90^\circ$

[b] In the opposite figure :

$m(\angle B) = 90^\circ$, $\overline{DE} \perp \overline{AC}$

Prove that : $\triangle ABC \sim \triangle AED$



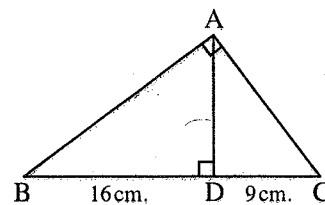
4 In the opposite figure :

$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

[a] Find the projection of :

- (1) \overline{AB} on \overline{AC} (2) \overline{AC} on \overline{BC} (3) \overline{BC} on \overline{AB}

[b] If $BD = 16$ cm. and $DC = 9$ cm. Find : The length of \overline{AD} , \overline{AC} , \overline{AB}

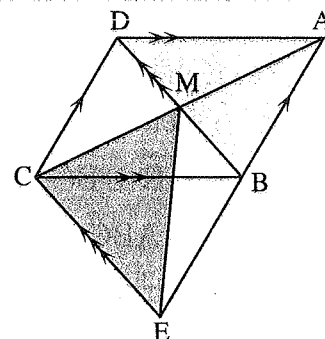


5 [a] * In the opposite figure :

ABCD and BECD are two parallelograms

, where $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that : The area of $\triangle ABD$ = the area of $\triangle MEC$

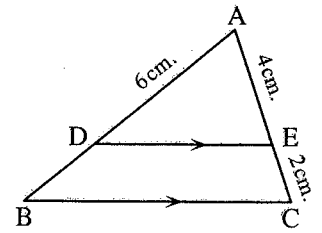


[b] In the opposite figure :

$\overline{DE} \parallel \overline{BC}$, $AE = 4$ cm.

, $EC = 2$ cm. , $AD = 6$ cm.

Find : With proof the length of \overline{AB}



8

El-Kalyoubia Governorate

Educational Zone
Language School

Answer the following questions :

1 Choose the correct answer from those given :

① $\triangle ABC$ in which $AB = 3$ cm. , $BC = 6$ cm. , and $AC = 4$ cm.

, then $m(\angle B)$ 90°

(a) < (b) > (c) = (d) \leq

② If \overline{AC} is the projection of \overline{AB} on \overleftrightarrow{AC} , then AC AB

(a) < (b) > (c) = (d) \leq

③ If $\triangle ABC \sim \triangle DEF$ and $AB = \frac{2}{5} DE$

, then the perimeter of $\triangle ABC$ = the perimeter of $\triangle DEF$

(a) 2 (b) 5 (c) $\frac{2}{5}$ (d) $\frac{4}{25}$

④ ABC is a right-angled triangle at B , $AC = 10$ cm. , $BC = 8$ cm. , then AB = cm.

(a) 8 (b) 10 (c) 6 (d) 4

⑤ ABC is a triangle in which $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 40^\circ$

, then $m(\angle A)$ =

(a) 90° (b) 40° (c) 130° (d) 50°

⑥ * The triangle whose base length is 6 cm. and its area is 24 cm^2 , the corresponding height = cm.

(a) 4 (b) 8 (c) 3 (d) 18

2 Complete each of the following :

① The two diagonals of the isosceles trapezium are

② The two triangles are similar if its corresponding side lengths are

③ The number of the diagonals of the quadrilateral =

④ The area of the trapezium = \times

⑤ The area of the square = $\frac{1}{2}$

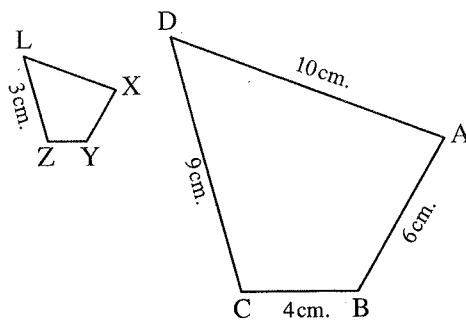
3 [a] In the opposite figure :

The polygon $ABCD \sim$ the polygon $XYZL$

, $AB = 6$ cm. , $BC = 4$ cm. , $CD = 9$ cm.

, $DA = 10$ cm. , $ZL = 3$ cm.

Find : The perimeter of the polygon $XYZL$



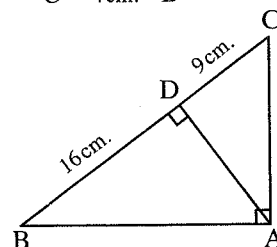
[b] In the opposite figure :

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, $BD = 16$ cm.

, $DC = 9$ cm.

Find : The length of each \overline{AB} and \overline{AD}



4 [a] A square whose area equals the area of the rectangle whose dimensions are 2 cm. and 9 cm. find the length of its diagonal.

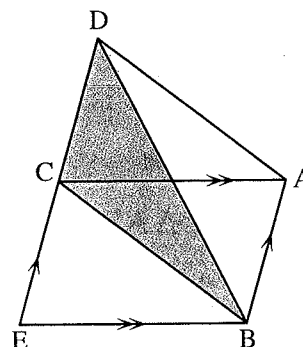
[b] * In the opposite figure :

$ABEC$ is a parallelogram.

, $D \in \overline{EC}$

such that : The area of $\triangle DBC =$ the area of $\triangle EBC$

Prove that : $\overline{AD} \parallel \overline{BC}$



5 [a] A rhombus , the ratio between the length of the two diagonals is 5 : 8 , if it's area = 2000 cm^2 , find the length of each it's diagonals.

[b] Determine the type of $\triangle ABC$ according to it's angles if $AB = 3.5$ cm. , $BC = 2.5$ cm. and $AC = 3$ cm.



Answer the following questions :

1 Complete each of the following :

(1) In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots) = 90^\circ$

(2) The area of rhombus is 20 cm^2 , the length of one of its diagonals is 5 cm. , then the length of the other diagonal =

(3) If $\triangle ABC$ is right-angled at A and $\overline{AD} \perp \overline{BC}$, then $(AB)^2 = \dots \times \dots$

(4) The isosceles trapezium has axes of symmetry.

(5) ABC is a triangle in which : $(BC)^2 = (AB)^2 + (AC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle C) = \dots^\circ$

2 Choose the correct answer :

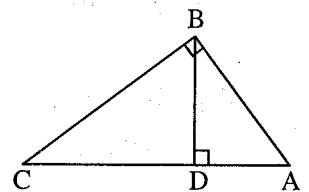
- ① A square of diagonal length 12 cm. , then its area = cm^2
 (a) 24 (b) 36 (c) 48 (d) 72
- ② If $\triangle ABC \sim \triangle DEF$ and $m(\angle B) + m(\angle C) = 70^\circ$, then $m(\angle D) =$
 (a) 70° (b) 35° (c) 140° (d) 110°
- ③ The middle base of a trapezium = 12 cm. long and its height = 6 cm. , then its area = cm^2 .
 (a) 72 (b) 36 (c) 9 (d) 18
- ④ The length of the projection of a line segment on a given straight line the length of the line segment itself.
 (a) $<$ (b) \leq (c) \geq (d) $=$
- ⑤ ABC is an obtuse-angled triangle at A in which $AB = 5 \text{ cm.}$, $BC = 8 \text{ cm.}$, then $AC =$ cm.
 (a) 5 (b) 7 (c) 8 (d) 13
- ⑥ * The two triangles drawn on a common base their vertices located on a straight line parallel to the base are
 (a) congruent. (b) similar. (c) equal in perimeter. (d) equal in area.

3 [a] In the opposite figure :

$\triangle ABC$ is right-angled at B , $\overline{BD} \perp \overline{AC}$
 , $AD = 9 \text{ cm.}$, and $CD = 16 \text{ cm.}$

Find : ① The length of \overline{AB}

② The length of \overline{BD}



[b] Determine the type of $\triangle ABC$ according to its angles.

If $AB = 2.5 \text{ cm.}$, $BC = 1.5 \text{ cm.}$ and $AC = 2 \text{ cm.}$

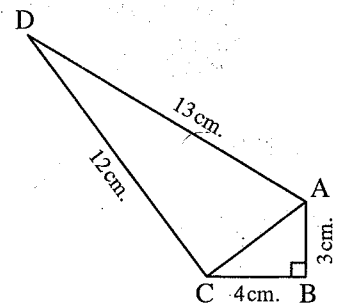
4 [a] In the opposite figure :

$BC = 4 \text{ cm.}$, $AD = 13 \text{ cm.}$, $AB = 3 \text{ cm.}$

, $DC = 12 \text{ cm.}$, $m(\angle B) = 90^\circ$

① **Find :** The length of \overline{AC}

② **Prove that :** $m(\angle ACD) = 90^\circ$



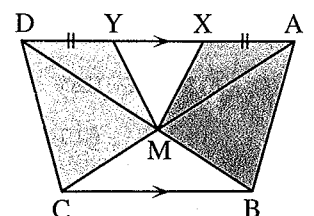
[b] * In the opposite figure :

ABCD is a quadrilateral whose diagonals intersect at M

, $\overline{AD} \parallel \overline{BC}$, $X \in \overline{AD}$ and $Y \in \overline{AD}$

Such that : $AX = DY$

Prove that : The area of the figure ABMX = the area of the figure DCMY



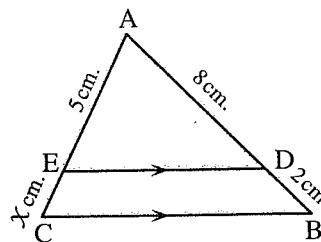
- 5 [a] Two similar polygons in which the ration between the lengths of two corresponding sides is 1 : 3 if the perimeter of the smaller is 20 cm. , find the perimeter of the greater.

[b] In the opposite figure :

ABC is a triangle in which $\overline{DE} \parallel \overline{BC}$, $BD = 2$ cm.
 , $AD = 8$ cm. , $AE = 5$ cm. , $CE = x$ cm.

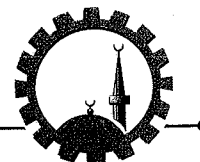
(1) Prove that : $\triangle ADE \sim \triangle ABC$

(2) Find the value of : x



10 El-Gharbia Governorate

Central Maths supervision
 Official language schools



Answer the following questions :

1 Complete each of the following :

- (1) In $\triangle ABC$, if $(AC)^2 + (BC)^2 = (AB)^2$, then $m(\angle \dots) = 90^\circ$
- (2) If the point $A \in$ the line L , then the projection of the point A on the line L is
- (3) A trapezium whose bases lengths are 8 cm. , 10 cm. , and its height is 5 cm. , then its area equals cm^2 .
- (4) The area of rhombus is 24 cm^2 , the length of one of its diagonals is 8 cm. , then the length of other diagonal is
- (5) The two polygons that are similar to third are

2 Choose the correct answer :

- (1) A square of perimeter 20 cm. , then its area equals cm^2
 (a) 20 (b) 25 (c) 50 (d) 100
- (2) ABC is right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, $D \in \overline{AC}$, then the projection of \overline{BD} on \overline{AC} is
 (a) A (b) B (c) C (d) D
- (3) If the ratio of enlargement between two triangles equals 1 , then the two triangles are
 (a) congruent. (b) different. (c) right-angled. (d) coincide.
- (4) A trapezium whose middle base length is 8 cm. , then the length of the two parallel bases may be cm.
 (a) 3 , 5 (b) 6 , 10 (c) 4 , 6 (d) 4 , 4
- (5) In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is
 (a) acute. (b) right. (c) obtuse. (d) straight.

- ⑥ * ABCD is a parallelogram in which , AB = 5 cm. , BC = 10 cm. and its smaller height is 4 cm. , then its greater height = cm.

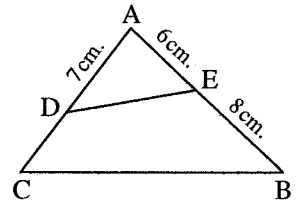
(a) 2 (b) 4 (c) 8 (d) 10

3 [a] In the opposite figure :

If $\triangle ABC \sim \triangle ADE$, AE = 6 cm.

, AD = 7 cm. and BE = 8 cm.

Find : ① DC ② $\frac{DE}{BC}$

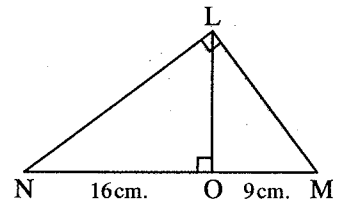


[b] In the opposite figure :

LMN is a right-angled triangle at L

, $\overline{LO} \perp \overline{MN}$, MO = 9 cm. and NO = 16 cm.

Find : The length of each of \overline{LM} , \overline{LN} and \overline{LO}



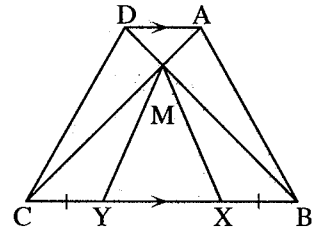
- 4 [a] Determine the type of the angle C in $\triangle ABC$ in which AB = 7 cm. , BC = 3 cm. and AC = 5 cm.

[b] * In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$ and BX = CY

Prove that :

The area of the figure ABXM = the area of the figure DCYM



5 Complete : In the opposite figure :

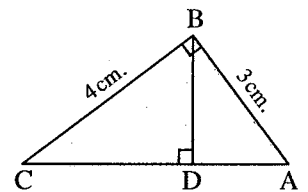
ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$

① The projection of \overline{AB} on \overline{AC} is

② $(BD)^2 = AD \times \dots$ ③ $(BC)^2 = CA \times \dots$

④ $\triangle ABC \sim \triangle \dots \sim \triangle \dots$

⑤ The perimeter of $\triangle ABC$: the perimeter of $\triangle DBC = \dots$



11

Suez Governorate

Math's Inspectorate



Answer the following questions :

1 Choose the correct answer :

① In $\triangle ABC$ if $(AC)^2 + (AB)^2 < (BC)^2$, then $\angle A$ is

(a) acute. (b) right. (c) obtuse. (d) straight.

② The area of square of diagonal length 6 cm. is cm^2

(a) 18 (b) 36 (c) 12 (d) 6

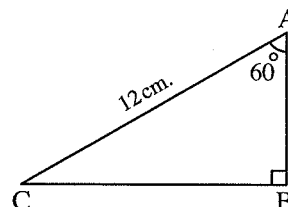
- ③ If the projection of a line segment on a straight line is a point, then the line segment straight line.
 (a) $//$ (b) \perp (c) \equiv (d) \subset
- ④ $\triangle ABC \sim \triangle XYZ$ if $AB = \frac{1}{2}XY$, then perimeter of $\triangle XYZ = \dots\dots\dots$ perimeter of $\triangle ABC$
 (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) 2 (d) 3
- ⑤ The number of axes of symmetry of the rectangle is
 (a) 0 (b) 3 (c) 1 (d) 2
- ⑥ * If ABCD is a parallelogram with area 20 cm^2 and $E \in \overline{AD}$, then the area of $\triangle EBC = \dots\dots\dots \text{cm}^2$.
 (a) 10 (b) 5 (c) 20 (d) 40

2 Complete each of the following :

- ① A triangle of sides length 8 cm. , 9 cm. , 6 cm. its type is angled triangle.
 ② The area of rhombus whose diagonals are 18 cm. and 15 cm. is cm^2 .

③ In the opposite figure :

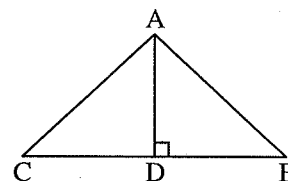
$AC = 12 \text{ cm.}$, $m(\angle B) = 90^\circ$
 , $m(\angle A) = 60^\circ$
 , $AB = \dots\dots\dots \text{cm.}$



- ④ Two triangles are similar if their corresponding angles are

⑤ In the opposite figure :

The projection of \overline{AB} on \overline{BC} is

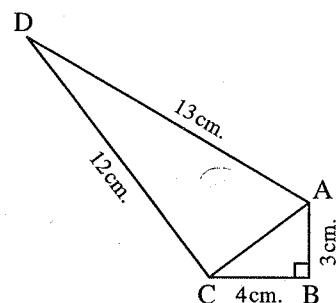


- 3 [a]** Find the area of trapezium of length of two parallel base 9 cm. , 6 cm. and its height is 8 cm.

[b] In the opposite figure :

$AB = 3 \text{ cm.}$, $AD = 13 \text{ cm.}$, $BC = 4 \text{ cm.}$
 , $DC = 12 \text{ cm.}$, $m(\angle B) = 90^\circ$

- ① **Find :** The length of \overline{AC}
 ② **Prove that :** $m(\angle ACD) = 90^\circ$

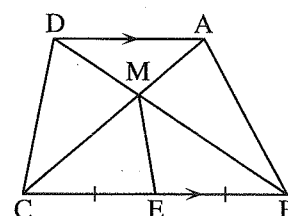


4 [a] * In the opposite figure :

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$
 , E is the midpoint of \overline{BC}

Prove that :

The area of the figure ABEM = the area of the figure DMEC

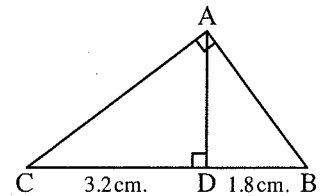


[b] In the opposite figure :

$$DB = 1.8 \text{ cm.}$$

$$, CD = 3.2 \text{ cm.}$$

Find : The length of each of : \overline{AB} , \overline{AD} and \overline{AC}



5 [a] A trapezium with area 40 cm^2 and its height is 5 cm. its middle base = cm.

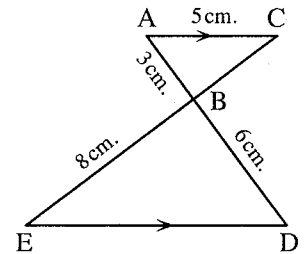
[b] In the opposite figure :

$$\overline{AC} \parallel \overline{ED} , AC = 5 \text{ cm.} , AB = 3 \text{ cm.}$$

$$, DB = 6 \text{ cm.} , EB = 8 \text{ cm.}$$

Prove that : $\triangle ABC \sim \triangle DBE$

Find : The length of each of : \overline{BC} , \overline{DE}



12 Port Said Governorate

Governmental Exp. Lang. School



Answer the following questions :

1 Complete each of the following :

- (1) The two triangles are similar if there corresponding angles are in measure.
- (2) A trapezium whose base lengths are 4 cm. and 6 cm.
 , then the length of its middle base = cm.
- (3) The projection of a point on a given straight line is
- (4) In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots) = 90^\circ$
- (5) The isosceles trapezium has axis of symmetry.

2 Choose the correct answer from the given ones :

- (1) The area of rhombus whose diagonal lengths are 6 cm. , 8 cm. = cm^2
 (a) 2 (b) 14 (c) 24 (d) 48
- (2) The length of projection of a given line segment the length of the original line segment.
 (a) \geq (b) $>$ (c) \leq (d) $<$
- (3) In $\triangle ABC$ if $(AB)^2 < (BC)^2 + (AC)^2$, then the angle C is
 (a) acute. (b) obtuse. (c) right. (d) straight.
- (4) If the ratio between the lengths of two corresponding sides in two similar triangles is equal to 1 , then the two triangles are
 (a) congruent. (b) different. (c) right-angle. (d) coincide.

- ⑤ The area of the square whose side length 4 cm. = cm^2
 (a) 4 (b) 16 (c) 8 (d) 1
- ⑥ * If \overline{XL} is a median in $\triangle XYZ$
 , then the area of $\triangle XYZ$ = the area of $\triangle XYL$
 (a) $\frac{1}{2}$ (b) 3 (c) 2 (d) 3

- ③ [a] Find the area of trapezium whose length of two parallel bases 3 cm. , 5 cm.
 and its height 10 cm.

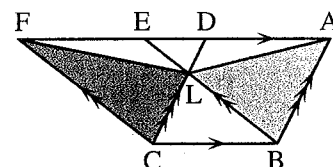
[b] * In the opposite figure :

ABCD and EBCF are two parallelograms

, $\overline{BE} \cap \overline{CD} = \{L\}$, $D \in \overline{AF}$ and $E \in \overline{AF}$

Prove that : ① The area of $\triangle ABL$ = the area of $\triangle FCL$

② The area of the figure ABCL = the area of the figure FCBL



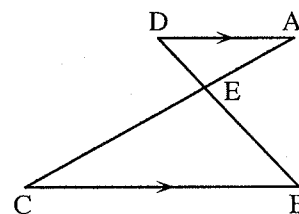
- ④ [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$

Prove that : $\triangle AED \sim \triangle CEB$

- [b] In $\triangle XYZ$, $XY = 9$ cm. , $YZ = 12$ cm. and $XZ = 15$ cm.

Prove that : $m(\angle XYZ) = 90^\circ$

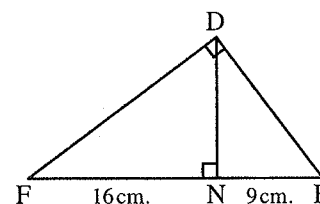


- ⑤ [a] In the opposite figure :

DEF is a right-angled triangle at D

, $\overline{DN} \perp \overline{EF}$, $EN = 9$ cm. and $NF = 16$ cm.

Find : The length of \overline{EF} , \overline{DE} and \overline{DF}

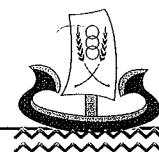


- [b] Determine the type of $\triangle ABC$ according to its angles

If $AB = 7$ cm. , $BC = 12$ cm. and $AC = 8$ cm.

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Inspection of Mathematic
Language Schools



Answer the following questions :

- ① Choose the correct answer :

- ① A trapezium whose middle base length is 12 cm. and its height = 3 dm.
 , then its area = cm^2
 (a) 360 (b) 15 (c) 63 (d) 36

- (2) Rhombus, the lengths of its diagonals are 6 cm. and 8 cm.
 , then its perimeter = cm.
 (a) 24 (b) 28 (c) 20 (d) 14
- (3) Number of axis of symmetry of isosceles trapezium =
 (a) 1 (b) 2 (c) 3 (d) 4
- (4) In $\triangle ABC$ if $(AB)^2 = (AC)^2 - (BC)^2$, then $(\angle C)$ is angle.
 (a) right (b) acute (c) obtuse (d) straight
- (5) ABC is an acute angled-triangle which $AB = 6$ cm. , $BC = 8$ cm.
 , the length of \overline{AC} = cm.
 (a) 2 (b) 6 (c) 10 (d) 14
- (6) * If ABCD is a parallelogram in which $AB = 5$ cm. , $BC = 10$ cm. and its smaller height is 4 cm. , then its greater height =
 (a) 2 cm. (b) 4 cm. (c) 8 cm. (d) 10 cm.

2 Complete each of the following :

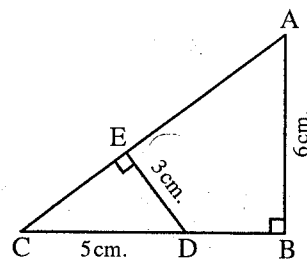
- (1) If two polygons are similar to a third , then they are
- (2) The length of the projection of a line segment on a straight line perpendicular to it =
- (3) The length of the projection of a line segment on a straight line the length of the original line segment.
- (4) In $\triangle XYZ$, if $(XY)^2 = (ZY)^2 + (XZ)^2 + 5$, then $m(\angle XZY) > \dots\dots\dots^\circ$
- (5) The diagonals of an isosceles trapezium are

- 3 [a]** The area of a trapezium is 450 cm^2 and the two bases lengths are 12 cm. and 24 cm. find the length of its height.

[b] In the opposite figure :

ABC is a right-angled triangle at B
 $\overline{ED} \perp \overline{AC}$, $AB = 6$ cm. , $ED = 3$ cm.
 , $CD = 5$ cm.

Prove that : $\triangle CED \sim \triangle CBA$, then find the length of \overline{AC}

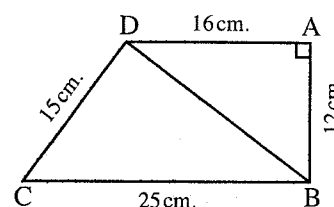


4 [a] In the opposite figure :

$\overline{AD} \perp \overline{AB}$, $AB = 12$ cm.
 , $AD = 16$ cm. , $CD = 15$ cm. , $CB = 25$ cm.

Prove that : (1) $\triangle CBD$ is right-angled.

(2) Then find the area of figure ABCD

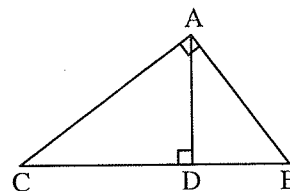


[b] In the opposite figure :

$$\overline{AD} \perp \overline{CB}$$

$$, \overline{AC} \perp \overline{AB}$$

Prove that : $\triangle ABC \sim \triangle DBA \sim \triangle DAC$



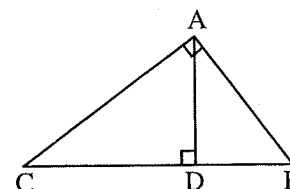
5 [a] In the opposite figure :

$\triangle ABC$ is right-angled at A , $\overline{AD} \perp \overline{CB}$

Complete : ① $(AD)^2 = \dots \times \dots$

② $(AB)^2 = \dots \times \dots$

③ $(AC)^2 = \dots \times \dots$

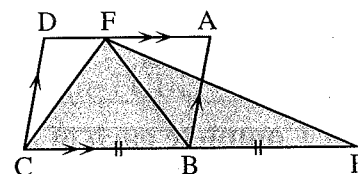


[b] * In the opposite figure :

ABCD is a parallelogram.

, $E \in \overline{CB}$, where $BC = BE$

Prove that : The area of $\triangle EFC$ = the area of $\square ABCD$



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Souhag Governorate

Maths Inspection



Answer the following questions :

1 Choose the correct answer :

① In $\triangle ABC$ if $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is

(a) acute. (b) right. (c) obtuse. (d) straight.

② The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is

(a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 5 : 2

③ $\triangle ABC$ in which $(AB)^2 - (BC)^2 = (AC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle A) = \dots$

(a) 40° (b) 50° (c) 90° (d) 130°

④ If the ratio of enlargement between two similar triangles equals 1 , then the two triangle are

(a) congruent. (b) different. (c) right-angled. (d) coincide.

⑤ A square of area 18 cm^2 , the length of its diagonal = cm.

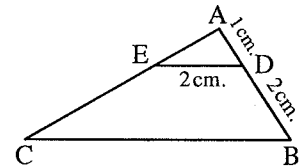
(a) 9 (b) 36 (c) 6 (d) 12

⑥ * The two triangles drawn on a common base and their vertices located on a straight line parallel to the base are

(a) similar. (b) congruent. (c) equal in area. (d) equal in perimeter.

2 Complete each of the following :

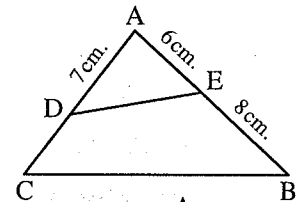
- (1) The two polygons are similar , if their corresponding sides lengths are and their corresponding angles are
- (2) In $\triangle ABC$ if $(AB)^2 = (BC)^2 - (AC)^2$, then $m(\angle \dots) = 90^\circ$
- (3) A trapezium whose parallel bases lengths are 12 cm. , 18 cm. and its height is 12 cm. , then its area equals cm^2 .
- (4) **In the opposite figure :**
 $\triangle ADE \sim \triangle ABC$
 , then the length of BC cm.
- (5) If $\angle A$ complements $\angle B$ and $\angle B$ supplements $\angle C$ and $m(\angle A) = 30^\circ$, then $m(\angle C) = \dots^\circ$



3 [a] In the opposite figure :

$\triangle ABC \sim \triangle ADE$, $AE = 6 \text{ cm.}$, $AD = 7 \text{ cm.}$, $BE = 8 \text{ cm.}$

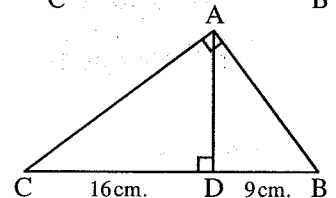
Find : (1) The length of \overline{DC} (2) $\frac{DE}{BC}$



[b] In the opposite figure :

ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$, $BD = 9 \text{ cm.}$, $CD = 16 \text{ cm.}$

Find : The length of each of \overline{AB} , \overline{AC} , \overline{AD}



- 4 [a]** The side lengths of one of two similar triangles are 3 cm. , 4 cm. and 5 cm. and the perimeter of the other triangle is 36 cm. , find the side lengths of the other triangle.

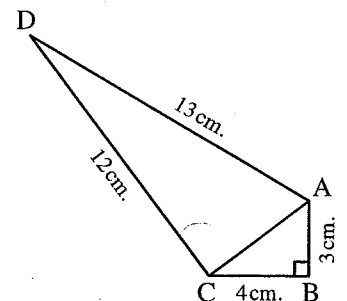
[b] In the opposite figure :

$AB = 3 \text{ cm.}$, $BC = 4 \text{ cm.}$

, $AD = 13 \text{ cm.}$, $CD = 12 \text{ cm.}$

, $m(\angle B) = 90^\circ$

Prove that : $m(\angle ACD) = 90^\circ$

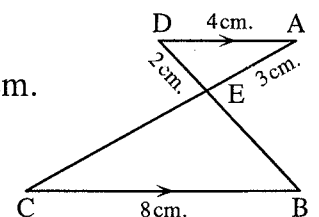


5 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AD = 4 \text{ cm.}$, $BC = 8 \text{ cm.}$, $AE = 3 \text{ cm.}$ and $ED = 2 \text{ cm.}$

(1) **Prove that :** $\triangle AED \sim \triangle CEB$

(2) **Find :** The perimeter of $\triangle EBC$



- [b]** The ratio between the lengths of diagonals of a rhombus is 5 : 8 and the area of this rhombus is 2000 cm^2 , find the lengths of its diagonals.



Answer the following questions :

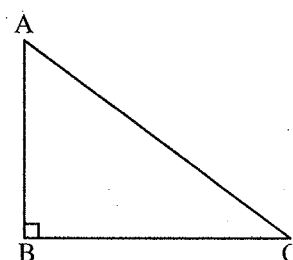
1 Choose the correct answer :

- (1) The area of rhombus whose diagonals 6 cm. and 10 cm. = cm^2
 (a) 60 (b) 30 (c) 10 (d) 6
- (2) If ABC is an acute angled triangle at C , then $(AB)^2$ $(BC)^2 + (AC)^2$
 (a) < (b) = (c) > (d) \leq

(3) In the opposite figure :

The projection of \overline{AB} on \overrightarrow{BC} is

- (a) \overline{AB} (b) \overline{AC}
 (c) \overline{BC} (d) $\{B\}$



(4) The diagonals of an isosceles trapezium are

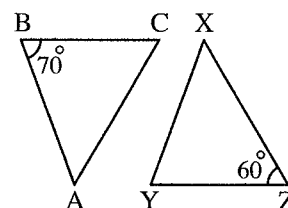
- (a) parallel. (b) equal in length.
 (c) not equal in length. (d) perpendicular.

(5) In the opposite figure :

If $\triangle ABC \sim \triangle XYZ$

, then $m(\angle A) = \dots\dots\dots$

- (a) 50° (b) 60°
 (c) 70° (d) 110°



**(6) * The triangle whose base length is 6 cm. and its area 30 cm^2
 , the corresponding height =**

- (a) 5 (b) 36 (c) 10 (d) 15

2 Complete each of the following :

- (1) The two polygons are similar , if their corresponding sides are and their corresponding angles are
- (2) If two polygons are similar and the ratio between the length of two corresponding sides is $2 : 5$, then the ratio between their perimeter is
- (3) The area of square is 50 cm^2 , then the length of its diagonal is cm.
- (4) If the measure of the corresponding angles in the two triangles are equal in measure , then the two triangles are
- (5) A square of perimeter 20 cm. , then its area equals cm^2

3 [a] In the opposite figure :

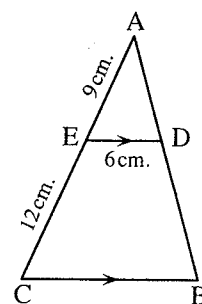
$\overline{ED} \parallel \overline{CB}$, $AE = 9$ cm.

, $EC = 12$ cm. and $ED = 6$ cm.

Prove that :

(1) $\triangle ABC \sim \triangle ADE$

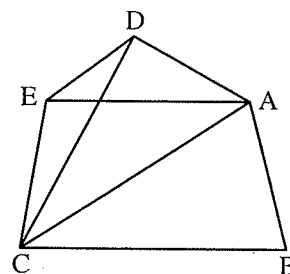
(2) **Find :** The length of \overline{CB}



[b] * In the opposite figure :

The area of the figure ABCD = the area of the figure ABCE

Prove that : $\overline{DE} \parallel \overline{AC}$



4 [a] Find the height of a trapezium with area of 450 cm^2 and the two base lengths are 24 cm. and 12 cm.

[b] Find the area of a square whose diagonal length is 8 cm.

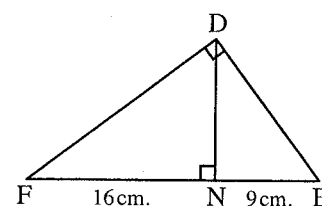
5 [a] In the opposite figure :

DEF is a right-angled triangle at D

, $\overline{DN} \perp \overline{EF}$, $EN = 9$ cm.

and $FN = 16$ cm.

Find : The length of each of \overline{DE} and \overline{DN}



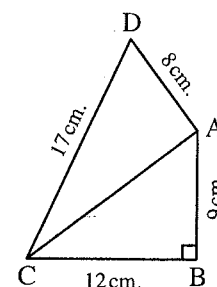
[b] In the opposite figure :

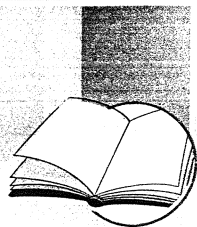
ABCD is a quadrilateral

, $m(\angle B) = 90^\circ$, $AB = 9$ cm. , $BC = 12$ cm.

, $CD = 17$ cm. and $DA = 8$ cm.

Prove that : $m(\angle DAC) = 90^\circ$





Some Schools Examinations

1

Cairo Governorate

Zeitoun Educational Administration
Gomhouria Language School



Answer the following questions :

1 Choose the correct answer :

- (1) In $\triangle ABC$: If $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- (2) The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is
 (a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 5 : 2
- (3) ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, then the projection of \overline{BD} on \overline{AC} is the point
 (a) A (b) B (c) C (d) D
- (4) If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overline{XY} the length of \overline{AB}
 (a) < (b) > (c) = (d) \leq
- (5) If the ratio of an enlargement between two triangles equals 1 , then the two triangles are
 (a) congruent. (b) different. (c) right-angled. (d) coincide.

2 Complete :

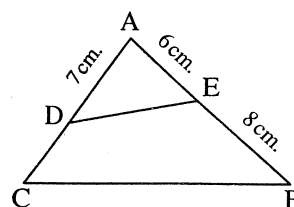
- (1) The two polygons are similar if their corresponding side lengths are and their corresponding angles are
- (2) If the point A \in the straight line L , then the projection of the point A on this straight line is
- (3) In $\triangle ABC$: If $(XY)^2 + (YZ)^2 = (XZ)^2$, then $m(\angle \dots) = 90^\circ$
- (4) The two polygons that are similar to a third are
- (5) If two triangles are similar , then their corresponding angles are

3 [a] In the opposite figure :

If $\triangle ABC \sim \triangle ADE$, $AE = 6$ cm.
 , $AD = 7$ cm. and $BE = 8$ cm.

Find : (1) DC

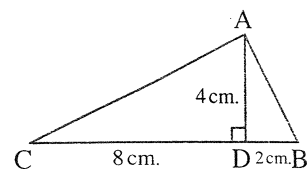
(2) $\frac{DE}{BC}$



[b] In the opposite figure :

ABC is a triangle in which : $BD = 2$ cm.
 $CD = 8$ cm. , $AD = 4$ cm. , $\overline{AD} \perp \overline{BC}$

Prove that : $m(\angle BAC) = 90^\circ$

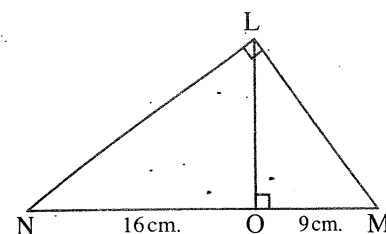


- 4 [a] Determine the type of the angle C in $\triangle ABC$ in which $AB = 7$ cm. , $BC = 3$ cm.
 and $AC = 5$ cm.

[b] In the opposite figure :

LMN is a right-angled triangle at L ,
 $\overline{LO} \perp \overline{MN}$, $MO = 9$ cm. and $NO = 16$ cm.

Find : The length of each of \overline{LM} , \overline{LN} and \overline{LO}



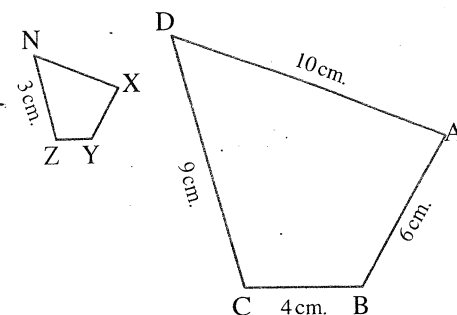
- 5 In the opposite figure :

The polygon ABCD ~ the polygon XYZN,

$AB = 6$ cm. , $BC = 4$ cm. , $CD = 9$ cm. ,

$DA = 10$ cm. and $ZN = 3$ cm.

Find : The length of each of \overline{XY} , \overline{YZ} and \overline{XN}



Additional question

[a] Complete each of the following :

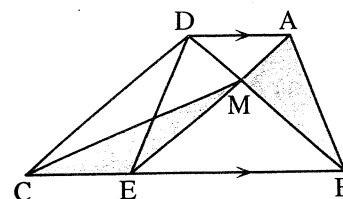
- (1) The median of a triangle divides its surface into
- (2) If the area of a trapezium is 75 cm^2 and the length of its middle base is 15 cm. , then its height cm. .

[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $\overline{AE} \cap \overline{BD} = \{M\}$

, the area of $\triangle AMB =$ the area of $\triangle EMC$

Prove that : $\overline{ME} \parallel \overline{DC}$





Answer the following questions :

1 Complete :

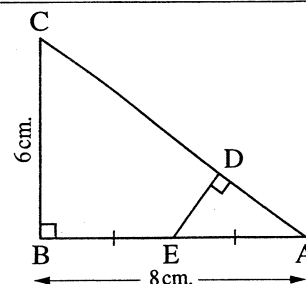
- (1) In a triangle, if the square of the length of a side is equal to the sum of the squares of the lengths of the other two sides, then the angle opposite to this side is a
- (2) If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AC} on \overline{BC} is
- (3) If ABC in an isosceles triangle, $AB = AC = 5$ cm. and $BC = 6$ cm., then the length of projection of \overline{AB} on \overline{BC} is cm.
- (4) The two polygons are similar if their corresponding sides lengths are and their corresponding angles are
- (5) In triangle ABC : If $(AB)^2 - (AC)^2 < (BC)^2$, then $\angle C$ is

2 Choose the correct answer :

- (1) The length of the projection of a given line segment the length of the original line segment.
(a) < (b) \leq (c) > (d) \geq
- (2) The ratio between the lengths of corresponding sides of two similar triangle is 3 : 5, if the perimeter of the greater triangle is 60 cm. , then the perimeter of the smaller triangle is cm.
(a) 24 (b) 36 (c) 40 (d) 100
- (3) If $\triangle ABC \sim \triangle DEO$, $AB = \frac{1}{4} DE$, then the perimeter of $\triangle ABC$ equals the perimeter of $\triangle DEO$.
(a) 4 (b) 2 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$
- (4) If ABC is an obtuse-angled triangle at A in which $AB = 5$ cm. , $BC = 8$ cm. , then $AC =$ cm.
(a) 5 (b) 7 (c) 8 (d) 13
- (5) $\triangle ABC$ in which : $(AB)^2 - (BC)^2 = (AC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle A) =$
(a) 40° (b) 50° (c) 90° (d) 130°

3 [a] In the opposite figure :

ABC is a right-angled triangle at B ,
E is the midpoint of \overline{AB} , $\overline{ED} \perp \overline{AC}$
, $AB = 8$ cm. , $BC = 6$ cm.
Find : The length of \overline{ED}

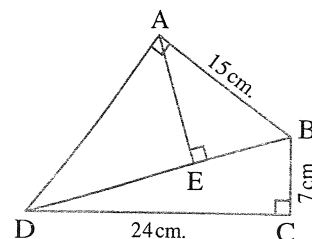


- [b] Find the length of \overline{BC} in the triangle ABC, in which : $(AB)^2 > (AC)^2 + (BC)^2$,
 $AB = 15$ cm. , $AC = 13$ cm. , $\overline{AD} \perp \overline{BC}$ and intersects it at D , $AD = 12$ cm.

4 [a] In the opposite figure :

ABCD is a quadrilateral, where
 $m(\angle BCD) = m(\angle BAD) = 90^\circ$,
 $\overline{AE} \perp \overline{BD}$, $BC = 7$ cm.
 $CD = 24$ cm. , $AB = 15$ cm.

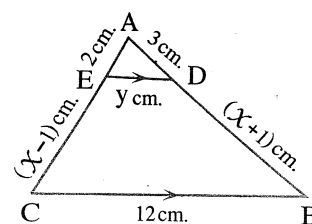
- Find :** (1) The length of the projection of \overline{BD} on \overleftrightarrow{AD}
 (2) The length of the projection of \overline{AB} on \overleftrightarrow{BD}
 (3) The length of the projection of \overline{AD} on \overleftrightarrow{AE}



[b] In the opposite figure :

$\overline{ED} \parallel \overline{BC}$

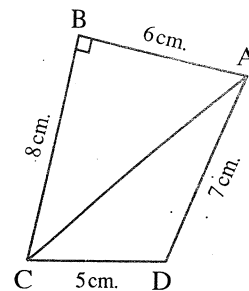
Find : The values of x and y



5 [a] In the opposite figure :

ABCD is a quadrilateral in which :
 $m(\angle B) = 90^\circ$, $AB = 6$ cm. $BC = 8$ cm.
 $AD = 7$ cm. and $DC = 5$ cm.

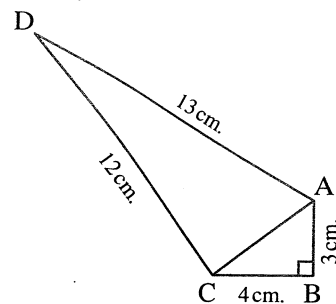
Determine the type of the angle which has
 the greatest measure in triangle ACD



[b] In the opposite figure :

$AB = 3$ cm. , $BC = 4$ cm. , $AD = 13$ cm.
 $CD = 12$ cm. , $m(\angle ABC) = 90^\circ$

Prove that : $m(\angle ACD) = 90^\circ$



Additional question

[a] Choose the correct answer :

- (1) A rhombus is of two diagonal lengths 8 cm. and 6 cm. , its area = cm^2 .
 (a) 14 (b) 24 (c) 48 (d) 20
- (2) The height of the triangle whose area is 24 cm^2 , and its corresponding base length is 8 cm. equals cm.
 (a) 3 (b) 8 (c) 4 (d) 6

[b] In the opposite figure :

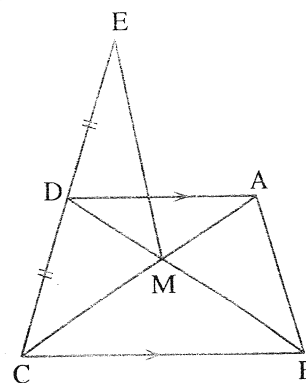
$$\overline{AD} \parallel \overline{BC} ,$$

$$\overline{AC} \cap \overline{BD} = \{M\} ,$$

D is the midpoint of \overline{EC}

Prove that :

The area of $\triangle MDE =$ the area of $\triangle AMB$



3

Cairo Governorate

El Waili Educational Directorate
Notre Dame Desapotres School



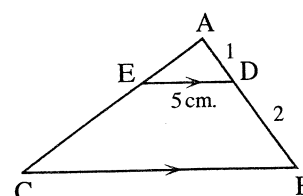
Answer the following questions :

1 Choose the correct answer :

- (1) The triangle whose side lengths are 4 cm., 5 cm. and 6 cm. is -angled triangle.
(a) acute (b) obtuse (c) right (d) isosceles
- (2) If $\overline{AB} \parallel \overline{XY}$, then the length of the projection of \overline{AB} on \overleftrightarrow{XY} the length of \overline{AB}
(a) $>$ (b) \geq (c) $=$ (d) $<$
- (3) The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters
(a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2
- (4) If the ratio of enlargement between two triangles equal 1 , then the two triangles are
(a) congruent. (b) different. (c) right-angled. (d) coincide.
- (5) If $\triangle ABC \sim \triangle DEF$ and $m(\angle B) + m(\angle C) = 70$, than $m(\angle D) =$
(a) 70° (b) 90° (c) 110° (d) 180°

2 Complete :

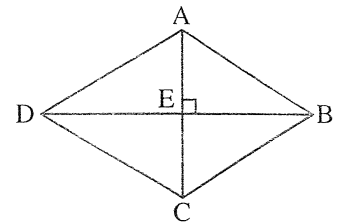
- (1) ABC is a triangle, if $(AC)^2 + (CB)^2 = (AB)^2 - 9$, then angle C is
- (2) Two polygons are similar if corresponding sides lengths are
and their corresponding angles are
- (3) In the opposite figure :
 $\triangle ABC \sim \triangle ADE$, $AD : DB = 1 : 2$, if $ED = 5$ cm.
 , then $BC =$ cm.



(4) In the opposites figure :

ABCD is a rhombus, then the
projection of \overrightarrow{AD} on \overrightarrow{AC} is

(5) ABC is a triangle, $AB = 12$ cm. , $BC = 5$ cm. and $AC = 13$ cm.
 , then $m(\angle \dots) = 90^\circ$

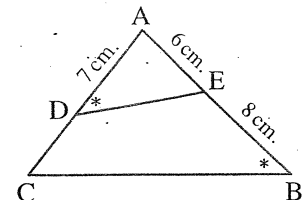


3 [a] In the opposite figure :

ABC is a triangle, $m(\angle ADE) = m(\angle ABC)$
 , $AE = 6$ cm. , $EB = 8$ cm. , $AD = 7$ cm.

(1) Prove that : $\triangle AED \sim \triangle ACB$

(2) Find : The length of \overline{CD}

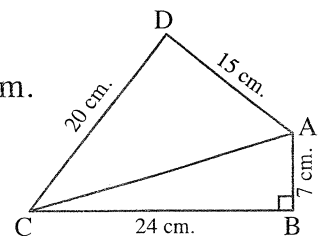


[b] In the opposite figure :

ABCD is aquadrilateral in which : $m(\angle ABC) = 90^\circ$, $AB = 7$ cm.
 , $BC = 24$ cm. , $CD = 20$ cm. and $AD = 15$ cm.

(1) Find : The length of \overline{AC}

(2) Prove that : $m(\angle ADC) = 90^\circ$



4 [a] In the opposite figure :

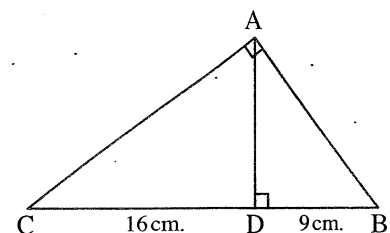
$m(\angle BAC) = 90^\circ$, $\overline{AD} \perp \overline{BC}$

Complete :

(1) The projection of \overline{AB} on \overline{BC} is

(2) $AB = \dots$ cm.

(3) $AD = \dots$ cm.



[b] $\triangle ABC \sim \triangle EFD$, $AB = 4$ cm. , $BC = 5$ cm. , $AC = 6$ cm. , if the perimeter of
 triangle EFD = 60 cm.

Find : The lengths of the sides of $\triangle EFD$

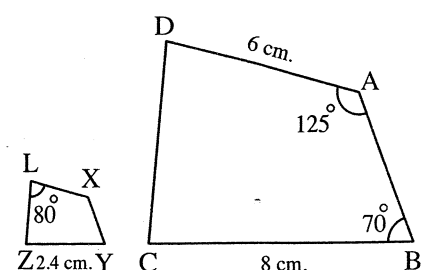
5 [a] In the opposite figure :

The polygon ABCD ~ the polygon XYZL

Calculate : (1) $m(\angle BCD)$

(2) The length of \overline{XL}

and determine the enlargement ratio.



[b] In the opposite figure :

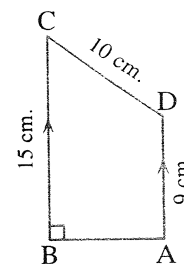
ABCD is a trapezium in which :

$\overline{AD} \parallel \overline{BC}$ and $m(\angle ABC) = 90^\circ$

If $AD = 9$ cm. , $DC = 10$ cm. and $CB = 15$ cm.

Find : (1) The length of the projection of \overline{DC} on \overline{BC}

(2) The length of the projection of \overline{DC} on \overline{AB}



Additional question

[a] Complete each of the following :

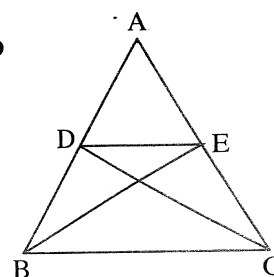
(1) If the area of a parallelogram is 35 cm^2 and the length of one base is 10 cm. , then the corresponding height of this base is cm.

(2) Triangles whose bases are equal in length and lying between two parallel straight lines are

[b] In the opposite figure :

If the area of $\triangle ACD =$ the area of $\triangle ABE$

Prove that : $\overline{ED} \parallel \overline{BC}$



4

Giza Governorate

El-Haram Directorate
The Egyptian International School



Answer the following questions :

1 Complete :

(1) The two polygons are similar if their corresponding side lengths are and their corresponding angles are

(2) In $\triangle ABC$: if $(AB)^2 = (BC)^2 - (AC)^2$, $m(\angle \dots) = 90^\circ$

(3) If the ratio of enlargement between two triangles equals 1 , then the two triangles are

(4) The projection of a point on a given straight line is

(5) ABC is a triangle in which : $(AB)^2 < (AC)^2 + (BC)^2$, then $\angle C$ is

2 Choose the correct answer :

(1) ABC is a triangle in which : $(BC)^2 = (AB)^2 + (AC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle C) =$

(a) 90° (b) 40° (c) 50° (d) 60°

(2) A triangle whose side lengths are 6 cm. , 8 cm. and 11 cm. , then its type according to its angles is -angled triangle.

(a) right (b) obtuse (c) acute (d) straight

- (3) If $\triangle ABC \sim \triangle DEF$ and $m(\angle B) + m(\angle C) = 70^\circ$, then $m(\angle D) = \dots\dots\dots$
 (a) 70° (b) 35° (c) 140° (d) 110°
- (4) The length of the projection of a line segment on a given straight line $\dots\dots\dots$ the length of the original line segment.
 (a) $<$ (b) \leq (c) \geq (d) $=$
- (5) If $\triangle ABC \sim \triangle XYZ$, $AB = 5$ cm., $XY = 10$ cm. and $YZ = 8$ cm., then $BC = \dots\dots\dots$ cm.
 (a) 3 (b) 4 (c) 5 (d) 6

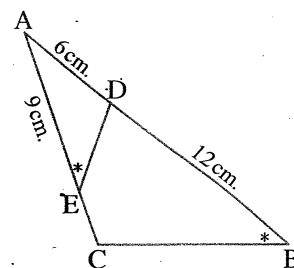
3 In the opposite figure :

$m(\angle AED) = m(\angle B)$, $AD = 6$ cm.

$AE = 9$ cm., $DB = 12$ cm.

(1) **Prove that :** $\triangle ADE \sim \triangle ACB$

(2) **Find :** The length of \overline{EC}



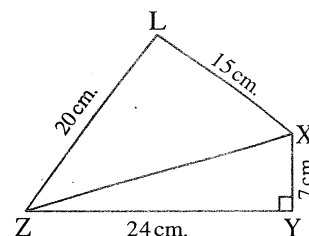
4 In the opposite figure :

$m(\angle XYZ) = 90^\circ$, $XY = 7$ cm.,

$YZ = 24$ cm., $LX = 15$ cm., $LZ = 20$ cm.

(1) **Find :** The length of \overline{XZ}

(2) **Prove that :** $m(\angle XLZ) = 90^\circ$



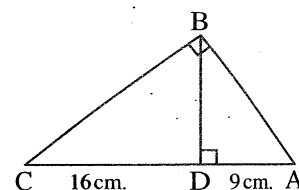
5 In the opposite figure :

$\triangle ABC$ is a right-angled at B, $\overline{BD} \perp \overline{AC}$,

$AD = 9$ cm. and $CD = 16$ cm.

Find : (1) The length of \overline{AB}

(2) The length of \overline{BD}



Additional question

[a] **Choose the correct answer :**

- (1) The area of the triangle is equal to $\dots\dots\dots$ the area of the parallelogram which has a common base and its vertex lies on the straight line parallel to this base.
 (a) equal to (b) half (c) twice (d) quarter
- (2) A square of area 18 cm^2 the length of its diagonal = $\dots\dots\dots$ cm.
 (a) 9 (b) 36 (c) 6 (d) 12

[b] The areas of two lands are equal. The first is in the shape of a rhombus where the lengths of its diagonals are 12 m. and 30 m. The second is in the shape of rectangle where the ratio between its two dimensions is 4 : 5 find the lengths of these dimensions.



Answer the following questions :

1 Choose the correct answer from the given ones :

(1) The length of the projection of a given line segment the length of the original line.

- (a) < (b) > (c) \leq (d) \geq

(2) $\triangle ABC$ in which : $AB = 3$ cm. , $BC = 5$ cm. and $AC = 4$ cm. , then $m(\angle B)$ 90°

- (a) < (b) > (c) = (d) twice

(3) In the opposite figure :

If $\triangle ADE \sim \triangle ABC$

, then the length of \overline{BC} equals cm.

- (a) 3 (b) 4 (c) 6 (d) 8

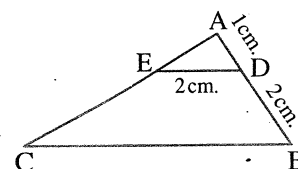
(4) The diagonal length of a square whose area is 50 cm^2 equals cm.

- (a) 10 (b) 30 (c) 40 (d) 50

(5) ABC is triangle in which : $(AB)^2 = (AC)^2 + (BC)^2$ and $m(\angle B) = 40^\circ$,

then $m(\angle A) =$

- (a) 40° (b) 50° (c) 90° (d) 130°



2 Complete :

(1) The two triangles are similar if the corresponding are equal in measure.

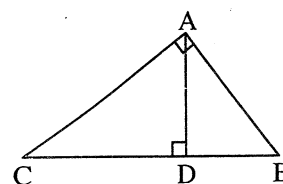
(2) In triangle ABC if $(AC)^2 + (AB)^2 < (BC)^2$, then angle A is

(3) If the ratio between two corresponding side lengths in two similar polygons is $3 : 4$, then the ratio between their perimeters equals

(4) The projection of a point on a given straight line is

(5) In the opposite figure :

$\triangle ABC \sim \triangle$

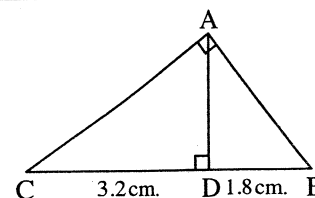


3 [a] In the opposite figure :

$\triangle ABC$ is right-angled at A ,

$\overline{AD} \perp \overline{BC}$, $BD = 1.8$ cm. , $CD = 3.2$ cm.

Find : The length of each of \overline{AC} and \overline{AD}



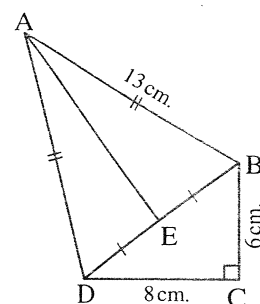
[b] In the opposite figure :

ABCD is a quadrilateral in which : $m(\angle C) = 90^\circ$,

$AB = AD = 13 \text{ cm.}$, $BC = 6 \text{ cm.}$,

$CD = 8 \text{ cm.}$ and E is the midpoint of \overline{BD}

Find : The area of the quadrilateral ABCD



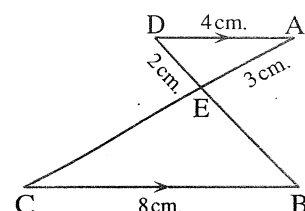
4 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AD = 4 \text{ cm.}$, $BC = 8 \text{ cm.}$,

$AE = 3 \text{ cm.}$ and $ED = 2 \text{ cm.}$

(1) **Prove that :** $\triangle AED \sim \triangle CEB$

(2) **Find :** The perimeter of $\triangle EBC$



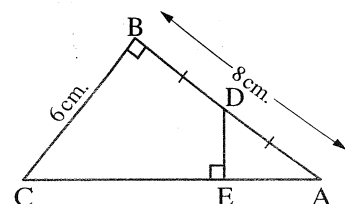
[b] In the opposite figure :

ABC is a right-angled triangle at B

, D is the midpoint of \overline{AB} , $\overline{DE} \perp \overline{AC}$

, $AB = 8 \text{ cm.}$, $BC = 6 \text{ cm.}$

Find : The length of \overline{DE}

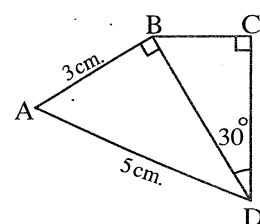


5 [a] In the opposite figure :

ABCD is a quadrilateral in which : $m(\angle ABD) = 90^\circ$,

$m(\angle BCD) = 90^\circ$, $m(\angle BDC) = 30^\circ$, $AB = 3 \text{ cm.}$, $AD = 5 \text{ cm.}$

Find : The length of \overline{BC}



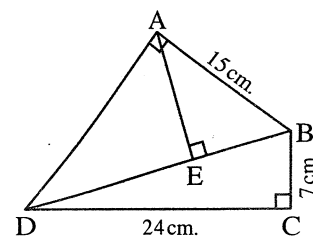
[b] In the opposite figure :

ABCD is a quadrilateral where :

$m(\angle BCD) = m(\angle BAD) = 90^\circ$, $\overline{AE} \perp \overline{BD}$,

$BC = 7 \text{ cm.}$, $CD = 24 \text{ cm.}$ and $AB = 15 \text{ cm.}$

Find : The length of each of \overline{BD} , \overline{AD} and \overline{AE}



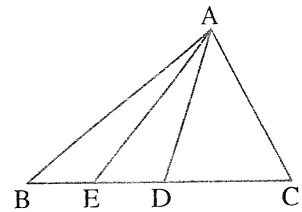
Additional question

[a] **Complete :**

- (1) A trapezium whose two parallel bases lengths are 12 cm. , 18 cm.
and its height is 12 cm. , then its area equals cm^2

(2) In the opposite figure :

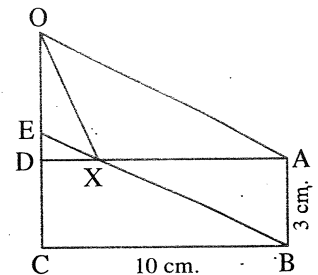
ABC is a triangle , D is the midpoint of \overline{BC}
and E is the midpoint of \overline{BD}
If the area of $\triangle ABC$ is 60 cm^2
 , then the area of $\triangle ABE$ = cm^2



[b] In the opposite figure :

ABCD is a rectangle ,
ABEO is a parallelogram ,
AB = 3 cm. and BC = 10 cm.

Find with proof : The area of $\triangle AXO$



6

Alexandria Governorate

East Educational Zone
English Language Schools



Answer the following questions : (Allows the use of a calculator)

1 Complete the following :

- (1) The ratio between the lengths of two corresponding sides in two congruent polygons =
- (2) The line segment joining the midpoints of two sides in triangle to the third side.
- (3) In triangle XYZ , if $m(\angle X) = 90^\circ$, then the projection of \overline{YZ} on \overline{XY} is
- (4) In triangle ABC , if $m(\angle A) = 90^\circ$, $\overline{AD} \perp \overline{BC}$ and cuts it at D
 , then $(AC)^2 = \dots \times \dots$
- (5) If $(AB)^2 < (AC)^2 + (BC)^2$, then $\angle ACB$ is an angle.

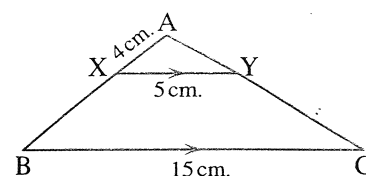
2 Choose the correct answer :

- (1) If two triangles are similar , then the lengths of the corresponding sides are
(a) congruent. (b) equal. (c) proportional. (d) parallel.
- (2) If $\angle ABC$ is an obtuse angle , then BC $AC - AB$
(a) $>$ (b) $<$ (c) $=$ (d) \equiv
- (3) If \overline{AC} is the projection of \overline{AB} , then AC AB
(a) $<$ (b) \geq (c) \leq (d) $>$
- (4) In triangle ABC , if $\overline{AD} \perp \overline{BC}$ and cuts it at D , where $AB = 15 \text{ cm}$, $AC = 20 \text{ cm}$.
and $BC = 25 \text{ cm}$, then $AD = \dots \text{ cm}$.
(a) 21 (b) 12 (c) 15 (d) 25
- (5) In $\triangle ABC$, if $m(\angle B) > m(\angle C)$, then AC AB
(a) $<$ (b) $>$ (c) $=$ (d) \geq

3 [a] In the opposite figure :

$\overline{XY} \parallel \overline{BC}$, $AX = 4$ cm. , $XY = 5$ cm. , $BC = 15$ cm.

Find with proof : The length of \overline{XB}



[b] Determine the type of triangle ABC where $AB = 9$ cm. , $BC = 10$ cm. and $AC = 15$ cm.

4 [a] In the opposite figure :

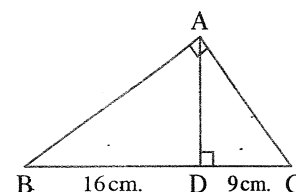
Complete :

(1) The projection of \overline{AB} on $\overline{BC} = \dots\dots\dots$

(2) The projection of \overline{AC} on $\overline{BC} = \dots\dots\dots$

(3) The projection of \overline{AD} on $\overline{BC} = \dots\dots\dots$

(4) The projection of \overline{BC} on $\overline{AC} = \dots\dots\dots$



[b] From the previous figure :

If $BD = 16$ cm. and $DC = 9$ cm. , then find the length of each of \overline{AD} , \overline{AB} , \overline{AC}

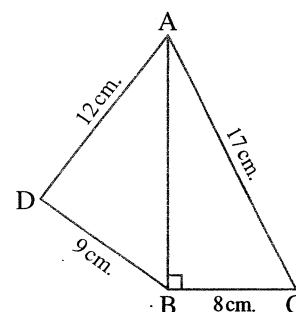
5 [a] In the opposite figure :

ABC is a right-angled triangle at B ,

$AC = 17$ cm. , $CB = 8$ cm. , $AD = 12$ cm.

and $DB = 9$ cm.

Prove that : $m(\angle ADB) = 90^\circ$

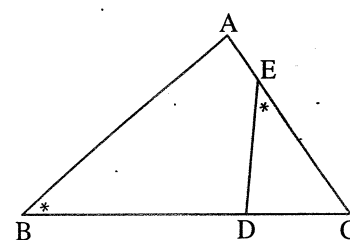


[b] In the opposite figure :

$m(\angle B) = m(\angle DEC)$

Prove that :

$\triangle ABC \sim \triangle DEC$



Additional question

[a] Choose the correct answer :

(1) The two base angles of the isosceles trapezium are

(a) parallel. (b) congruent. (c) complementary. (d) supplementary.

(2) A square of perimeter 20 cm. , then its area = cm^2

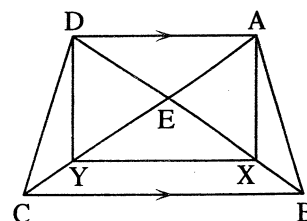
(a) 20 (b) 50 (c) 25 (d) 100

[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$

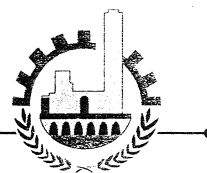
, the area of $\triangle AXB =$ the area of $\triangle DYC$

Prove that : $\overline{XY} \parallel \overline{AD}$



7 El-Kalyoubia Governorate

Central Maths Supervision



Answer the following questions :

1 Choose the correct answer :

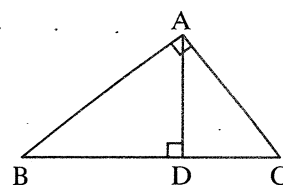
- (1) In $\triangle ABC$, if $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- (2) ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$
 , then the projection of \overline{BD} on \overline{AC} is
 (a) {A} (b) {B} (c) {C} (d) {D}
- (3) If $\triangle ABC \sim \triangle DEF$ and $AB = \frac{1}{5} DE$, then the perimeter of $\triangle ABC = \dots\dots\dots$ the perimeter of $\triangle DEF$.
 (a) 5 (b) 1 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$.
- (4) If the ratio of enlargement between two similar triangles equals , then the two triangles are congruent.
 (a) 1 (b) 2 (c) 0.5 (d) 0.25
- (5) If $\triangle ABC$ is right-angled at A and $\overline{AD} \perp \overline{BC}$, then $AC \times AB = AD \times \dots\dots\dots$
 (a) CD (b) DB (c) AD (d) CB

2 Complete :

In the opposite figure :

$\triangle ABC$ is right-angled at A , $\overline{AD} \perp \overline{BC}$, then :

- (1) $(AC)^2 = \dots\dots\dots + \dots\dots\dots$
- (2) $(AC)^2 = \dots\dots\dots - \dots\dots\dots$
- (3) $(AC)^2 = \dots\dots\dots \times \dots\dots\dots$
- (4) $\triangle ABC \sim \triangle \dots\dots\dots$



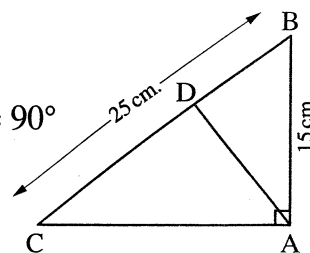
- (3) [a] ABCD is a parallelogram in which : $AB = 8$ cm. , $AC = 20$ cm. and $BD = 12$ cm.

Prove that : $m(\angle ABD) = 90^\circ$

[b] In the opposite figure :

$AB = 15$ cm. , $BC = 25$ cm. and $\triangle DBA \sim \triangle ABC$, $m(\angle BAC) = 90^\circ$

- (1) Prove that : $\overline{AD} \perp \overline{BC}$
- (2) Find : The length of \overline{BD}



- (4) [a] Determine the type of $\triangle ABC$ according to its angles

If $AB = 2.5$ cm. , $BC = 1.5$ cm. , and $AC = 2$ cm.

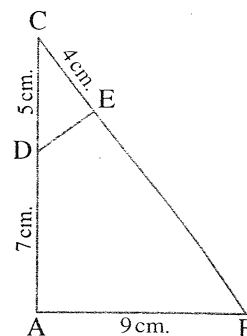
[b] In the opposite figure :

$$\triangle CDE \sim \triangle CBA ,$$

if $CD = 5 \text{ cm.}$, $AD = 7 \text{ cm.}$,

$CE = 4 \text{ cm.}$ and $AB = 9 \text{ cm.}$

Find : BE , DE



- 5 [a] $\triangle ABC$ is obtuse - angled at C , $\overline{AD} \perp \overline{BC}$, $AB = 15 \text{ cm.}$, $AC = 13 \text{ cm.}$, $AD = 12 \text{ cm.}$

Find : The length of \overline{BC}

[b] ABC is a triangle , \overline{AB} , \overline{BC} and \overline{CA} are bisected at D , E and F respectively.

Prove that : $\triangle ABC \sim \triangle EFD$

Additional question

[a] Complete the following :

- (1) The median of a triangle divides its surface into two triangles
- (2) Surfaces of two parallelograms with common base and between two parallel straight lines , one is carrying this base

[b] The ratio between the lengths of the two diagonals of a rhombus is $5 : 8$, if its area is 2000 cm^2 , find the length of each of its diagonals.

8

El-Sharkia Governorate

Directorate of Education
Dep. of Governmental L. School



Answer the following questions :

1 Choose the correct answer :

- (1) If $\overline{AB} \perp \overline{BC}$, then the projection of \overline{AB} on \overline{BC} is
 (a) \overline{AB} (b) \overline{BC} (c) $\{B\}$ (d) \overline{AC}
- (2) In $\triangle XYZ$, if $(XY)^2 = (XZ)^2 - (YZ)^2$, then $\angle Y$ is angle.
 (a) right (b) acute (c) obtuse (d) straight
- (3) If the length of a rectangle is 8 cm. and its width is 6 cm. , then the length of its diagonal is
 (a) 8 cm. (b) 6 cm. (c) 9 cm. (d) 10 cm.
- (4) If the ratio between two corresponding side lengths in similar two triangles is $1 : 3$, then the ratio between their perimeters is
 (a) $3 : 1$ (b) $2 : 4$ (c) $1 : 3$ (d) $1 : 1$

- (5) If ABC is an obtuse-angled triangle at A, in which : $AB = 5$ cm. , $BC = 8$ cm. ,
then $AC = \dots\dots\dots$ cm.

(a) 5 (b) 7 (c) 8 (d) 3

2 Complete the following :

- (1) The two polygons are similar if their corresponding side lengths are $\dots\dots\dots$ and their corresponding angles are $\dots\dots\dots$

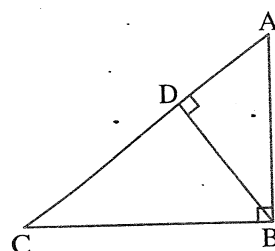
- (2) If M is the midpoint of \overline{AB} , then $(AB)^2 = \dots\dots\dots (AM)^2$

- (3) Any two squares are $\dots\dots\dots$

- (4) From the opposite figure :

(i) $(AB)^2 = \dots\dots\dots + \dots\dots\dots$

(ii) $(BC)^2 = \dots\dots\dots \times \dots\dots\dots$



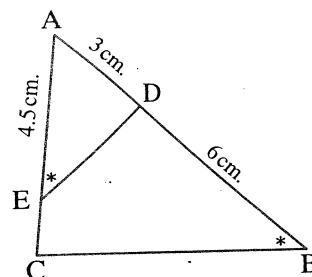
3 [a] In the opposite figure :

$m(\angle AED) = m(\angle B)$, $AD = 3$ cm. ,

$AE = 4.5$ cm. , $BD = 6$ cm.

- (1) **Prove that :** $\triangle ADE \sim \triangle ACB$

- (2) **Find :** The length of \overline{CE}

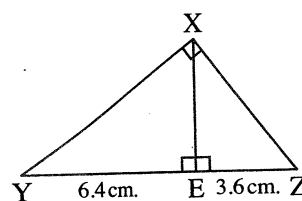


[b] In the opposite figure :

XYZ is a right-angled triangle at X , $\overline{XE} \perp \overline{YZ}$

If $EY = 6.4$ cm. , $EZ = 3.6$ cm.

Find : The length of each of : \overline{XE} and \overline{XY}



4 In the opposite figure :

ABCD is a quadrilateral , where :

$m(\angle BCD) = 90^\circ$, $\overline{AE} \perp \overline{BD}$,

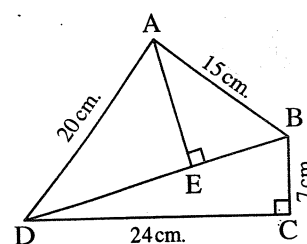
$BC = 7$ cm. , $CD = 24$ cm. ,

$AD = 20$ cm. and $AB = 15$ cm.

- (1) **Find :** The length of \overline{BD}

- (2) **Prove that :** $m(\angle BAD) = 90^\circ$

- (3) **Find :** The length of the projection of \overline{AB} on \overline{BD}



- 5 [a] Determine the type of the greatest angle in $\triangle ABC$ where :

$AB = 8$ cm. , $BC = 10$ cm. and $AC = 7$ cm.

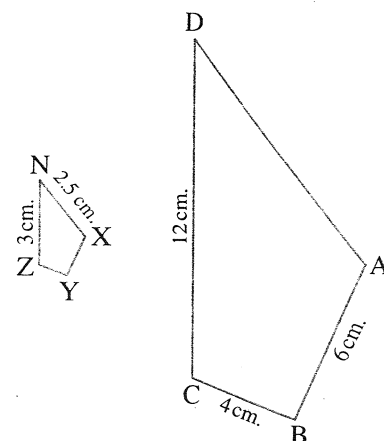
- [b] In the opposite figure :

The polygon $ABCD \sim$ The polygon $XYZN$

$AB = 6$ cm. , $BC = 4$ cm. ,

$CD = 12$ cm. , $NX = 2.5$ cm. , $ZN = 3$ cm.

Find : The length of each of \overline{XY} , \overline{YZ} and \overline{AD}



Additional question

- [a] Choose the correct answer :

(1) If the lengths of the parallel bases of a trapezium are 10 cm. and 8 cm. and its height is 5 cm. , then its area = cm^2 .

- (a) 40 (b) 50 (c) 45 (d) 90

(2) $ABCD$ is a parallelogram , $E \in \overline{BC}$,
then the area of $\square ABCD =$ the area of $\triangle EAD$

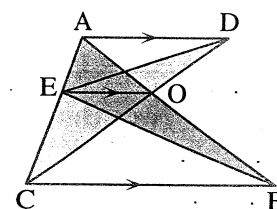
- (a) the same (b) half (c) twice (d) third

- [b] In the opposite figure :

$\overline{AD} \parallel \overline{EO} \parallel \overline{CB}$

Prove that :

Area of $\triangle DEC =$ area of $\triangle AEB$



9 El-Monofia Governorate

Official Language Schools
The Central Maths Supervision



Answer the following questions :

- 1 Choose the correct answer :

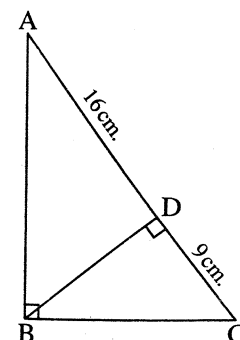
- (1) In the opposite figure :

The length of \overline{BD} is cm.

- (a) 9 (b) 16
(c) 12 (d) 15

(2) $\triangle ABC$ is an acute-angled triangle where $AB = 6$ cm. ,
 $BC = 8$ cm. , then $AC =$ cm.

- (a) 2 (b) 7 (c) 10 (d) 14



- (3) The ratio between the lengths of two corresponding side lengths of two similar polygons is $3 : 5$, then the ratio between their perimeters is
- (a) $2 : 5$ (b) $5 : 3$ (c) $3 : 5$ (d) $1 : 2$
- (4) The projection of any point on a straight line is
- (a) line segment. (b) ray. (c) straight line. (d) point.
- (5) If $\triangle ABC \sim \triangle XYZ$, $AB = 5$ cm., $XY = 10$ cm. and $YZ = 8$ cm., then $BC =$ cm.
- (a) 3 (b) 4 (c) 5 (d) 6

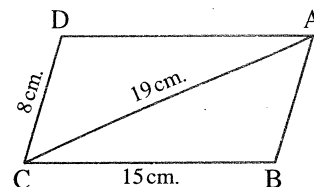
2 Complete the following :

- (1) The two polygons are similar if their corresponding side lengths are and their corresponding angles are
- (2) A triangle whose side lengths are 6 cm., 8 cm. and 11 cm., its type according to its angles is
- (3) In $\triangle ABC$, if $(AC)^2 + (CB)^2 = (AB)^2 - 9$, then angle C is
- (4) If $\overrightarrow{AD} \perp \overrightarrow{BC}$, then the projection of \overrightarrow{AB} on \overrightarrow{BC} is
- (5) All squares are

3 [a] In the opposite figure :

ABCD is a parallelogram in which : $BC = 15$ cm.,
 $AC = 19$ cm., $DC = 8$ cm.

Prove that : $\angle ABC$ is obtuse.



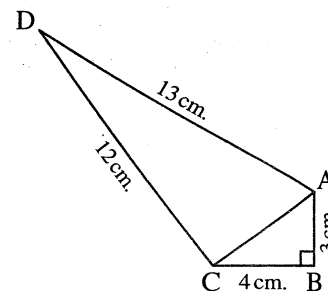
- [b] Two triangles are similar, the length of the sides of one of them are 6 cm., 8 cm., 10 cm. and the perimeter of the other is 72 cm.

Find : The length of sides of the other triangle.

4 [a] In the opposite figure :

$BC = 4$ cm., $AD = 13$ cm., $AB = 3$ cm.,
 $DC = 12$ cm., $m(\angle B) = 90^\circ$

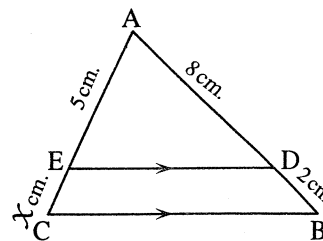
- (1) **Find :** The length of \overline{AC}
- (2) **Prove that :** $m(\angle ACD) = 90^\circ$



[b] In the opposite figure :

ABC is a triangle in which : $\overline{DE} \parallel \overline{BC}$, $BD = 2$ cm.,
 $AD = 8$ cm., $AE = 5$ cm., $CE = x$ cm.

- (1) **Prove that :** $\triangle ADE \sim \triangle ABC$
- (2) **Find :** The value of x



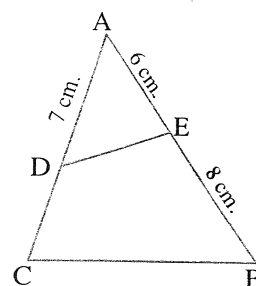
5 [a] In the opposite figure :

$$\triangle ABC \sim \triangle ADE$$

, AE = 6 cm. , AD = 7 cm. , BE = 8 cm.

Find : (1) The length of \overline{DC}

$$(2) \frac{DE}{BC}$$



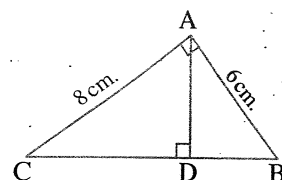
[b] In the opposite figure :

ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$

Find with proof :

(1) The length of each of \overline{BC} and \overline{AD}

(2) The length of the projection of \overline{AB} on \overrightarrow{BC}



Additional question

[a] Complete the following :

(1) The diagonals of the isosceles trapezium are

(2) The area of the rhombus of perimeter 20 cm. and height 3 cm. =

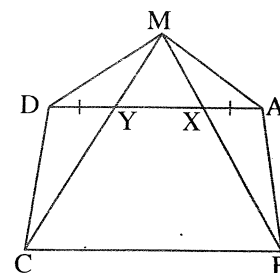
[b] In the opposite figure :

ABCD is a quadrilateral.

$X \in \overline{AD}$ and $Y \in \overline{AD}$ such that $AX = YD$

, the area of $\triangle ABM =$ the area of $\triangle DCM$

Prove that : $\overline{AD} \parallel \overline{BC}$



10

Suez Governorate

Educational Directorate
Maths Inspectorate



Answer the following questions :

1 Complete :

(1) In $\triangle ABC$, if $(AB)^2 = (BC)^2 + (AC)^2$, then $m(\angle \dots) = 90^\circ$

(2) If $\overline{AD} \perp \overrightarrow{BC}$, then the projection of \overline{AD} on \overrightarrow{BC} is

(3) Two polygons are similar if their corresponding side lengths are and their corresponding angles are

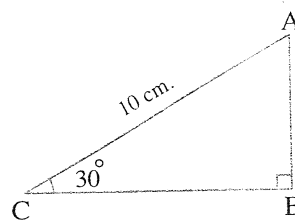
(4) A triangle whose side lengths are 6 cm. , 8 cm. , 11 cm. , then its type according to its angle is

(5) In the opposite figure :

$$AC = 10 \text{ cm.}, m(\angle C) = 30^\circ,$$

$$m(\angle B) = 90^\circ$$

$$AB = \dots\dots\dots \text{ cm.}$$



2 Choose the correct answer :

(1) If $\overline{AB} \parallel \overleftrightarrow{XY}$, then the length of the projection of \overline{AB} on \overleftrightarrow{XY} the length of \overline{AB}

- (a) > (b) = (c) \leq (d) <

(2) In $\triangle ABC$, if $(AB)^2 > (AC)^2 + (BC)^2$, then $\angle C$ is angle.

- (a) acute (b) obtuse (c) right (d) straight

(3) If $\triangle ABC \sim \triangle DEO$, $AB = \frac{1}{4} DE$

, then the perimeter of $\triangle ABC$ = the perimeter of $\triangle DEO$

- (a) 4 (b) 2 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

(4) ABC is a right-angled triangle at B, $AC = 10 \text{ cm.}$, $BC = 8 \text{ cm.}$, $AB = \dots\dots\dots \text{ cm.}$

- (a) 8 (b) 6 (c) 4 (d) 5

(5) If the ratio of enlargement between two triangles equals 1, then the two triangles are

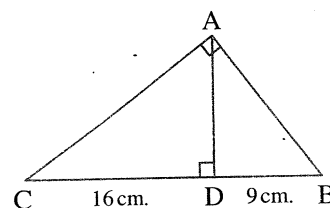
- (a) congruent. (b) different. (c) right-angled.

3 [a] In the opposite figure :

$$m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC},$$

$$BD = 9 \text{ cm.}, DC = 16 \text{ cm.}$$

Find : The length of each of \overline{AD} , \overline{AB} and \overline{AC}

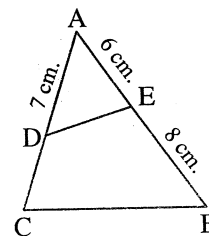


[b] In the opposite figure :

$$\triangle ABC \sim \triangle ADE,$$

$$AE = 6 \text{ cm.}, EB = 8 \text{ cm.}, AD = 7 \text{ cm.}$$

Find : The length of \overline{DC} and the ratio $\frac{DE}{BC}$



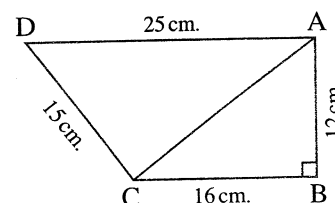
4 [a] In the opposite figure :

$$AB = 12 \text{ cm.}, BC = 16 \text{ cm.}, AD = 25 \text{ cm.},$$

$$DC = 15 \text{ cm.}, m(\angle B) = 90^\circ$$

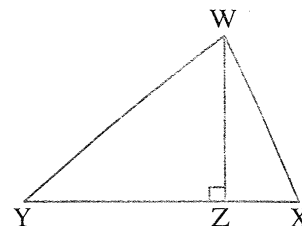
Find : The length of \overline{AC}

Prove that : $\angle ACD$ is right.



[b] In the opposite figure :

- (1) The projection of \overline{WX} on \overline{XY} is
- (2) The projection of \overline{WY} on \overline{XY} is

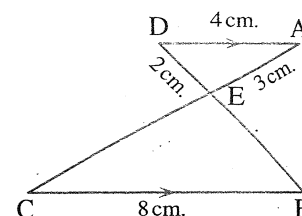


5 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AE = 3$ cm. , $DE = 2$ cm. ,

$AD = 4$ cm. , $BC = 8$ cm.

Prove that : $\triangle AED \sim \triangle CEB$, then find the length of \overline{CE}



- [b] Determine the type of $\triangle ABC$ according to its angles if $AB = 8$ cm. ,
 $BC = 9$ cm. , $CA = 7$ cm.

Additional question

[a] Choose the correct answer :

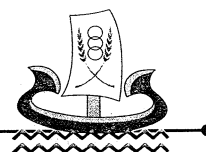
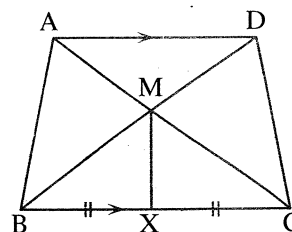
- (1) If two triangles are equal in area and drawn on the same base , then their vertices are on a straight line
 - (a) perpendicular to the base.
 - (b) bisects the base.
 - (c) parallel to the base.
 - (d) cuts the base.
- (2) The lengths of the two adjacent sides in a parallelogram are 7 cm. , 5 cm. and its smallest height is 4 cm. , then the area of the parallelogram equals cm^2
 - (a) 35
 - (b) 25
 - (c) 28
 - (d) 20

[b] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, X is the midpoint of \overline{BC}

Prove that :

The area of the figure ABXM = the area of the figure DCXM



Answer the following questions :

1 Choose the correct answer :

- (1) ABC is an obtuse - angled triangle at A in which : $AB = 5$ cm. , $BC = 8$ cm. , then $AC =$ cm.
 - (a) 5
 - (b) 7
 - (c) 8
 - (d) 13

(2) ABC is a triangle in which : $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 40^\circ$,

then $m(\angle A) = \dots\dots\dots$

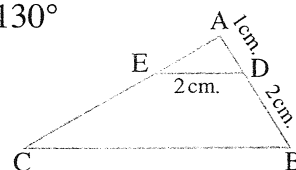
- (a) 40° (b) 50° (c) 90° (d) 130°

(3) In the opposite figure :

$\triangle ADE \sim \triangle ABC$,

then the length of $\overline{BC} = \dots\dots\dots$ cm.

- (a) 3 (b) 4 (c) 6 (d) 8



(4) If the ratio of enlargement between two triangles equals 1 , then the two triangles are $\dots\dots\dots$

- (a) congruent. (b) different. (c) right-angled. (d) coincide.

(5) If the ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is $\dots\dots\dots$

- (a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2

2 Complete :

In the opposite figure :

$m(\angle B) = 90^\circ$, $\overline{BD} \perp \overline{AC}$

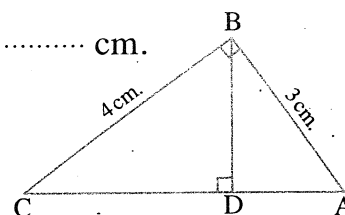
(1) $(AC)^2 = \dots\dots\dots + \dots\dots\dots = \dots\dots\dots \text{ cm}^2$, then $AC = \dots\dots\dots$ cm.

(2) The projection of \overline{AB} on \overline{AC} is $\dots\dots\dots$

(3) $(BD)^2 = AD \times \dots\dots\dots$

(4) $(BC)^2 = CA \times \dots\dots\dots$

(5) $\triangle ABC \sim \triangle \dots\dots\dots \sim \triangle \dots\dots\dots$



3 [a] In the opposite figure :

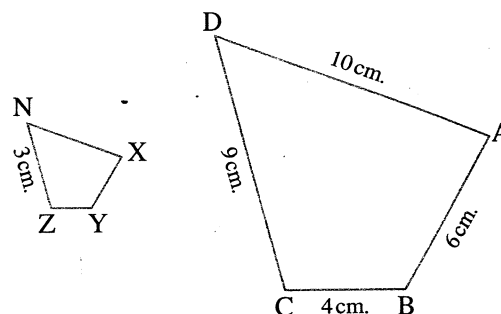
The polygon ABCD \sim The polygon XYZN

, $AB = 6 \text{ cm}$, $BC = 4 \text{ cm}$, $CD = 9 \text{ cm}$.

, $DA = 10 \text{ cm}$, $ZN = 3 \text{ cm}$.

Find :

The length of each of \overline{XY} , \overline{YZ} , \overline{XN}

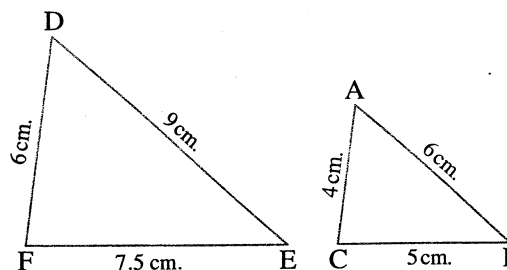


[b] In the opposite figure :

Prove that :

(1) $\triangle DEF \sim \triangle ABC$

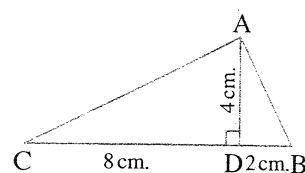
(2) $\frac{\text{Perimeter of } \triangle DEF}{\text{Perimeter of } \triangle ABC} = \text{the ratio of the similarity}$



4 [a] In the opposite figure :

ABC is a triangle in which : $BD = 2$ cm.
 $CD = 8$ cm. , $AD = 4$ cm. , $\overline{AD} \perp \overline{BC}$

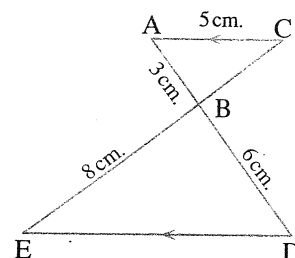
Prove that : $m(\angle BAC) = 90^\circ$



[b] In the opposite figure :

(1) Prove that : $\triangle ABC \sim \triangle DBE$

(2) Find : The length of each of \overline{BC} , \overline{DE}



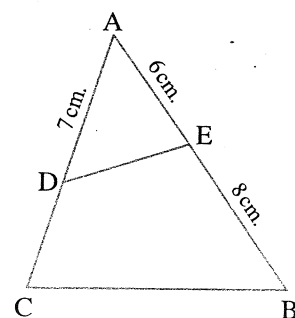
5 In the opposite figure :

If $\triangle ABC \sim \triangle ADE$, $AE = 6$ cm.

, $AD = 7$ cm. , $BE = 8$ cm.

Find : (1) The length of \overline{DC}

(2) $\frac{DE}{BC}$



Additional question

[a] Complete each of the following :

(1) A trapezium whose base lengths are 6 cm. , 8 cm. and its height is 5 cm. , then its area = cm^2

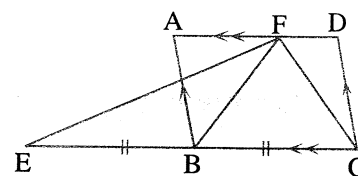
(2) ABCD is parallelogram , $E \in \overline{DC}$, if the area of $\triangle AEB = 25 \text{ cm}^2$, then the area of parallelogram ABCD = cm^2

[b] In the opposite figure :

ABCD is a parallelogram

, $E \in \overline{BC}$ where $BE = EC$, $F \in \overline{AD}$

Prove that : The area of $\triangle EFC =$ the area of $\square ABCD$



12 El-Beheira Governorate

Central Maths Supervision



Answer the following questions :

1 Complete :

(1) The two polygons are similar to a third palygon are

(2) If $\overline{XY} \perp \overline{AB}$ at the point Y , then the projection of \overline{XY} on \overline{AB} is

(3) The two triangles are similar if its corresponding side lengths are

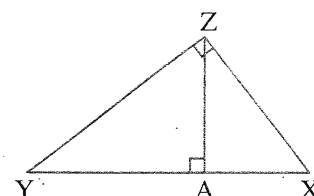
- (4) $\triangle ABC$ in which : $(AC)^2 + (BC)^2 = (AB)^2$, $m(\angle A) = 65^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
- (5) If the ratio of enlargement between two similar triangles equals 1 , then the two triangles are

2 Choose the correct answer :

(1) In the opposite figure :

$(ZA)^2 = YA \times \dots\dots\dots$

- (a) YX (b) AX
(c) ZY (d) ZX



- (2) $\triangle ABC$ is an obtuse-angled triangle at B , $AB = 3$ cm. , $BC = 5$ cm. , then $AC = \dots\dots\dots$ cm.
(a) 8 (b) 7 (c) 15 (d) 4

- (3) The length of the projection of a given line segment the length of the original line segment.

- (a) \geq (b) $>$ (c) \leq (d) $<$

- (4) In $\triangle ABC$, if $(AC)^2 - (BC)^2 > (AB)^2$, then $\angle A$ is

- (a) acute. (b) right. (c) obtuse. (d) straight.

- (5) The perpendicular segment drawn from the right angle of the right-angled triangle to the hypotenuse divides it into two triangles.

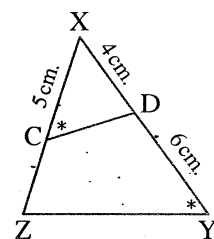
- (a) obtuse-angled (b) acute-angled (c) equilateral (d) similar

3 [a] In the opposite figure :

$m(\angle XCD) = m(\angle Y)$, $XD = 4$ cm.

, $XC = 5$ cm. , $DY = 6$ cm. ,

Prove that : $\triangle XCD \sim \triangle XYZ$, then calculate length of \overline{CZ}

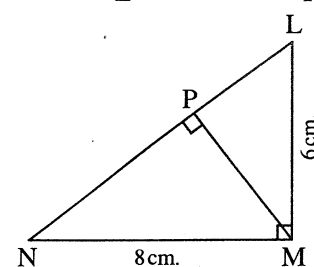


[b] In the opposite figure :

$m(\angle M) = 90^\circ$, $\overline{MP} \perp \overline{NL}$

, $LM = 6$ cm. , $MN = 8$ cm.

Find : The length of each of \overline{NP} and \overline{MP}



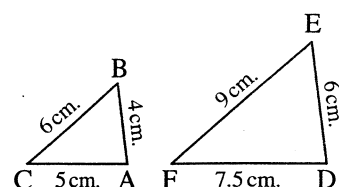
4 [a] In $\triangle XYZ$, $XY = 7$ cm. , $YZ = 9$ cm. and $XZ = 12$ cm.

Determine the type of the angle Z

[b] In the opposite figure :

Prove that : (1) $\triangle ABC \sim \triangle DEF$

(2) $\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF} = \frac{2}{3}$

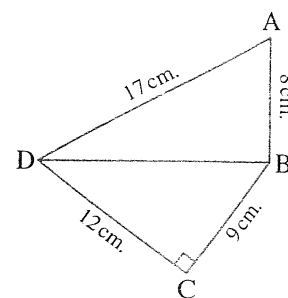


5 In the opposite figure :

ABCD is a quadrilateral in which : $m(\angle C) = 90^\circ$, $AB = 8$ cm.
 , $BC = 9$ cm. , $CD = 12$ cm. and $DA = 17$ cm.

(1) **Prove that :** $m(\angle ABD) = 90^\circ$

(2) **Find :** The projection of \overline{BD} on \overleftrightarrow{CD}

**Additional question**

[a] **Complete each of the following :**

- (1) Area of a triangle is equal to half of area of a parallelogram if they have a common
- (2) The parallelograms with bases equal in length and lying on a straight line , while the opposite sides to these bases are on another straight line are

[b] The area of a trapezium is 88 cm^2 , its height is 8 cm. and the length of one of its parallel bases is 10 cm. find the length of the other base.

13 Assiut Governorate

Assiut Educational Zone
Badr Language School



Answer the following questions :

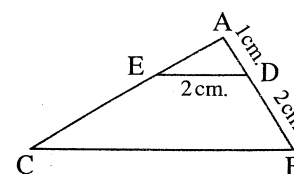
1 Choose the correct answer :

- (1) If two polygons are similar and the ratio between the lengths of two corresponding sides is 1 : 3 and the perimeter of smaller polygon is 15 cm. , then the perimeter of the greater polygon is cm.
 (a) 30 (b) 45 (c) 60 (d) 75
- (2) ABC is a triangle in which : $(AB)^2 > (AC)^2 + (BC)^2$, then $\angle C$ is
 (a) acute. (b) right. (c) obtuse. (d) straight.
- (3) If the ratio of enlargement between two similar triangles equals , then the two triangle are congruent.
 (a) 1 (b) 2 (c) 0.5 (d) 0.25
- (4) ABC is a triangle in which : $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 40^\circ$, then $m(\angle A) =$
 (a) 40° (b) 50° (c) 90° (d) 130°

(5) In the opposite figure :

$\triangle ADE \sim \triangle ABC$, then the length of $\overline{BC} =$ cm.

- (a) 3 (b) 4
- (c) 6 (d) 8



2 [a] Complete :

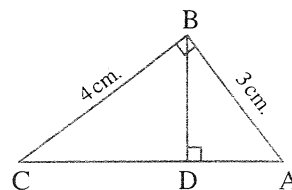
The polygons are similar if the corresponding side lengths are and the corresponding angles are

[b] In the opposite figure :

ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$

Complete :

- (1) The projection of \overline{AB} on \overline{AC} is
- (2) $(BD)^2 = AD \times \dots\dots\dots$
- (3) $(BC)^2 = CD \times \dots\dots\dots$
- (4) The perimeter of ΔBAD : The perimeter of $\Delta CBD = \dots\dots\dots : \dots\dots\dots$



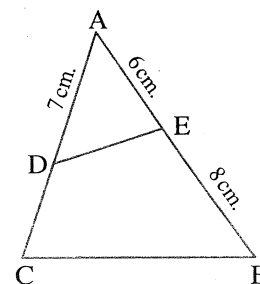
3 [a] In the opposite figure :

If $\Delta ABC \sim \Delta ADE$, $AE = 6$ cm.
 , $AD = 7$ cm. , $BE = 8$ cm.

Find : (1) The length of \overline{DC}

(2) $\frac{DE}{BC}$

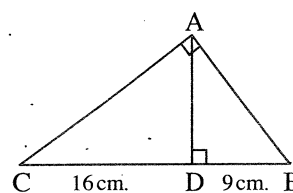
- [b] In ΔABC , if $AB = 8$ cm. , $BC = 10$ cm. and $CA = 7$ cm.**
 What is the type of ΔABC according to its angles ?



4 [a] In the opposite figure :

ABC is a right-angled triangle at A ,
 $\overline{AD} \perp \overline{BC}$, $BD = 9$ cm. , $CD = 16$ cm.

Find : The length of each of \overline{AB} , \overline{AC} , \overline{AD}

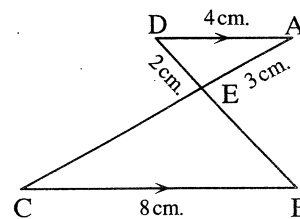


- [b] The side lengths of one of two similar triangles are 3 cm. , 4 cm. and 5 cm. and the perimeter of the other triangle is 36 cm. Find the side lengths of the other triangle.**

5 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $AD = 4$ cm. , $BC = 8$ cm.
 , $AE = 3$ cm. and $ED = 2$ cm.

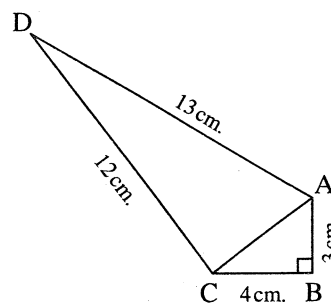
- (1) **Prove that :** $\Delta AED \sim \Delta CED$
- (2) **Find :** The perimeter of ΔEBC



[b] In the opposite figure :

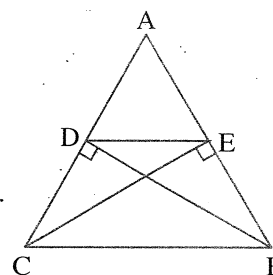
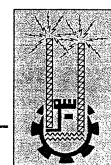
$AB = 3$ cm. , $BC = 4$ cm. , $AD = 13$ cm. ,
 $CD = 12$ cm. , $m(\angle B) = 90^\circ$

Prove that : $m(\angle ACD) = 90^\circ$

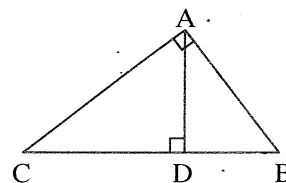


Additional question**[a] Choose the correct answer :**

- (1) The quadrilateral whose area half square of its diagonal length is
 (a) parallelogram. (b) rectangle. (c) rhombus. (d) square.
- (2) The diagonals of an isosceles trapezium
 (a) congruent. (b) perpendicular. (c) bisect each other. (d) parallel.

[b] In the opposite figure :If $AB = AC$, $\overline{BD} \perp \overline{AC}$ and $\overline{CE} \perp \overline{AB}$ **Prove that :** (1) $\overline{ED} \parallel \overline{BC}$ (2) The area of $\triangle ADB$ = the area of $\triangle AEC$ **14****Aswan Governorate**Aswan Educational Directorate
Eng. M.M. Yaqoub L. School**Answer the following questions :****1 Complete each of the following :**

- (1) The two triangles are similar if their corresponding angles are
- (2) **In the opposite figure :**
 ABC is a right-angled triangle at A
 and $\overline{AD} \perp \overline{BC}$, then $(BA)^2 = BD \times \dots\dots\dots$
- (3) In a triangle , if the square of the length of a side is equal to the sum of the squares of the lengths of the other two sides , then the angle opposite to this side is a angle.
- (4) In a parallelogram each two opposite angles are
- (5) ABC is a triangle in which : $(BC)^2 = (AB)^2 + (AC)^2$, $m(\angle B) = 40^\circ$
 , then $m(\angle C) = \dots\dots\dots^\circ$

**2 Choose the correct answer :**

- (1) If $\overline{AB} \parallel \overleftrightarrow{XY}$, then the length of the projection of \overline{AB} on \overleftrightarrow{XY} the length of \overline{AB}
 (a) < (b) > (c) = (d) \leq
- (2) $\triangle ABC$ is an obtuse-angled triangle at B , $AB = 3$ cm. and $BC = 5$ cm. ,
 then AC can be equal cm.
 (a) 4 (b) 5 (c) 7 (d) 8

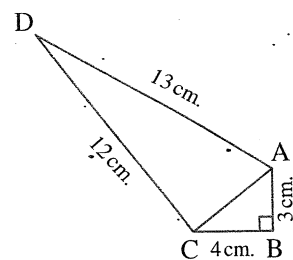
- (3) If the ratio between the lengths of two corresponding sides in two similar triangles is equal to , then the two triangles are congruent.
 (a) 1 (b) 2 (c) 0.5 (d) 0.25
- (4) The number of axis of symmetry of the square =
 (a) 1 (b) 2 (c) 3 (d) 4
- (5) If the measure of the vertex angle of an isosceles triangle is 80° , then the measure of each of its two base angles =
 (a) 80° (b) 100° (c) 60° (d) 50°

3 [a] In the opposite figure :

$AB = 3 \text{ cm.}$, $BC = 4 \text{ cm.}$, $AD = 13 \text{ cm.}$

$CD = 12 \text{ cm.}$, $m(\angle B) = 90^\circ$

Prove that : $m(\angle ACD) = 90^\circ$

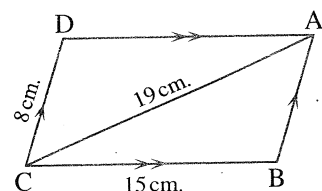


[b] In the opposite figure :

ABCD is a parallelogram in which :

$BC = 15 \text{ cm.}$, $CD = 8 \text{ cm.}$ and $AC = 19 \text{ cm.}$

Prove that : $\angle ABC$ is an obtuse-angled.

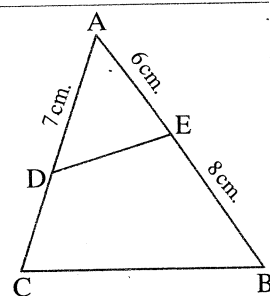


4 [a] In the opposite figure :

If $\triangle ABC \sim \triangle ADE$, $AE = 6 \text{ cm.}$,

$AD = 7 \text{ cm.}$, $BE = 8 \text{ cm.}$

Find : (1) The length of \overline{DC} (2) $\frac{DE}{BC}$



- [b]** Determine the type of the greatest angle in $\triangle ABC$ where $AB = 8 \text{ cm.}$, $BC = 10 \text{ cm.}$ and $AC = 7 \text{ cm.}$

5 In the opposite figure :

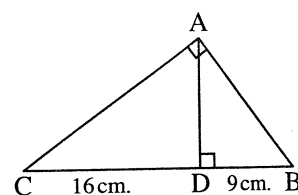
ABC is a right-angled triangle at A ,

$\overline{AD} \perp \overline{BC}$, $BD = 9 \text{ cm.}$, $CD = 16 \text{ cm.}$

Find : (1) The length of \overline{AB}

(2) The length of \overline{AC}

(3) The length of the projection of \overline{AC} on \overleftrightarrow{AD}



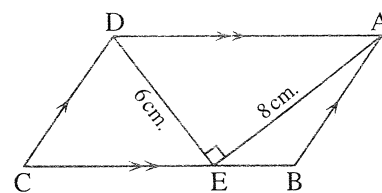
Additional question

[a] Complete the following :

(1) In the opposite figure :

Area of $\square ABCD$ = cm^2

(2) The median of a triangle divides its surface into two triangles in area.

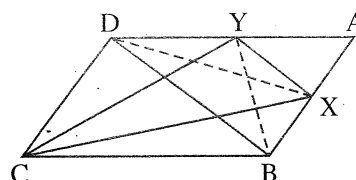


[b] In the opposite figure :

ABCD is a parallelogram , $X \in \overline{AB}$, $Y \in \overline{AD}$

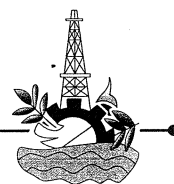
such that : area of $\triangle CBX$ = area of $\triangle CYD$

Prove that : $\overline{XY} \parallel \overline{BD}$



15 South Sinai Governorate

Educational Directorate
Tur Sinai Educational Zone



Answer the following questions :

1 Choose the correct answer :

(1) If $m(\angle ABC) = 45^\circ$, then $m(\text{reflex } \angle ABC) = \dots\dots\dots$

- (a) 45° (b) 90° (c) 270° (d) 315°

(2) Two similar polygons , if the ratio between two corresponding side lengths is $3 : 5$, then the ratio between their perimeters is

- (a) $5 : 2$ (b) $5 : 3$ (c) $3 : 5$ (d) $1 : 2$

(3) In the triangle ABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is

- (a) obtuse angle. (b) straight angle. (c) right angle. (d) acute angle.

(4) If $\angle A$ complements $\angle B$ and $\angle B$ supplements $\angle C$ and $m(\angle A) = 30^\circ$ then $m(\angle C) = \dots\dots\dots$

- (a) 150° (b) 120° (c) 60° (d) 30°

(5) The two triangles are congruent if the ratio of magnification =

- (a) 0.25 (b) 0.5 (c) 0.75 (d) 1

2 Complete the following :

(1) The type of the triangle whose side lengths are 6 cm. , 8 cm. and 10 cm. is -angled triangle.

- (2) The two triangles are similar if the corresponding angles are in measure.
- (3) The length of the projection of a line segment on a given straight line the length of the original line segment.
- (4) The number of the diagonals of the quadrilateral is
- (5) In $\triangle ABC$, if $(AC)^2 = (AB)^2 + (BC)^2$, then $m(\angle \dots) = 90^\circ$

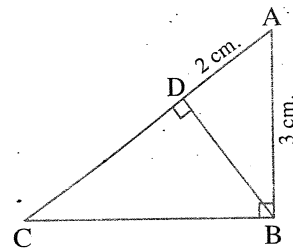
- 3** [a] Determine the type of the greatest angle of the triangle ABC where $AB = 8$ cm., $BC = 10$ cm., $AC = 7$ cm. What is the type of the triangle according to measures of its angles ?

[b] In the opposite figure :

ABC is a right-angled triangle at B ,

$AB = 3$ cm. , $AD = 2$ cm. , $\overline{BD} \perp \overline{AC}$

Find : the length of \overline{DC}



- 4** [a] In the opposite figure :

$m(\angle AED) = m(\angle B)$

Prove that : $\triangle ADE \sim \triangle ACB$

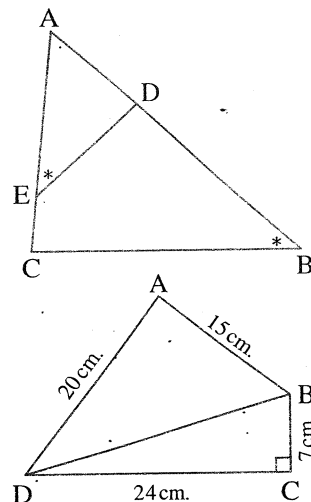
[b] In the opposite figure :

$m(\angle C) = 90^\circ$, $AB = 15$ cm. , $BC = 7$ cm. ,

$CD = 24$ cm. , $AD = 20$ cm.

(1) Find : The length of \overline{BD}

(2) Prove that : $m(\angle A) = 90^\circ$



- 5** [a] In the opposite figure :

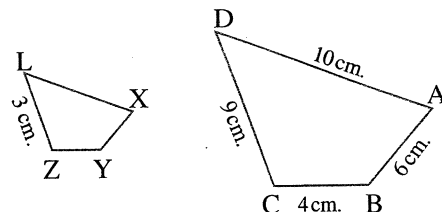
The polygon ABCD ~ The polygon XYZL ,

$AB = 6$ cm. , $BC = 4$ cm. ,

$CD = 9$ cm. , $DA = 10$ cm. ,

$ZL = 3$ cm.

Find : The perimeter of the polygon XYZL



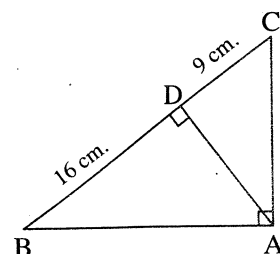
[b] In the opposite figure :

ABC is a right-angled triangle at A ,

$\overline{AD} \perp \overline{BC}$, $BD = 16$ cm. ,

$DC = 9$ cm.

Find : The length of each of \overline{AB} and \overline{AD}



Additional question**[a] Choose the correct answer :**

- (1) The ratio between the area of the parallelogram and the area of the triangle whose base is common and are included between two parallel straight lines =
- (a) 1 : 2 (b) 1 : 3 (c) 4 : 2 (d) 2 : 3
- (2) If ABCD is a parallelogram in which : $AB = 5$ cm. , $BC = 10$ cm. and its smaller height is 4 cm. , then its greater height =
- (a) 2 cm. (b) 4 cm. (c) 8 cm. (d) 10 cm.

[b] In the opposite figure : \overline{AD} is a median of $\triangle ABC$,E is the midpoint of \overline{AD} **Prove that :** Area of $\triangle EBC = \frac{1}{2}$ area of $\triangle ABC$ 