



Part (1)

(1) Complete the following:

- 1) The area of the triangle whose base length 10cm and height 6cm equals cm^2 .
- 2) Two triangles which have the same base and their vertices opposite to this base on a straight line parallel to the base are in area.
- 3) The area of the rhombus whose diagonals 12 cm, 8 cm equals cm^2 .
- 4) The median of a triangle divide it into two triangle in the area,
- 5) The area of trapezium whose parallel base 6 cm, 10 cm and height 5 cm. equals
- 6) If two triangles have equal areas and drawn on the same base and in one side of it then
- 7) Surface of two parallelograms with common base and between two parallel lines
- 8) The median of a triangle divides its surface into
- 9) Area of the parallelogram equals
- 10) Triangles of equal bases in length and lying between two parallel lines are equal in
- 11) The area of the rhombus whose diagonals X cm, Y cm is
- 12) The area of the right angled triangle whose sides length of the right angle are 6 cm , 8 cm equals
- 13) The area of the trapezium whose middle base 9 cm and height 6 cm equals



- 14) The measure of base angles of an isosceles trapezium are
- 15) The lengths of two adjacent sides in a parallelogram are 9 cm, 6 cm and the smallest height is 4cm then the length of the other height is
- 16) The height of trapezium whose parallel base are 5 cm, 7 cm and area of 42 cm^2 is
- 17) The area of rhombus whose perimeter is 20 cm and height 4 cm =
- 18) The length of the diagonal of a square of area 50 cm^2 equals cm .
- 19) The length of side of a square whose area equals the area of a rectangle with dimensions 9 cm , 16 cm =
- 20) The length of the middle base of a trapezium whose area = 30 cm^2 and height 5 cm equals

(2) Choose the correct answer:-

- 1) The length of the base of a triangle whose area 30 cm^2 and height 6 cm....
a) 5 b) 10 c) 15 d) 20
- 2) 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
- 3) The area of trapezium whose middle base length is 10 cm and height 8 cm equals cm^2 .
a) 80 b) 60 c) 40 d) 20



Geometry

2nd Preparatory

- 4) The quadrilateral whose area equals half square of its diagonal is
- a) parallelogram b) rectangle c) rhombus d) square
- 5) The diagonals of an isosceles trapezium
- a) congruent b) perpendicular
c) bisect each other d) parallel
- 6) The area of rhombus whose diagonals length are 6 cm, 8 cm equals.....
- a) 2 cm^2 b) 14 cm^2 c) 24 cm^2 d) 48 cm^2
- 7) The ratio between area of parallelogram and area of triangle if they have a common base and including between two parallel lines equals
- a) 1 : 2 b) 1 : 3 c) 2 : 1 d) 2 : 3
- 8) If the area of a square 18 cm^2 then length of its diagonal is ...
- a) 36 b) 12 c) 9 d) 6
- 9) If two triangles area equal in area and drawn on same base and in one side of it then their vertices lie on a straight line.
- a) perpendicular to this base. b) bisect this base
c) parallel to this base d) intersects the base.
- 10) The quadrilateral whose area equals the square of its side length is...
- a) parallelogram b) rectangle
c) rhombus d) square
- 11) The area of the rectangle whose dimensions 5 cm, 4 cm is
- a) 9 cm^2 b) 10 cm^2 c) 20 cm^2 d) 40 cm^2



- 12) The side length of a square whose area equals the area of a parallelogram of base length 8 cm and corresponding height 4.5cm equals.....
- a) 6 cm b) 13 cm c) 18 cm d) 36 cm
- 13) The median of a triangle divides its surface into two triangles
- a) congruent b) equals in area
c) isosceles d) right angles
- 14) The perimeter of the square whose area $81 \text{ cm}^2 = \dots$ cm.
- a) 24 b) 8 c) 9 d) 36
- 15) If the area of a rhombus is 24 cm^2 and the length of one of its diagonal is 6 cm then the length of the other diagonal is
- a) 4 cm b) 8 cm c) 10 cm d) 12 cm

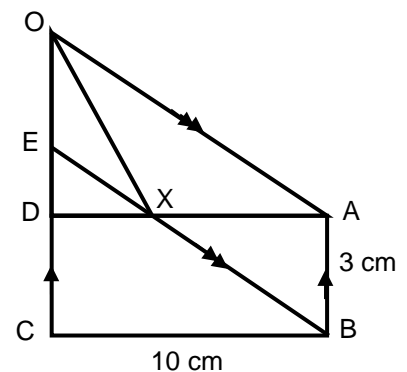
(3) Essay Questions:-

(1) In opposite figure :

ABCD is a rectangle, ABEO is a parallelogram,

AB = 3 cm, BC = 10 cm

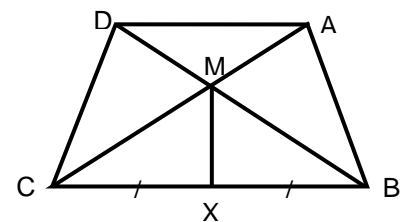
Find with proof: the area of ΔAXO



(2) In the opposite figure:

$\overline{AD} \parallel \overline{BC}$, X midpoint of \overline{BC} prove that:

- (i) Area of $\Delta AMB =$ area of ΔDMC
 (ii) Area of shape ABXM = area of shape DCXM



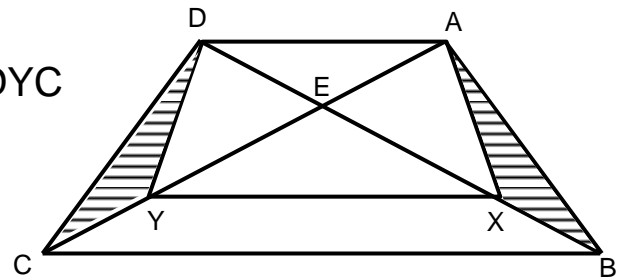


(3) The area of a trapezium is 88 cm^2 , its height is 8 cm and the length of one of the two parallel base 10 cm , find the length of the other base.

(4) In the opposite figure:

$\overline{AD} \parallel \overline{BC}$ area of $\Delta AXB = \text{area of } \Delta DYC$

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



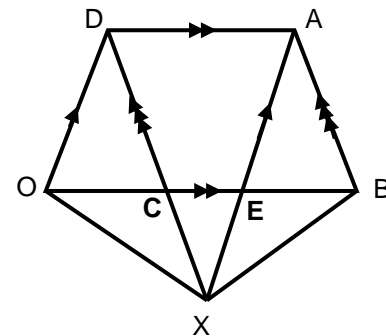
(5) In the opposite figure:

ABCD , AEOD area two parallelograms

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

Prove that

Area of ΔABX equals area of ΔDOX

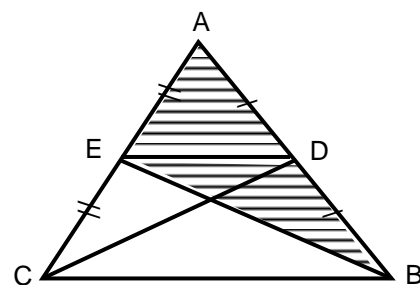


(6) Two pieces of land have equal areas, one of them has the shape of a square and the other has the shape of trapezium with two parallel bases of lengths 7 m , 11 m and height of 4m find the perimeter of the square land.

(7) In the opposite figure

If area of $(\Delta ADC) = \text{are of } (\Delta AEB)$

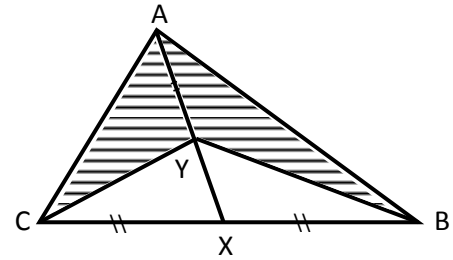
Prove that $\overline{DE} \parallel \overline{BC}$





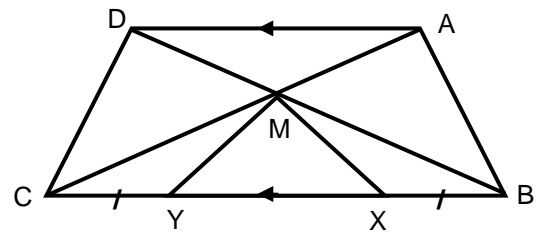
(8) In the opposite figure:

\overline{AX} is a median in ΔABC
 $Y \in \overline{AX}$, \overline{BY} , \overline{CY} are drawn prove that
 area of $(\Delta ABY) = \text{area of } (\Delta ACY)$



(9) In the opposite figure:

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$
 $X, Y \in \overline{BC}$ such that $BX = CY$
 Prove that:
 area of shape $ABXM = \text{area of shape } DCYM$



**(10) ABCD is a parallelogram in which $\overline{DE} \perp \overline{BC}$, $\overline{DO} \perp \overline{AB}$
 if $AB = 4 \text{ cm}$, $BC = 6 \text{ cm}$, $DE = 3 \text{ cm}$ find the length of \overline{DO}**



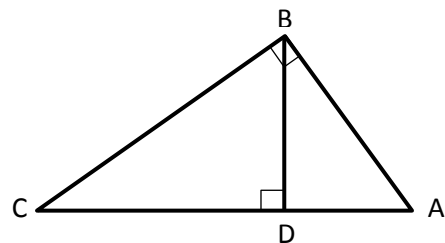
Part (2)

First : Complete the following:

- 1) If $\overline{AB} \perp \overline{BC}$ then the projection of \overline{AC} on \overline{BC} is
- 2) In ΔABC if $(AB)^2 = (BC)^2 + (AC)^2$ then $m(\angle \dots) = 90^\circ$
- 3) The two polygons are similar to a third are
- 4) The two triangles are similar if its corresponding angles are
in measure.
- 5) ABC is a right angled triangle at B in which $AB = 5$ cm, $BC = 12$ cm
then $AC = \dots$ cm.
- 6) The projection of a point which belongs to a straight line on this line
is
- 7) In ΔABC if $(AC)^2 + (AB)^2 < (BC)^2$ then angle A is
- 8) In ΔXYZ if $(ZX)^2 + (YZ)^2 > (XY)^2$ then angle Z is
- 9) In the opposite figure:

ΔABC is right angle triangle at B, $\overline{BD} \perp \overline{AC}$

- a) The projection of \overline{AB} on \overline{AC} is
- b) $(AB)^2 = AD \times \dots$
- c) $(BD)^2 = AD \times \dots$
- d) $(BC)^2 = CD \times \dots$
- e) $\Delta ABC \sim \Delta \dots \sim \Delta \dots$

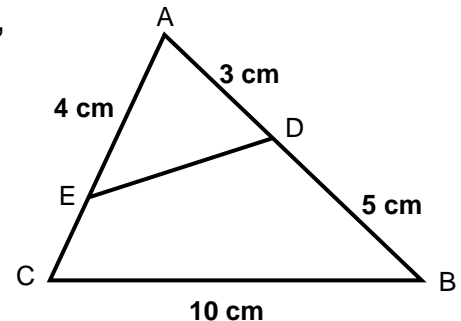




10) In the opposite figure:

If $\triangle AED \sim \triangle ABC$, $AD = 3$ cm, $AE = 4$ cm,
 $BC = 10$ cm , $BD = 5$ cm then

- a) $m(\angle ADE) = m(\angle \dots\dots\dots)$
- b) $m(\angle BAC) = m(\angle \dots\dots\dots)$
- c) $DE = \dots\dots\dots$ cm
- d) $ED = \dots\dots\dots$ cm



- 11) The area of a rectangle whose length of one of its dimensions = 12 cm, its diagonal = 13 cm equal
- 12) The triangle of side length 3 cm, 4 cm, 5 cm is angled triangle.
- 13) Two triangles are similar one of them has sides length 9 cm, 12 cm, 16 cm and the perimeter of the other 148 cm then side lengths of the other triangle are,,

Second: Choose the correct answer:

- 1) 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) $\frac{1}{2}$ d) $\frac{1}{4}$
- 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 angle triangle at A in which $AB = 5$ cm, $BC = 8$ cm then $AC = \dots\dots\dots$ cm
 - a) 5 b) 7 c) 8 d) 13



Geometry

2nd Preparatory

- 4) The triangle whose sides length are 3 cm, 4 cm, 5 cm its area = ... cm²
a) 12 b) 10 c) 8 d) 6
- 5) 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
- 6) ΔABC in which $(AC)^2 = (BC)^2 - (AB)^2$ then angle A is
a) acute b) right c) obtuse d) straight
- 7) The triangle whose sides length are 5 cm, 12 cm, 13 cm its area = cm²
a) 30 b) 32.5 c) 78 d) 144
- 8) ΔABC is obtuse angle triangle at B and $AB = 3$ cm, $BC = 5$ cm then $AC =$
a) 8 cm b) 7 cm c) 15 cm d) 4 cm
- 9) In the two similar polygons their corresponding angles are in measure.
a) equal b) difference c) proportional d) alternatives
- 10) The perpendicular segment drawn from the right angle of a triangle to the hypotenuse divides it to two triangles.
a) obtuse angle b) acute angle
c) equal's sides triangle d) similar
- 11) ABC is a triangle in which $\overline{AD} \perp \overline{BC}$ then the projection of \overline{AB} on \overline{BC} is
a) \overline{BD} b) \overline{DC} c) \overline{AC} d) \overline{AB}
- 12) ΔABC in which $(AB)^2 + (BC)^2 < (AC)^2$ then $\angle B$ is
a) acute b) right c) obtuse d) reflex



13) The diagonal of a square whose area 50 cm^2 equals

- a) 10 cm b) 20 cm c) 30 cm d) 40 cm

14) $\triangle ABC$ in which $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 40^\circ$ then

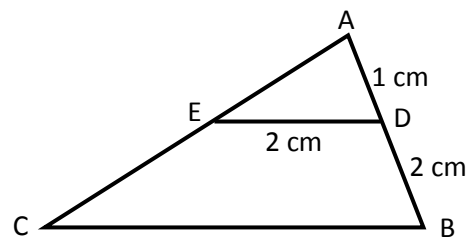
$m(\angle A) = \dots\dots\dots$

- a) 40° b) 50° c) 90° d) 130°

15) In the opposite figure:

If $\triangle ADE \sim \triangle ABC$ then the length of \overline{BC} in cm equals

- a) 3 b) 4
c) 6 d) 8



Third: Essay question:

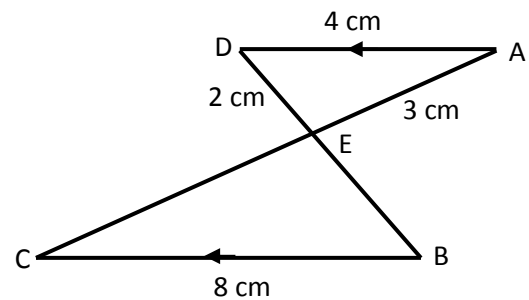
(1) Determine the type of the angle B in $\triangle ABC$ in each of the following:

- a) $AB = 7 \text{ cm}$, $BC = 12 \text{ cm}$, $AC = 8 \text{ cm}$
 b) $AB = 5 \text{ cm}$, $BC = 8 \text{ cm}$, $AC = 11 \text{ cm}$
 c) $AB = 6 \text{ cm}$, $BC = 3.6 \text{ cm}$, $AC = 4.6 \text{ cm}$

(2) In the opposite figure:

$\overline{AD} \parallel \overline{BC}$, $AD = 4 \text{ cm}$, $BC = 8 \text{ cm}$,
 $AE = 3 \text{ cm}$, $ED = 2 \text{ cm}$

- i) Prove that $\triangle AED \sim \triangle CEB$
 ii) Find the perimeter of $\triangle EBC$

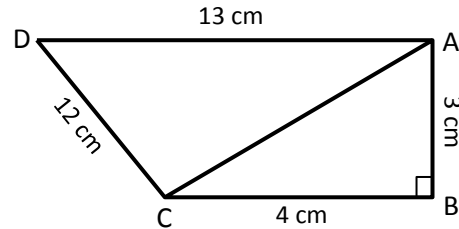




(3) In the opposite figure:

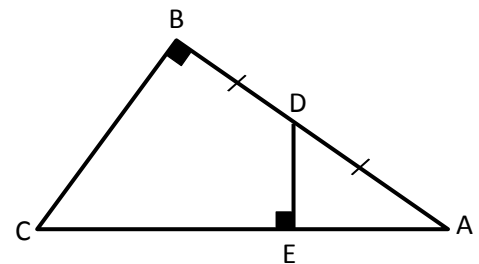
$AB = 3 \text{ cm}$, $BC = 4 \text{ cm}$,
 $AD = 13 \text{ cm}$, $CD = 12 \text{ cm}$
 $m(\angle B) = 90^\circ$

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



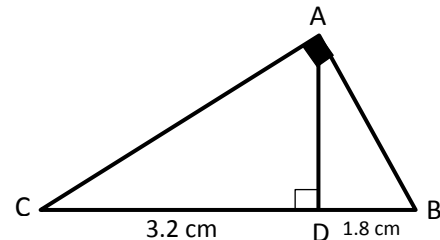
(4) In the opposite figure:

ABC is right angle 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}



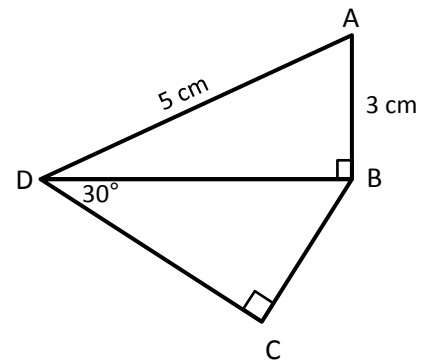
(5) In the opposite figure:

$ED = 1.8 \text{ cm}$, $DC = 3.2 \text{ cm}$
 Find the lengths of each \overline{AC} , \overline{AD}



(6) In the opposite figure:

ABCD is 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 \overline{BC}





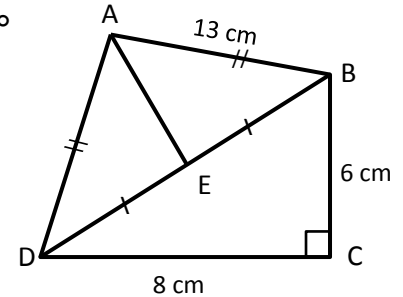
(7) In the opposite figure:

ABCD is a quadrilateral in which $m(\angle C) = 90^\circ$

$AB = AD = 13$ cm, $BC = 6$ cm, $CD = 8$ cm

E is midpoint of \overline{BD}

Find the area of the shape ABCD



(8) In the opposite figure:

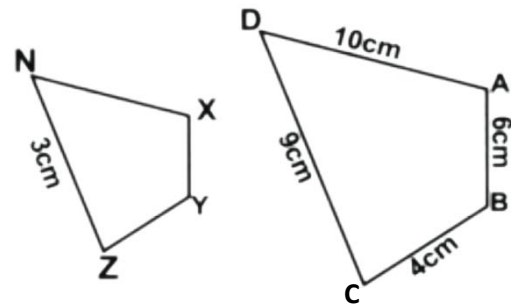
The polygon ABCD

is similar to the polygon XYZN ,

$AB = 6$ cm , $BC = 4$ cm ,

$CD = 9$ cm , $DA = 10$ cm

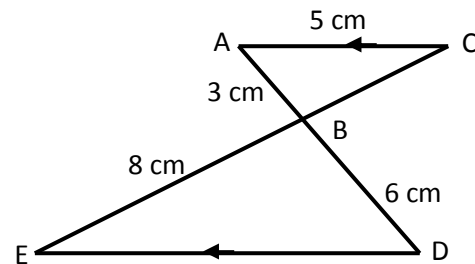
, $ZN = 3$ cm find the lengths of \overline{XY} , \overline{YZ} , \overline{XN}



(9) In the opposite figure:

i) Prove that $\triangle ABC$ is similar $\triangle DBE$

ii) Find the length of \overline{BC} , \overline{DE}



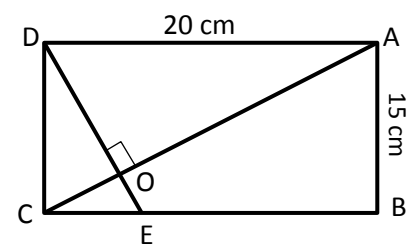
(10) In the opposite figure:

ABCD is a rectangle $\overline{DE} \perp \overline{AC}$

, DE intersect AC at O and intersect BC at E

If $AB = 15$ cm, $AD = 20$ cm

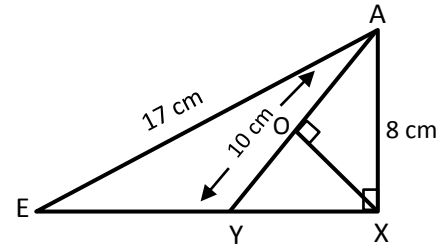
Find the lengths of each \overline{AO} , \overline{CE}





(11) In the opposite figure:

- Find the length of projection of \overline{AY} on \overline{XE}
- Find the length of \overline{XO} , \overline{AO}

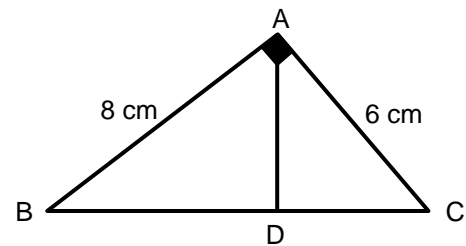


(12) In the opposite figure:

$$\triangle DBA \sim \triangle ABC , m(\angle BAC) = 90^\circ$$

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

Find BD if $AB = 8 \text{ cm}$, $AC = 6 \text{ cm}$



(13) A piece of land has a rectangle shape whose length twice its width and its area 200 meter square is drawn by a scale 1:200 find the dimensions of this land at the drawing.



Model Answers

Part (1)

(1) Complete:

1) 30 cm^2

2) equal.

3) 48 cm^2 .

4) equal.

5) $\frac{1}{2} (6 + 10) \times 5 = 40 \text{ cm}^2$

6) Their vertices lie on a straight line parallel to this base.

7) one is carrying this base are equal in area.

8) Two triangular surface equal in area.

9) the length of the base X its corresponding height.

10) Area.

11) $\frac{1}{2} XY \text{ cm}^2$.

12) $\frac{1}{2} \times 6 \times 8 = 24 \text{ cm}^2$

13) $9 \times 6 = 54 \text{ cm}^2$

14) equal in measure

15) 6 cm.

16) the middle base = $\frac{1}{2} (5 + 7) = 6 \text{ cm}$

$$H = 42 \div 6 = 7 \text{ cm.}$$

17) $b = 20 \div 4 = 5 \text{ cm}$

$$A = 5 \times 4 = 20 \text{ cm}^2$$

18) 10 cm.

19) A. of rectangle = $9 \times 16 = 144 \text{ cm}^2$

$$\text{S. of square} = \sqrt{144} = 12 \text{ cm.}$$

20) $30 \div 5 = 6 \text{ cm.}$



(2) Choose the correct answer:-

- | | | | |
|---------|---------|---------|---------|
| 1) (b) | 2) (c) | 3) (a) | 4) (d) |
| 5) (a) | 6) (c) | 7) (c) | 8) (d) |
| 9) (c) | 10) (d) | 11) (c) | 12) (d) |
| 13) (b) | 14) (d) | 15) (b) | |

(3)

(1) Proof: ∴ ABCD is a rectangle, ABEO is a parallelogram

 ABCD ,  ABEO have common base \overline{AB}


∴ Area of  ABCD = Area of  ABEO

∴ AB = 3 cm , BC = 10 cm

∴ Area of  ABCD = $3 \times 10 = 30 \text{ cm}^2$

∴ Area of  ABEO = 30 cm^2

∴ In ΔAXO ,  ABEO have common base \overline{AO}
 $\overline{AO} \parallel \overline{BE}$

∴ Area of $\Delta AXO = \frac{1}{2}$ area of  ABEO
 $= \frac{1}{2} \times 30 = 15 \text{ cm}$

(2) Proof: ∴ $\overline{AD} \parallel \overline{BC}$

In ΔACD , ΔADB have common base \overline{AD}

∴ Area of $\Delta ACD = \text{Area of } \Delta ADB$ (1)

subtracting A. of ΔAMD from (1)

∴ Area of $\Delta DMC = \text{Area of } \Delta AMB$ (2)

∴ X midpoint of \overline{BC}

∴ Area of $\Delta MXC = \text{Area of } \Delta MXB$ (3)

Adding (2) & (3)

∴ Area of the shape DCXM = Area of the shape ABXM



(3) Area of trapezium = $\frac{1}{2} (b_1 + b_2) \times h$

$$88 = \frac{1}{2} (10 + b_2) \times 8$$

$$b_2 = 12 \text{ cm}$$

(4) $\therefore \overline{AD} \parallel \overline{BC}$

In $\triangle ADB$, $\triangle ADC$ have common base \overline{AD}

$$\therefore \text{Area of } \triangle ADB = \text{Area of } \triangle ADC \quad (1)$$

$$\therefore \text{Area of } \triangle AXB = \text{Area of } \triangle DYC \quad (2)$$

subtracting (2) from (1)

$$\therefore \text{Area of } \triangle ADX = \text{Area of } \triangle AYD \quad (3)$$

have a common base \overline{AD}

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

(5) $\therefore ABCD$, $AEOD$ are two parallelogram

, \overline{AD} is a common base

$$\therefore \text{Area of } \square ABCD = \text{Area of } \square AEOD \quad (1)$$

subtracting Area of the figure $AECD$ from (1)

$$\therefore \text{Area of } \triangle ABE = \text{Area of } \triangle DCO \quad (2)$$

$$\therefore OC = EB$$

\therefore in $\triangle XCO$, $\triangle XEB$ have common vertex X

$$\therefore EB = CO$$

$$\therefore \text{Area of } \triangle XBE = \text{Area of } \triangle XCO \quad (3)$$

Adding (2) & (3)

$$\therefore \text{Area of } \triangle ABX = \text{Area of } \triangle DOX$$



(6) Area of trapezium = $\frac{1}{2} (b_1 + b_2) \times h$
 $= \frac{1}{2} (7 + 11) \times 4$
 $= 36 \text{ cm}^3$.

Area of square = 36 cm^3 .

$S = \sqrt{36} = 6 \text{ cm}$.

Perimeter of square = $6 \times 4 = 24 \text{ cm}^2$

(7) **Proof:** ∴ Area of $\Delta ADC = \text{Area of } \Delta AEB$

subtracting Area of ΔADE from both side

∴ Area of $\Delta EDC = \text{Area of } \Delta DEB$

, \overline{ED} is a common base

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

(8) **Proof:** ∴ In ΔABC

X is midpoint

∴ A. of $\Delta ABX = \text{A. of } \Delta AXC$ (1)

∴ In ΔYBC

X is midpoint

∴ A. of $\Delta YBX = \text{A. of } \Delta YXC$ (2)

subtracting (2) from (1)

∴ A. of $\Delta ABY = \text{A. of } \Delta ACY$.



(9) Proof: ∴ In $\triangle ABD$, $\triangle ACD$

$\overline{AD} \parallel \overline{BC}$, \overline{AD} is a common base .

$$\therefore \text{Area of } \triangle ABD = \text{Area of } \triangle ADC \quad (1)$$

By subtracting Area of $\triangle AMD$ from both side

$$\therefore \text{Area of } \triangle AMB = \text{Area of } \triangle DMC \quad (2)$$

∴ $\triangle MXB$, $\triangle MYC$

M is a common vertex, $XB = YC$

$$\therefore \text{Area of } \triangle MXB = \text{A. of } \triangle MYC \quad (3)$$

Adding (2) & (3)

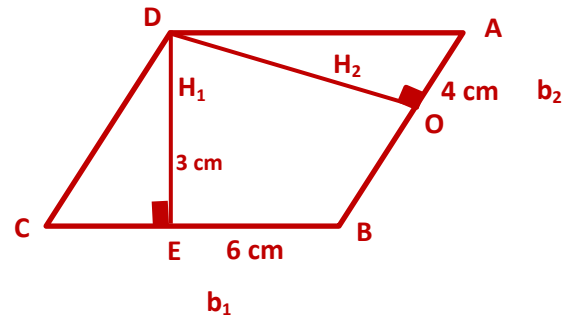
$$\therefore \text{Area of shape } ABXM = \text{Area of shape } DCYM$$

(10) Area of parallelogram

$$= b_1 \times h_1 = 3 \times 6 = 18 \text{ cm}^2$$

$$A = b_2 \times h_2 = 4 \times h_2 = 18 \text{ cm}^2$$

$$h_2 (DO) = 18 \div 4 = 4.5 \text{ cm}$$





Part (2)

First: Complete:

- 1) \overline{BC} 2) $(\angle C)$ 3) similar
4) equal 5) 13 cm 6) the same point
7) obtuse 8) acute
9) a) \overline{AC} b) AC c) DC d) \overline{CA} e) $\triangle ADB - \triangle BDC$
10) a) $m(\angle ACB)$ b) $m(\angle EAD)$ c) 5 cm d) 2 cm
11) 60 cm^2 12) right
13) 36 cm , 48 cm , 64 cm

Second: Choose:

- 1) d 2) c 3) a 4) d 5) a
6) b 7) a 8) b 9) a 10) d
11) a 12) a 13) a 14) b 15) c

Third: Essay Question

(1) a) obtuse b) obtuse c) obtuse

(2) $\because \overline{AD} \parallel \overline{BC}$, \overline{AC} & \overline{DB} are transversals

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

$$m(\angle A) = m(\angle C) \text{ alternate angles} \rightarrow (1)$$

$$\because \overleftrightarrow{DB} \cap \overleftrightarrow{AC} = \{ E \}$$

$$\therefore m(\angle DEA) = m(\angle BEC) \text{ V.O.A} \rightarrow (2)$$

From (1) & (2)

$$\therefore \triangle ADE \sim \triangle CBE$$

$$\therefore \frac{AD}{CB} = \frac{DE}{BE} = \frac{AE}{CE} = \frac{\text{P.of } \triangle ADE}{\text{P.of } \triangle CBE}$$



$$\therefore \frac{4}{8} = \frac{2}{BE} = \frac{3}{CE} = \frac{4+2+3}{\text{P.of } \triangle CBE}$$

$$\text{P. of } \triangle CBE = \frac{9 \times 8}{4} = 18 \text{ cm}$$

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

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 \quad (\text{Pythagoras})$$

$$AC = \sqrt{(3)^2 + (4)^2} = 5 \text{ cm}$$

In $\triangle ACD$

$$\therefore (AD)^2 = (13)^2 = 169,$$

$$(AC)^2 = 25, \quad (CD)^2 = 144$$

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

$$\therefore m(\angle ACD) = 90^\circ \text{ (converse of Pythagoras theory)}$$

(4) In $\triangle ABC$: $\therefore (\angle B) = 90^\circ$

$$\therefore (AC)^2 = (AB)^2 + (BC)^2 = 64 + 36 = 100$$

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

, $\therefore D$ is the midpoint of \overline{AB}

$$\therefore AD = DB = 4 \text{ cm}$$

In $\triangle AED$, $\triangle ABC$

$$m(\angle AED) = m(\angle B) = 90^\circ \text{ (given)}$$

, $\angle A$ is common

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

$$\therefore \triangle AED \sim \triangle ABC$$

$$\therefore \frac{DE}{CB} = \frac{AD}{AC}, \quad \therefore \frac{DE}{6} = \frac{4}{10}$$

$$\therefore DE = \frac{6 \times 4}{10} = 2.4 \text{ cm}$$



(5) In $\triangle ABC$:

$$\because m(\angle A) = 90^\circ, \overline{AD} \perp \overline{CB}$$

$$\therefore (AC)^2 = CD \times CB = 3.2 \times 5 = 16 \text{ (Euclidean theorem)}$$

$$AC = 4 \text{ cm}$$

$$(AD)^2 = DB \times DC = 1.8 \times 3.2 = 5.76$$

$$AD = 2.4 \text{ cm}$$

(6) In $\triangle ABD$: $\because m(\angle B) = 90^\circ$

$$\therefore (BD) = \sqrt{(5)^2 - (3)^2} = 4 \text{ cm (Pythagoras theorem)}$$

In $\triangle BCD$: $\because m(\angle C) = 90^\circ, m(\angle CDB) = 30^\circ$

$$\therefore CB = \frac{1}{2} BD = \frac{1}{2} \times 4 = 2 \text{ cm}$$

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

$$\therefore BD = \sqrt{(BC)^2 + (CD)^2} = \sqrt{(6)^2 + (8)^2} = 10 \text{ cm (Pythagoras Theorem)}$$

In $\triangle ABD$: E is a midpoint of \overline{BD} , $AB = AD$

$$\therefore AE \perp BD, EB = 5 \text{ cm}$$

$$\therefore AE = \sqrt{(AB)^2 - (EB)^2} = \sqrt{(13)^2 - (5)^2} = 12 \text{ cm}$$

\therefore The area of the quadrilateral ABCD =

$$\text{Area of } \triangle BCD + \text{Area of } \triangle ABD$$

$$\begin{aligned} \therefore \text{Area} &= \frac{1}{2} \times DC \times BC + \frac{1}{2} \times BD \times AE \\ &= \frac{1}{2} \times 8 \times 6 + \frac{1}{2} \times 10 \times 12 = 24 + 60 = 84 \text{ cm}^2 \end{aligned}$$

(8) \therefore Polygon ABCD \sim Polygon XYZN

$$\therefore \frac{AB}{XY} = \frac{BC}{YZ} = \frac{CD}{ZN} = \frac{AD}{XN}$$

$$\frac{6}{XY} = \frac{4}{YZ} = \frac{9}{ZN} = \frac{10}{XN}$$

$$XY = 2 \text{ cm}, YZ = 1 \frac{1}{3} \text{ cm}, XN = 3 \frac{1}{3} \text{ cm}$$



(9) $\because \overline{AC} \parallel ED$, \overline{AD} & \overline{CE} are transversals

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

$$m(\angle C) = m(\angle E) \text{ alternate angles} \rightarrow (1)$$

$$\because \overline{AD} \cap \overline{CE} = \{ B \} , \therefore m(\angle ABC) = m(\angle EBD) \text{ V.O.A} \rightarrow (2)$$

From (1) & (2)

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

$$\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{CA}{ED} = \frac{3}{6} = \frac{BC}{8} = \frac{5}{ED} ,$$

$$BC = 4 \text{ cm} , ED = 10 \text{ cm}$$

(10) In $\triangle ABC$: $\because (\angle B) = 90^\circ$

$$\therefore AC = \sqrt{(AB)^2 + (BC)^2} = \sqrt{(15)^2 + (20)^2} = 25 \text{ cm (Pythagoras)}$$

In $\triangle ADC$: $\because (\angle D) = 90^\circ$

$$\therefore (DA)^2 = AO \times AC \text{ (Euclidean Theorem)}$$

$$\therefore AO = \frac{(20)^2}{25} = 16 \text{ cm}$$

$$\therefore DO = \frac{DA \times DC}{AC} = \frac{20 \times 15}{25} = 12 \text{ cm}$$

$\because \triangle DCE$ is right angled at C , $\overline{CO} \perp \overline{DE}$

$$\therefore (CD)^2 = DO \times DE \rightarrow DE = \frac{(15)^2}{12} = 18.75 \text{ cm}$$

$$OE = 18.75 - 12 = 6.75 \text{ cm}$$

$$(CE)^2 = EO \times ED = 6.75 \times 18.75 = 126.5625 \text{ cm}^2$$

$$CE = 11.25 \text{ cm}$$



(11) $\because \overline{XY}$ is the projection of \overline{AY} on \overline{XE} , ΔAXY is right angled

$$\therefore (XY)^2 = (AY)^2 - (AX)^2 = 100 - 64 = 36, XY = 6 \text{ cm}$$

$$\because \overline{XD} \perp \overline{AY}, XO = \frac{AX \times XY}{AY} = \frac{6 \times 8}{10} = 4.8 \text{ cm}$$

$$(AX)^2 = AF \times AY, AF = 6.4 \text{ cm}$$

(12) $\because \Delta ABC$ is right angled at A, $\therefore BC = \sqrt{8^2 + 6^2} = 10 \text{ cm}$

$$\because \Delta DBA \sim \Delta ABC, \therefore m(\angle BDA) = m(\angle BAC) = 90^\circ$$

$$\therefore \overline{AD} \perp \overline{BC}, \therefore (BA)^2 = BD \times BC, BD = \frac{64}{10} = 6.4 \text{ cm}$$

(13) Let the real length be = $2x$, width = x

$$A = L \times w = 2x \times x = 2x^2 = 200 \text{ m} \rightarrow x = 10 \text{ cm}, 2x = 20 \text{ m}$$

$$\text{Length in drawing} = \frac{2000 \times 1}{200} = 10 \text{ cm} \quad \text{D.L : R.L}$$

$$\text{Width in drawing} = \frac{1000 \times 1}{200} = 5 \text{ cm} \quad 1 : 200$$