Part (1)

(1) Complete:

1) The square is a rectangle in which ……

2) ABDC in a parallelogram in which m (∠ A) = 60°, then m (∠ B) = ……

3) The sum of measures of the angles of the quadrilateral equals …….

4) The ray drawn parallel to one side of a triangle and passing through the mid-point of another side ……

5) The rhombus is a parallelogram in which ……

6) Each two opposite angles in a parallelogram are ……

7) The line segment joining the midpoint of two sides of a triangle is ……

8) The quadrilateral is a parallelogram if ……

9) The parallelogram whose diagonals are perpendicular in ……

10) If the measure of an interior angle of a triangle is equals to the sum of the measures of the other two interior angles, then the triangle is ……

11) Any triangle has at least two …… interior angles.

12) The measure of the exterior angle of a triangle is ……

13) The parallelogram whose diagonals are perpendicular and equal in length is ……

14) The sum of measures of the interior angles of a hexagon equals ……

15) The rectangle is a parallelogram in which one of its angles is ……

16) The parallelogram whose perimeter 24 cm and the length of its sides is 7 cm. Then the length of the adjacent side equal ……

17) If ABCD is a rhombus, then …… ⊥ ……

18) In the parallelogram XYZL, if m (x) = $\frac{1}{2}$ m (∠ Y) then m (∠ Y) =……°

19) Each of the two diagonals of the …… makes an angle of measure 45° with the adjacent side.

20) The side length of a rhombus whose perimeter 42 cm equals …… cm.

21) The sum of measure of interior angles of pentagon = ……

22) The measure of one interior angle of regular pentagon = ……

23) The number of sides of regular polygon if the measure of one interior angle 144° = ……

24) The number of the diagonals of a pentagon is ……

25) The measure of each angle of regular hexagon equals ……

26) If the measure of an angle of a triangle is greater than the sum of the other two angles then the triangle is ……

27) The sum of measure of the exterior angles of a triangle equals ……

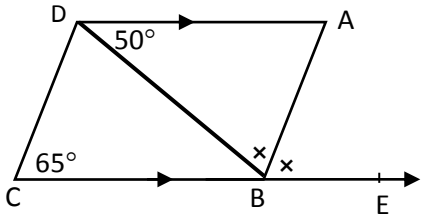
28) The measure of any of the exterior angle of an equilateral triangle equals ……

(2) In the opposite figure:

$\overrightarrow{DA}$ // $\overrightarrow{BE}$, BA bisect ∠ DBE

, m (∠ ADB) = 50°, m (∠ C) = 65°

Prove that ABCD is a parallelogram



(3) In the opposite figure:

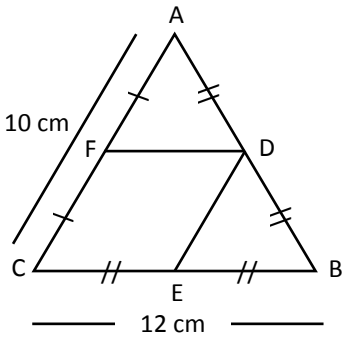
ABC is a triangle in which

D,E and F are midpoints of $\overline{AB}$, $\overline{BC}$

and $\overline{CA}$ respectively

BC = 12 cm , AC = 10 cm

Find the perimeter of the quadrilateral DECF

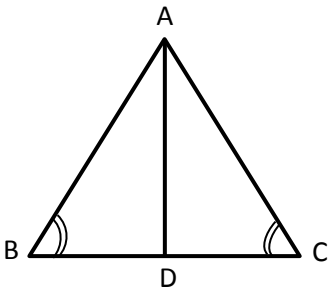


(4) In the opposite figure:

ABC is a triangle, m (∠ B) = m (∠ C)

and $\overrightarrow{AD}$ is the bisector of ∠ A

prove that: AB = AC



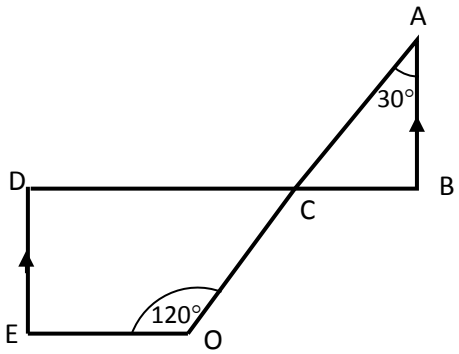
(5) In the opposite figure:

$\overline{AB}$, $\overline{ED}$ are perpendicular

to $\overline{BD}$, $\overline{BD} \cap \overline{AO}$ = { C }

m (∠ A) = 30°, m (∠ EOC) = 120°

Find m (∠ E)



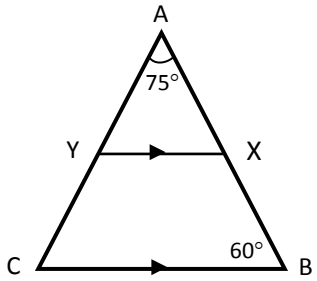
(6) In the opposite figure:

ABC is a triangle in which m (∠ A) = 75°

m (∠ B) = 60°, X ∈ $\overline{AB}$ and Y ∈ $\overline{AC}$

such that: $\overline{XY}$ // $\overline{BC}$

Find: m (∠ AYX)



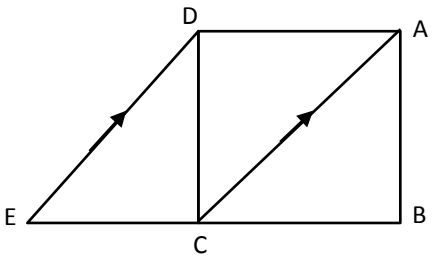
(7) In the opposite figure:

ABCD is a square. Draw $\overrightarrow{DH}$ // $\overrightarrow{AC}$

to intersect $\overleftrightarrow{BC}$ at H

1- Prove that: CH = BC

2- Find: m (∠ ADH)



Part (2)

(1) Complete:

1) The sum of measures of the interior angles of a polygon is 18 × 180° then the number of its sides is …….

2) The ray drawn from a midpoint of a side of a triangle parallel to another side then …….

3) Δ ABC, if m (∠ A) + m (∠ B) = m (∠ C) then m (∠ C) = …….°

4) The line segment joining the midpoints of two sides of a triangle is ……. and its length is equal to …….

5) The regular polygon is …….

6) The regular polygon is …….

7) The image of (-3, 7) by rotation about the origin with an angle of measure 180° is …….

8) The point (4, 2) is the image of …… by reflection on y-axis.

9) The image of (-2, 2) by translation (x, y) → (x + 4, y – 2) is ……

10) The sum of the measures of the exterior angles of a convex polygon the number of its sides n is …….

11) Measure of the interior angle of the regular hexagon is ……

12) The image of point (2, 1) by reflection in x-axis is …….

13) The image of point (2, -1) by rotation about the origin 180° is ……

14) (-3 , 2) is the image of point (3 , 2) by reflection in ……. axis.

15) The image of point (4, 6) by transformation (x, y) → (-x , y - 7) is …….

16) The image of point (5 , -3) by translation 3 units in negative direction of x-axis is ……

17) The image of the point (2 , 3) by translation MN in direction MN where M (2 , -1), N (5 , 1) is ……

(2) Choose the correct answer from the given ones:

1) The two diagonals of a rectangle ……

a) are perpendicular

b) are equal in length.

c) are perpendicular and equal in length.

d) bisect its interior angles

2) The two diagonals of a rhombus are ……

a) perpendicular and are not equal.

b) equal in length and are not perpendicular.

c) perpendicular and equal in length.

d) not equal in length and are not perpendicular.

3) The two diagonals of the square, are ……

a) just perpendicular.

b) just equal in length

c) perpendicular and equal in length

d) not equal in length and are not perpendicular

4) If two adjacent sides are equal in length in a parallelogram, then the figure is a ……

a) square b) rhombus c) rectangle d) trapezium

5) If: ABCD is a rectangle in which AC = 5 cm, then: BD = …… cm.

a) 2.5 b) 5 c) 10 d) 20

6) If: ABCD is a square, then: m (∠ CAB) = ……

a) 90° b) 45° c) 60° d) 30°

7) If: ABCD is a parallelogram in which m (∠ A) = m (∠ B), then: ABCD is a ……

a) rectangle b) rhombus c) square d) trapezium

8) If: ABCD is a rhombus in which m (∠ ACB) = 32°, then: m (∠ D) = …

a) 32° b) 64° c) 116° d) 26°

9) The image of point (-1 , 3) by translation (4 , -2) is ……

a) (3 , 1) b) (3 , -1) c) (5 , 1) d) (5 , -5)

10) The number of the diagonals of a pentagon is ……

a) 3 b) 5 c) 7 d) 9

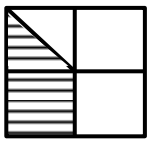
11) The image of point (2, -5) by reflection in x-axis is ……

a) b) c) d)

12) The area of shaded part from the area of all shape is ……

a) $\frac{1}{8}$ b) $\frac{1}{4}$

c) $\frac{3}{8}$ d) $\frac{3}{4}$



13) The number of diagonals of a quadrilateral is ……

a) 2 b) 3 c) 4 d) 5

14) The image of point (3 , -5) by reflection in y-axis is ……

a) (3 , 5) b) (-3 , -5) c) (-3 , 5) d) (-5 , 3)

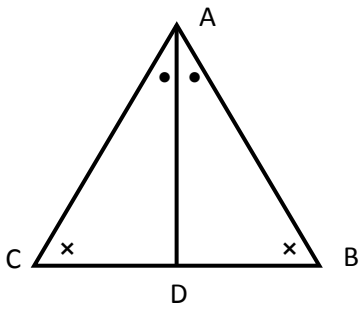
(3) a) In the opposite figure:

In Δ ABC, m (∠ B) = m (∠ C)

D ∈ $\overline{CD}$ such that:

$\overrightarrow{AD}$ bisects (∠ BAC)

Prove that: AB = AC

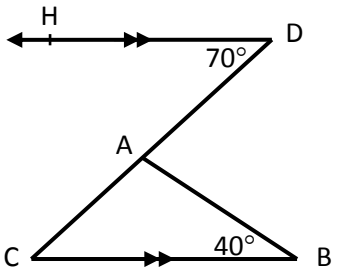


b) In the opposite figure:

$\overrightarrow{DH}$ // $\overline{BC}$, m (∠ ABC) = 40°

m (∠ HAD) = 70°, A ∈ $\overline{DC}$

Find: m (∠ BAC)



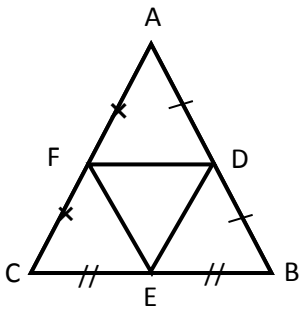
c) In the opposite figure:

Δ ABC and D, E, F are midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{CA}$ respectively

FD = 3 cm, DE = 4 cm,

FE = 5 cm

Find the perimeter of Δ ABC

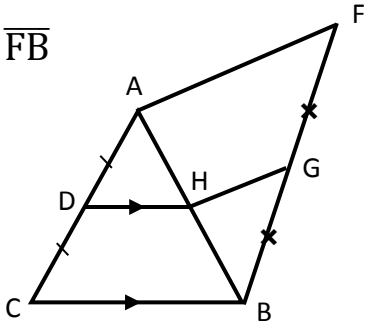


d) In the opposite figure:

D is a midpoint of $\overline{AC}$, O is a midpoint of $\overline{FB}$

$\overline{DH}$ // $\overline{CB}$

Prove that: $\overline{HO}$ // $\overline{AF}$

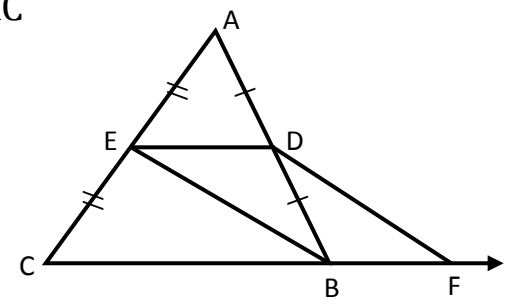


e) In the opposite figure:

Δ ABC, X, Y are the midpoint of $\overline{AB}$, $\overline{AC}$ respectively, H ∈ $\overrightarrow{CB}$ where BH = BC

Prove that:

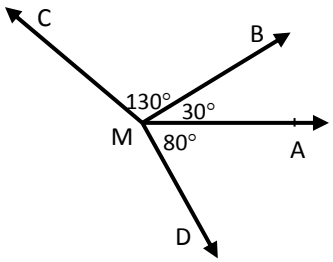
XHBY is a parallelogram.



f) In the opposite figure:

Find with proof:

m (∠ CMD)



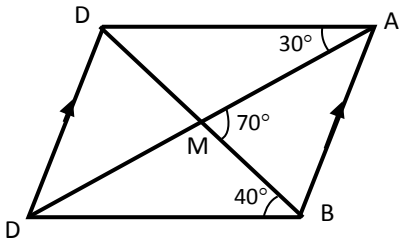
g) ABCD is a quadrilateral where:

$\overline{AC}$ ∩ $\overline{BD}$ = {M},

$\overline{AB}$ // $\overline{DC}$, m (∠ AMB) = 70°,

m (∠ MBC) = 40°and m (∠ MAD) = 30°

Prove that: ABCD is a parallelogram



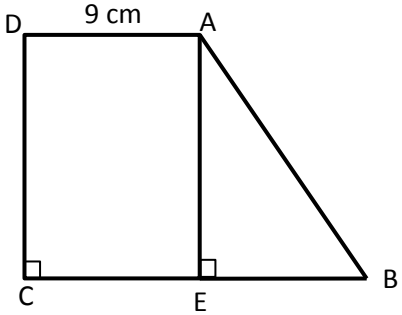
(4) In the opposite figure:

ABCD is a trapezium, where

$\overline{AD}$ // $\overline{BC}$, m (∠ DCB) = 90°

$\overline{AE}$ ⊥ $\overline{BC}$, AB = BC = 17 cm , AD = 9 cm

Find the length of DC, the area of trapezium



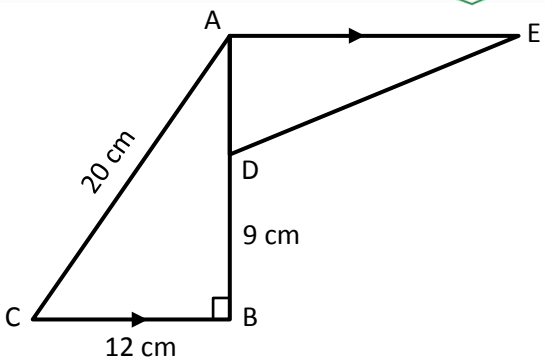
(5) In the opposite figure:

Δ ABC , m ($\angle$ B) = 90° , $\overline{AE}$ // $\overline{BC}$

If BC = 12 cm , AC = 20 cm, D $\in \overrightarrow{AB}$

BD = 9 cm, AE = 2 BC

Find the length of $\overline{AD}$, $\overline{ED}$

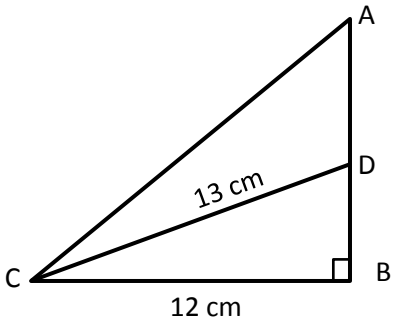


(6) In the opposite figure:

ABC is a triangle m ($\angle$ B) = 90°, D $\in \overline{AB}$,

AD = 11 cm if BC = 12 cm, DC = 13 cm

Find the length of $\overline{BD}$, $\overline{AC}$

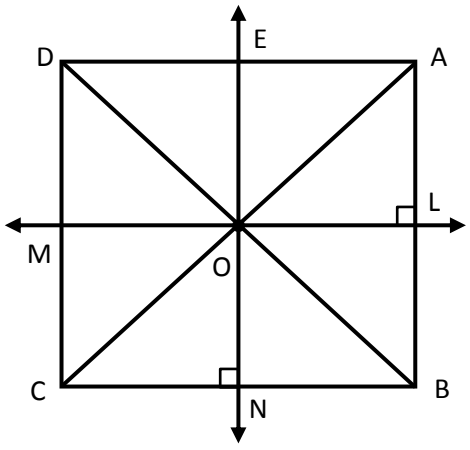


(7) Find:

a) The image of Δ AOL by translation 3 cm in direction $\overrightarrow{AB}$

b) Find the image of Δ AOL by reflection in $\overleftrightarrow{EN}$

c) Find the image of Δ AOL by rotation about O with angle (-90°)



(8) Draw the right angled triangle ABC at B, where AB = 3 cm, BC = 4 cm find the image by translation of magnitude 4 cm in direction $\overrightarrow{BC}$

(9) Find the image of Δ AOB where A (4 , 1) , B (1 , 5) , C (0 , 0) by rotation about the origin with an angle 90°

Model Answers

Part (1)

(1) Complete:

1) Diagonals are perpendicular

2) 120°

3) 360°

4) bisect the third side

5) diagonals are perpendicular

6) equal in measure

7) parallel to the third side

8) each two opposite sides are equal and parallel

9) rhombus

10) right-angled triangle

11) acute

12) equal to the sum of the measure of the other two interior opposite angles.

13) square

14) 720°

16) 5 cm

17) AC ⊥ BD

18) 120°

19) rectangle

20) 10.5 cm

21) 540°

22) 108°

23) $\frac{360}{180-144}$ = 10 sides

24) 2 diagonals

25) 120°

26) obtuse angled

27) 360°

28) 120°

(2) Proof: ∵ $\overrightarrow{DA}$ // BE

∴ m (∠ DBC) = m (∠ ADB) = 50° (alternate angles)

∵ (∠ CBE) is a straight angle

∴ m (∠ DBE) = 180° - 50° = 130°

∵ $\overrightarrow{BE}$ bisect ∠ DBE

∴ m (∠ ABD) = 130° ÷ 2 = 65°

∴ m (∠ ABC) = 50° + 65° = 115°

∵ m (∠ C) + m (∠ ABC) = 115° + 65° = 180°,
and they are interior angles

∴ $\overrightarrow{AB}$ // $\overrightarrow{CD}$

∵ $\overrightarrow{AB}$ // $\overrightarrow{CD}$ & $\overrightarrow{AD}$ // $\overrightarrow{BC}$

∴ ABCD is a parallelogram

(3) Proof: ∵ D is the midpoint of $\overline{AB}$, F is the midpoint of $\overline{AC}$

∴ $\overline{DF}$ // $\overline{BC}$, DF = $\frac{1}{2}$ BC = 6 cm

∵ D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{BC}$

∴ $\overline{DE}$ // $\overline{AC}$, DE = $\frac{1}{2}$ AC = 5 cm

∵ FC = $\frac{1}{2}$ AC , Ac = $\frac{1}{2}$ CB

∴ The perimeter of the quadrilateral DECF

= 6 + 5 + 6 + 5 = 22 cm

(4) Proof: In the ΔΔ ADC and ADB

∵ $\overleftrightarrow{AD}$ is the bisector of ∠ A

∴ m (∠ DAC) = m (∠ DAB) and ∵ m (∠ B) = m (∠ C)

∴m (∠ ADB) = m (∠ ADC) → (1)

∵ 1- m (∠ DAC) = m (∠ DAB)

2- AD is a common side

3- m (∠ ADB) = m (∠ ADC)

∴ Δ ADC ≡ Δ ADB

AB = AC

(5) Proof: ∵ The sum of measures of interior angle of Δ = 180°

∴ m (∠ ACB) = 180° - (90° + 30°) = 60°

∵ ∠ ACB and ∠ DCB are vertically opposite angles.

∴ m (∠ ACB) = m (∠ DCB) = 60°

∵ The sum of measures the interior angles of the quadrilateral

= (4 - 2) × 180° = 2 × 180° = 360°

∴ m (∠ E) = 360 - (60° + 90° + 120°) = 90°

(6) Proof: m (∠ A) = 75° and m (∠ B) = 60° (given)

, the sum of measures of the interior angle of Δ ABC = 180°

m (∠ C) = 180° - (75° + 60°)

= 180° - 135° = 45°

∵ $\overline{XY}$ // $\overline{BC}$ and $\overleftrightarrow{AC}$ is a transversal

m (∠ AYX) = m (∠ C) = 45° (corresponding angles)

(7) Proof: ∵ $\overline{AD}$ // $\overline{BC}$ (two opposite sides in the square)

and H ∈ $\overrightarrow{BC}$

∴ $\overline{AD}$ // $\overline{CH}$

∵ $\overline{DH}$ // $\overline{AC}$ (given)

∴ ACHD is a parallelogram ∴ CH = AD

But AD = BC (two opposite side in the square)

∴ CH = BC

∵ $\overline{AC}$ is a diagonal in the square

∵ $\overrightarrow{CA}$ bisects ∠ BCD

∴ m (∠ ACD) = 90° ÷ 2 = 45°

∵ $\overleftrightarrow{DH}$ // $\overleftrightarrow{AC}$ & $\overleftrightarrow{CD}$ is their transversal

∴ m (∠ CDH) = m (∠ ACD) = 45° (Two alternate angles)

, ∵ (∠ ADC) = 90°

∴ m (∠ ADH) = m (∠ ADC) + m (∠ CDH)

= 90° + 45° = 135°

Part (2)

1) Complete :

1) 20
2) its length = half of the third side
3) 90°
4) Parallel - half
5) has sides equals in length
6) has sides equals in length
7) (3 , -7)
8) (- 4 , 2)
9) (2 , 0)
10) 360°
11) 720°
12) (2 , -1)
13) (-2 , 1)
14) y
15) (-4 , -1)
16) (2 , -3)
17) (5 , 5)

2) Choose :

1) equal in length
2) Perpendicular and not equal
3) Perpendicular and equal in length
4) Rhombus
5) 5
6) 45
7) rectangle
8) 116
9) (3 , 1)
10) 5
11) (2 , 5)
12) $\frac{3}{8}$
13) 2
14) 2
15) (-3 , -5)

(3)

A) Proof by yourself

B) m (< BAC) = 70

C) Perimeter of Δ ABC = 24 cm

D) Try by yourself

F) m (< CMD) = 120°

G) Proof by your self

(4)

∵ Δ ABC is right Δ

∴ $(AE)^2 = (AB)^2 - (EB)^2$

$= 17^2 - 8^2$

$(AE)^2 = 289 - 64 = 225$

$AE = \sqrt{225} = 15$ cm

Area of Δ AEB = $\frac{1}{2} \times 17 \times 8 = 68$ cm^2

Area of rectangle AECD = $9 \times 15 = 135$ cm^2

Area of trapezium = $68 + 135 = 203$ cm^2

∵ m ∠ AEB = m ∠ DCE = 90°

∵ $\overline{DA}$ // $\overline{CB}$

∴ AECD is a rectangle

∴ AE = DC = 15 cm

(5) In Δ ABC → right Δ

$(AB)^2 = (AC)^2 - (CB)^2$

$= 400 - 144 = 256$

$AC = \sqrt{256} = 16$ cm

AD = 16 - 9 = 7 cm

∵ AE = 2 BC

∴ AE = 12 × 2 = 24 cm

In Δ AED → right Δ

$(ED)^2 = (AD)^2 + (AE)^2$

$= 7^2 + 24^2$

$= 49 + 576 = 625$

$ED = \sqrt{625} = 25$ cm

(6) In Δ BDC → right Δ

$(BD)^2 = (CD)^2 - (CB)^2$

$= 13^2 - 12^2$

$= 169 - 144 = 25$

$BD = \sqrt{25} = 5$ cm

AB = 11 + 5 = 16 cm

In Δ ABC → right Δ

$(AC)^2 = (AB)^2 + (BC)^2$

$= 16^2 + 12^2$

$= 256 + 144 = 400$

$AC = \sqrt{400} = 20$ cm

(7) a) Δ BLO b) Δ DOM c) Δ ONB