PERIMETER AND AREA

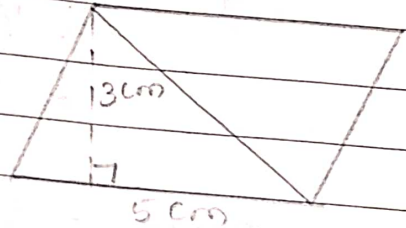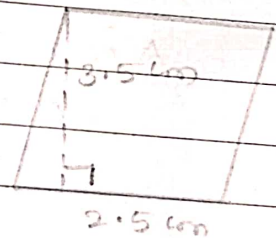## EXERCISE 11.2

Q1. Find the area of each of the following parallelogram :

(a)
Height of parallelogram = 4 cm
Base of parallelogram = 7 cm
Area = base × height
= 4 × 7 = 28 cm²
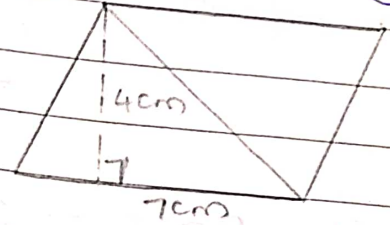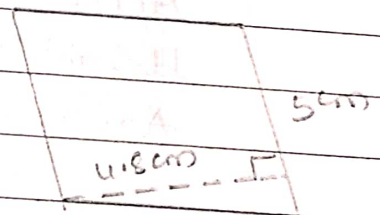
(b) Height of parallelogram = 3 cm
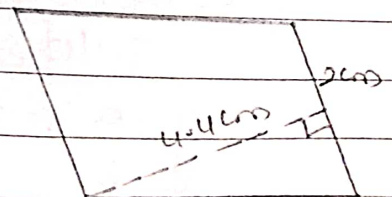Base of parallelogram = 5 cm
Area = Base × Height
= 3 × 5 = 15 cm²

(c) Height = 3.5 cm
Base = 2.5 cm
Area = Base × Height = 2.5 × 3.5
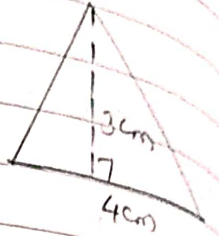= 8.75 cm²

(d) Height = 4.8 cm
Base = 5 cm
Area = Base × Height
= 5 × 4.8
= 24 cm²

(e) Height = 4.4 cm
Base = 2 cm
Area = Base × height
= 2 × 4.4
= 8.8 cm²

Q2. Find the area of each of the following triangles:

(a) Base of triangle = 4 cm

Height of triangle = 3 cm

Area = ½ × base × height

= ½ × 4 × 3

= 6 cm²

(b) Base = 5 cm

Height = 3.2 cm

Area = ½ × base × height

= ½ × 5 × 3.2
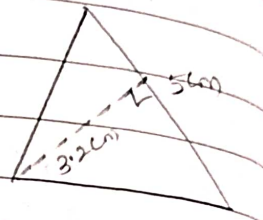
= 8 cm²

(c) Base = 3 cm

Height = 4 cm

Area = ½ × Base × Height

= ½ × 3 × 4
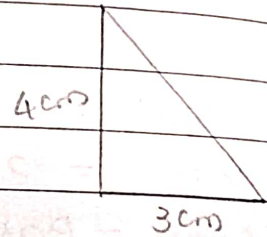
= 6 cm²

(d) Base = 3 cm

Height = 2 cm

Area = ½ × Base × Height

= ½ × 3 × 2

= 3 cm²
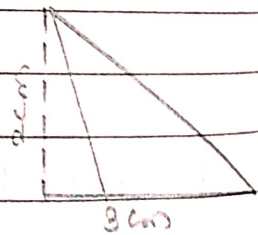
Q3. Find the missing values:

S.NO	Base	Height	Area of parallelogram
a	20 cm		246 cm²
b		15 cm	154.5 cm²
c		8.4 cm	48.72 cm²
d	15.6 cm		16.38 cm²

(a) Base $= 20$ cm

Area $= 246$ cm^2

Height $= ?$

Area $=$ Base $\times$ Height

$246 = 20 \times$ Height

$\dfrac{246}{20} =$ Height

$$\boxed{H = 12 \cdot 3 \text{ cm}}$$

(b) Height $= 15$ cm

Area $= 154 \cdot 5$ cm^2

Base $= ?$

Area $=$ Base $\times$ Height

$154 \cdot 5 =$ Base $\times 15$

$\dfrac{154 \cdot 5}{15} =$ Base

$$\boxed{\text{Base} = 10 \cdot 3 \text{ cm}}$$

(c) Height $= 8 \cdot 4$ cm

Area $= 48 \cdot 72$ cm^2

Base $= ?$

Area $=$ Base $\times$ Height

$48 \cdot 72 =$ Base $\times 8 \cdot 4$

$\dfrac{48 \cdot 72}{8 \cdot 4} =$ Base

$$\boxed{\text{Base} = 5 \cdot 8 \text{ cm}}$$

(d) Base $= 15 \cdot 6$ cm

Area $= 16 \cdot 38$ cm

Height $= ?$

Area $=$ Base $\times$ Height

$16 \cdot 38 = 15 \cdot 6 \times$ Height

$\dfrac{16 \cdot 38}{15 \cdot 6} =$ Height

$$\boxed{\text{Height} = 1 \cdot 05 \text{ cm}}$$

Q4. Find the missing 🔯 Values:

Base	Height	Area of Triangle
		87 cm²
15 cm		
	31.4 mm	1256 ᵃmm²
		170.5 cm²
22 cm		

a) Base = 15 cm

Area = 87 cm²

Height = ?

$Area = \frac{1}{2} \times b \times h$

$87 = \frac{1}{2} \times 15 \times h$

$h = \frac{87 \times 2}{15}$

$\boxed{h = 11.6 \text{ cm}}$

b) Height = 31.4 cm

Area = 1256 cm²

Base = ?

$Area = \frac{1}{2} \times b \times h$

$1256 = \frac{1}{2} \times b \times 31.4$

$b = \frac{1256 \times 2}{31.4}$

$\boxed{b = 80 \text{ mm} = 8 \text{ cm}}$

c) Base = 22 cm

Area = 170.5 cm²

Height = ?

$$Area = \frac{1}{2} \times b \times h$$

$$170.5 = \frac{1}{2} \times 22 \times h$$

$$h = \frac{170.5 \times 2}{22}$$

$$\boxed{h = 15.5 \text{ cm}}$$

Q5. PQRS is a parallelogram. QM is the height from Q to SR & QN is the height from Q to PS. If SR = 12 cm & QM = 7.6 cm. Find:

(a) The area of the parallelogram PQRS.

(b) QN, if PS = 8 cm.

→ Given : SR = 12 cm, QM = 7.6 cm

(a) Area of Parallelogram
= Base × Height
= 12 × 7.6

$$\boxed{A = 91.2 \text{ cm}^2}$$
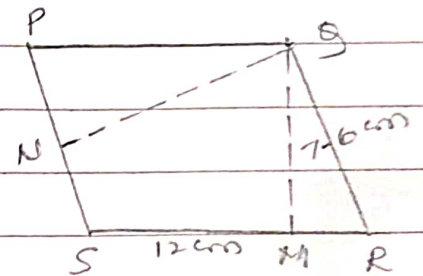
(b) Area of parallelogram = PS × QN

$$91.2 = 8 \times QN$$

$$QN = \frac{91.2}{8}$$

$$\boxed{QN = 11.4 \text{ cm}}$$

Q6. DL & BM are the heights on sides AB & AD resp. of parallelogram ABCD. If the area of the parallelogram is 1470 cm². AB = 35 cm. & AD = 49 cm. Find the length of BM & DL

Given :

Area of parallelogram $= 1470 \text{cm}^2$

$AB = 35 \text{ cm}$

$AD = 49 \text{ cm}$.

WKT. Area of Parallelogram = Base × Height

$$1470 = AB \times DL$$
$$1470 = 35 \times DL$$
$$DL = \frac{1470}{35}$$

$$\boxed{DL = 42 \text{cm}}$$

Area of Parallelogram = Base × Height

$$1470 = AD \times BM$$
$$1470 = 49 \times BM$$
$$BM = \frac{1470}{49}$$

$$\boxed{BM = 30 \text{ cm}}$$

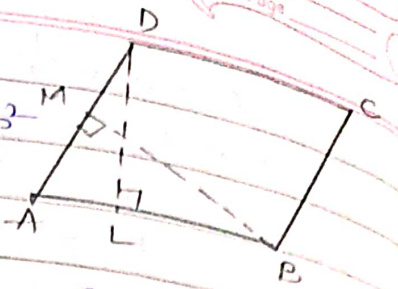Q7. $\triangle ABC$ is right angled at A. AD is perpendicular to BC. If $AB = 5 \text{ cm}$, $BC = 13 \text{cm}$ $AC = 12 \text{ cm}$. Find the area of $\triangle ABC$. Also find the length of AD.

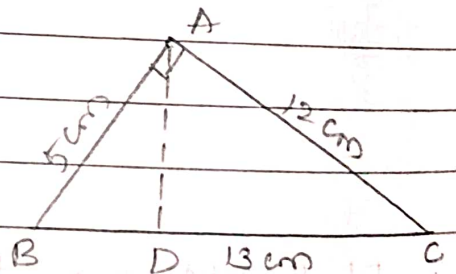→ Given :

$AB = 5 \text{ cm}$, $BC = 13 \text{ cm}$,
$AC = 12 \text{ cm}$.

Area of $\triangle^{le}$ $ABC = \frac{1}{2} \times b \times h$

$$= \frac{1}{2} \times AB \times AC$$

$$= \frac{1}{2} \times 5 \times 12$$

$$\boxed{A = 30 \text{ cm}^2}$$

Area of $\triangle^{le}$ ABC $= \frac{1}{2} \times$ base $\times$ height

$$30 = \frac{1}{2} \times AD \times 13$$

$$AD = \frac{30 \times 2}{13}$$

$$\boxed{AD = 4 \cdot 6 \text{ cm}}$$

Q5. $\triangle$ ABC is isosceles with AB = AC = 7.5 cm & BC = 9 cm. The height AD from A to BC is 6 cm. Find the area of $\triangle$ ABC. What will be the height from C to AB. ie, CE?

→ Given: AB = AC = 7.5 cm.

BC = 9 cm.   AD = 6 cm.

Area of $\triangle^{le}$ ABC $= \frac{1}{2} \times b \times h$

$$= \frac{1}{2} \times BC \times AD$$

$$= \frac{1}{2} \times 9 \times 6$$

$$\boxed{A = 27 \text{ cm}^2}$$
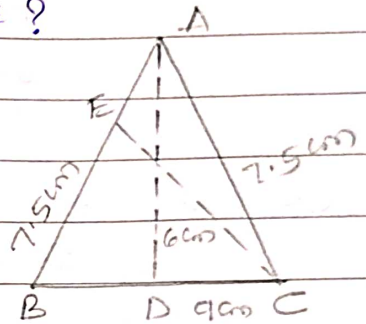

Area of $\triangle^{le}$ ABC $= \frac{1}{2} \times b \times h$

$$27 = \frac{1}{2} \times AB \times CE$$

$$27 = \frac{1}{2} \times 7.5 \times CE$$

$$CE = \frac{27 \times 2}{7.5}$$

$$\boxed{CE = 7.2 \text{ cm}}$$

Exercise 11.3

Q1. Find the circumference of the circles with the following radius. [Take $\pi = 22/7$]

(a) 14 cm

$R = 14$ cm

$C = 2\pi r$

$= 2 \times \dfrac{22}{7} \times \overset{2}{14} = 88$ cm.

(b) 28 mm

$r = 28$ mm

$C = 2\pi r$

$= 2 \times \dfrac{22}{7} \times \overset{4}{28} = 176$ mm

(c) 21 cm

$r = 21$ cm

$C = 2\pi r$

$= 2 \times \dfrac{22}{7} \times \overset{3}{21} = 132$ cm.

Q2. Find the area of the following circles, given that

(a) radius $= 14$ mm

Area of circle $= \pi r^2$

$= \dfrac{22}{7} \times 14 \times \overset{2}{14}$

$= 616$ mm^2

(b) diameter $= 49$ m

radius $= d/2 = 49/2$

Area of circle $= \pi r^2$

$= \dfrac{\overset{11}{22}}{\underset{1}{7}} \times \dfrac{49}{\underset{2}{}} \times \dfrac{\overset{7}{49}}{2} = 1886.5$ m^2

(c) radius = 5 cm

Area of circle = πr^2

$$= \frac{22}{7} \times 25$$

$$= \frac{550}{7} = 78.57 \text{ cm}^2$$

Q3. If the circumference of a circular sheet is 154 m. Find its radius. Also find the area of the sheet.

→ Circumference = 154 m.

Circumference = $2\pi r$

$$154 = 2 \times \frac{22}{7} \times r$$

$$r = \frac{154 \times 7}{2 \times 22}$$

$$r = \frac{49}{2}$$

$$r = 24.5 \text{ m}$$

Area of circle = πr^2

$$= \frac{22}{7} \times (24.5)^2$$
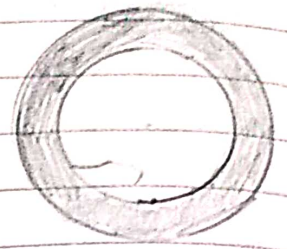
$$= \frac{22}{7} \times 600.25$$

(85.75)

$$= 1886.5 \text{ m}^2$$

∴ Radius of circle is 24.5 m & Area is 1886.5 m².

Q4. A gardener wants to fence a circular garden of diameter 21 m. Find the length of the rope he needs to purchase, if he makes 2 rounds of fence. Also find the cost

of the rope, if it costs ₹4 per meter.

→ Diameter of the garden = 21 m

$$r = \frac{d}{2} = \frac{21}{2} = 10.5 m$$

Circumference of circle $= 2\pi r$

$$= 2 \times \frac{22}{7} \times 10.5$$

$$= \frac{462}{7} = 66 m$$

Length of the rope required $= 2 \times 66 = 132 m$

Cost of 1 m rope $= ₹4$

Cost of 132 m rope $= ₹4 \times 132 = ₹528.$

Q5. From a circular sheet of radius 4 cm, a circle of radius 3 cm is removed. Find the area of the remaining sheet.

→ Radius of the circular sheet (R) = 4 cm.

A circle of radius to be removed (r) = 3 cm.

Area of the remaining sheet

$$= \pi R^2 - \pi r^2$$
$$= \pi (R^2 - r^2)$$
$$= 3.14 (4^2 - 3^2)$$
$$= 3.14 (16 - 9)$$
$$= 3.14 \times 7$$
$$= 21.98 \, cm^2.$$

∴ Area of the remaining sheet is $21.98 \, cm^2$.

Q6. Saima wants to put a lace on the edge of a circular table cover of diameter 1.5 m. Find the length of the lace required & also find its cost if one meter of the sheet

lace costs ₹ 15. (Take $\pi = 3.14$)

Diameter of the circular table = 1.5 m.

$r = \dfrac{d}{2} = \dfrac{1.5}{2} = 0.75\,m.$

circumference of the circle = $2\pi r$

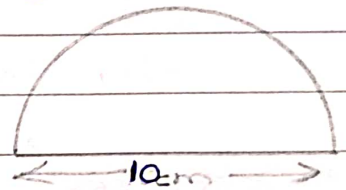$= 2 \times 3.14 \times 0.75$

$= 4.71\,m.$

Lengths of lace = 4.71 m.

cost of 1m lace = ₹ 15.

cost of 4.71m lace = ₹15 × 4.71m = ₹ 70.65.

Q7. Find the perimeter of the adjoining figure, which is a semicircle including its diameter.

→ Diameter of semi-circle = 10 cm.

$r = \dfrac{d}{2} = \dfrac{10}{2} = 5\,cm.$

← 10cm →

Circumference of Semi – circle

$= \pi r = \dfrac{22}{7} \times 5 = \dfrac{110}{7} = 15.71\,cm.$

Perimeter of the given fig =

Circumference of semi-circle + semi-circle diameter

$= 15.71 + 10$

$= 25.71\,cm.$

Q8. Find the cost of polishing a circular table-top of diameter 1.6m. If the rate of polishing is ₹15/m². (Take $\pi = 3.14$)

→ Diameter of table-top = 1.6m

$r = \dfrac{d}{2} = \dfrac{1.6}{2} = 0.8\,m.$

Area of the circular $\underset{\wedge}{\text{top}}^{\text{table}} = \pi r^2$

$= 3.14 \times 0.8 \times 0.8$ $= 22$

$= 2.0096 \, m^2$.

Cost for polishing $1m^2$ area $= ₹15$.

Cost for polishing $2.0096m^2 =$

$₹15 \times 2.0096$

$= 230.144$.

Q9. Shazli took of wire of length 44 cm & bent it into the shape of a circle. Find the radius of that circle. Also find its area. If the same wire is bent into the shape of a square, what will be the length of each of its sides? Which figure encloses more area, the circle on the square? (Take $\pi = 22/7$)

$\longrightarrow$ Length of wire $= 44$ cm

circumference of the circle $= 2\pi r$

$44 = 2 \times \dfrac{22}{7} \times r$

$r = \dfrac{44 \times 7}{2 \times 22}$

$r = 7 \, cm$.

Area of circle $= \pi r^2$

$= \dfrac{22}{7} \times 7 \times 7$

$= 154 \, cm^2$.

If the wire is bent into a square.

The length of the each side of square $= \dfrac{44}{4} = 11 \, cm$

Area of square = length of the side of square^2
$$= 11^2 = 121 \, cm^2$$

By comparing the two areas of the square & circle, Clearly, circle encloses more area.

Q10. From a circular card sheet of radius 14 cm, two circles of radius 3.5 cm & a rectangle of length 3 cm & breadth 1 cm are removed. (Take $\pi = 22/7$)

→ Radius of the circular card sheet = 14 cm
Radius of the two small circle = 3.5 cm
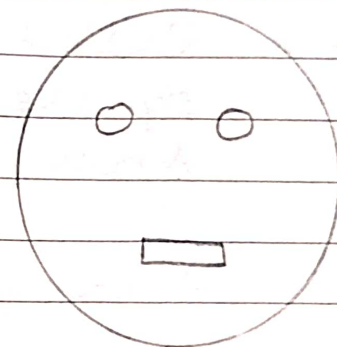Length of the rectangle = 3 cm
Breadth of the rectangle = 1 cm
Area of the circular card Sheet = πr^2

$$= \frac{22}{7} \times 14^2$$

$$= \frac{22}{7_1} \times \overset{2}{\cancel{14}} \times 14$$

$$= 616 \, cm^2$$

Area of 2 small circles $= 2 \times \pi r^2$

$$= 2 \times \left[\frac{22}{7} \times (3.5)^2 \right]$$

$$= 2 \times \frac{22}{7_1} \times \overset{0.5}{\cancel{(3.5)}} \times (3.5)$$

$$= 77 \, cm^2$$

Area of rectangle = length × breadth
$$= 3 \times 1$$
$$= 3 \, cm^2$$

Area of the remaining part =
Card sheet area − (area of two small circles
+ rectangle area)

$$= 616 - (77 + 3)$$
$$= 616 - 80$$
$$= 536 \ cm^2$$

Q11. A circle of radius 2 cm is cut out from a square piece of an aluminium Sheet of side 6 cm. What is the area of the left over aluminium Sheet ? (Take $\pi = 3.14$)

→ Radius of circle = 2 cm
Square sheet side = 6 cm
Area of square = $(Side)^2$
$$= 6^2 = 36 \ cm^2$$
Area of circle = πr^2
$$= 3.14 \times 2^2$$
$$= 3.14 \times 4$$
$$= 12.56 \ cm^2$$

Area of the remaining part =
Area of aluminium square sheet −
area of circle
$$= 36 - 12.56$$
$$= 23.44 \ cm^2$$

Q12. The circumference of a circle is 31.4. Find the radius & the area of the circle ? (Take $\pi = 3.14$)

→ circumference of a circle = 31.4 cm
circumference of a circle = $2\pi r$

$$31.4 = 2 \times 3.14 \times r$$

$$\frac{31.4}{6.28} = r$$

$$r = 5 \ cm$$

Area of circle $= \pi r^2$

$$= 3.14 \times 25$$

$$= 78.5 \ cm^2.$$

Q3. A circular flower bed is surrounded by a path 4 m wide. The diameter of the flower bed is 66 m. What is the area of this path? ($\pi = 3.14$)

→ Diameter of flower bed $= 66m$

Radius of flower bed $= \dfrac{66}{2} = 33 m$
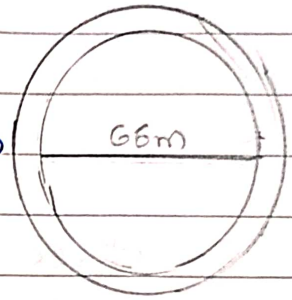

Area of flower bed

$= \pi r^2$

$$= 3.14 \times (33)^2 =$$

$$= 3.14 \times 1089$$

$$= 3419.46 \ m^2$$

Radius of flower bed & path together

$$= 33 + 4 = 37 \ m.$$

Area of the flower bed & path together

$= \pi r^2$

$$= 3.14 \times (37)^2$$

$$= 3.14 \times 1369$$

$$= 4298.66 \ m$$

Area of the path = Area of the flower bed & path together - Area of flower bed

$$= 4298.66 - 3419.46$$

$$= 879.20 \ m^2$$

Q14. A circular flower garden has an area of 314 m². A sprinkler at the centre of the garden can cover an area that has a radius of 12m. Will the sprinkler water the entire garden? (Take $\pi = 3.14$)

→ Area of circular flower garden = 314 m²
Sprinkler at the centre of the garden can cover an area that has a radius = 12m.

Area of circular garden = πr^2

$$314 = 3.14 \times r^2$$

$$\frac{314}{3.14} = r^2$$

$$r^2 = 100$$

$$r = \sqrt{100}$$

$$r = 10\ m$$

Since, the sprinkler can cover an area of radius 12m.

Hence, the sprinkler will water the whole garden.

Q15. Find the circumference of the inner & the outer circles, shown in the adjoining fig. (Take $\pi = 3.14$)

→ Radius of inner circle =
radius of outer circle – 10
= 19 – 10 = 9 m

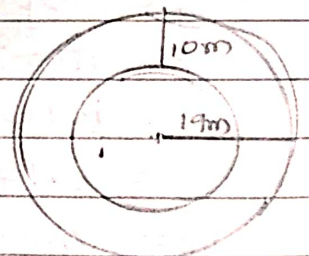Circumference of inner circle
= $2\pi r$
= $2 \times 3.14 \times 9$ = 56.52 m.

Circumference of outer circle
= $2\pi r$
= $2 \times 3.14 \times 19$ = 119.32 m.

Q16. How many times a wheel of radius 28 cm must rotate to go 352 m? (Take $\pi = 22/7$)

→ Radius of wheel = 28 cm.

circumference of wheel = $2\pi r$

$$= 2 \times \frac{22}{7} \times 28^{\,4}$$

$$= 176 cm$$

No. of rotation of the wheel =

$$= \frac{\text{Total distance to be covered}}{\text{circumference of wheel}}$$

$$= \frac{352 \, m}{176 \, cm}$$

$$= \frac{35200 \, cm}{176 \, cm}$$

$$= 200$$

Q17. The minute hand of a circular clock is 15 cm long. How far does the tip of the minute hand move in 1 hour. (Take $\pi = 3.14$)

→ Given:

Length of the minute hand of the circular clock = 15 cm.

Distance travelled by the tip of minute hand in 1 hour = circumference of the clock

$$= 2\pi r$$

$$= 2 \times 3.14 \times 15$$

$$= 94.2 \, cm.$$