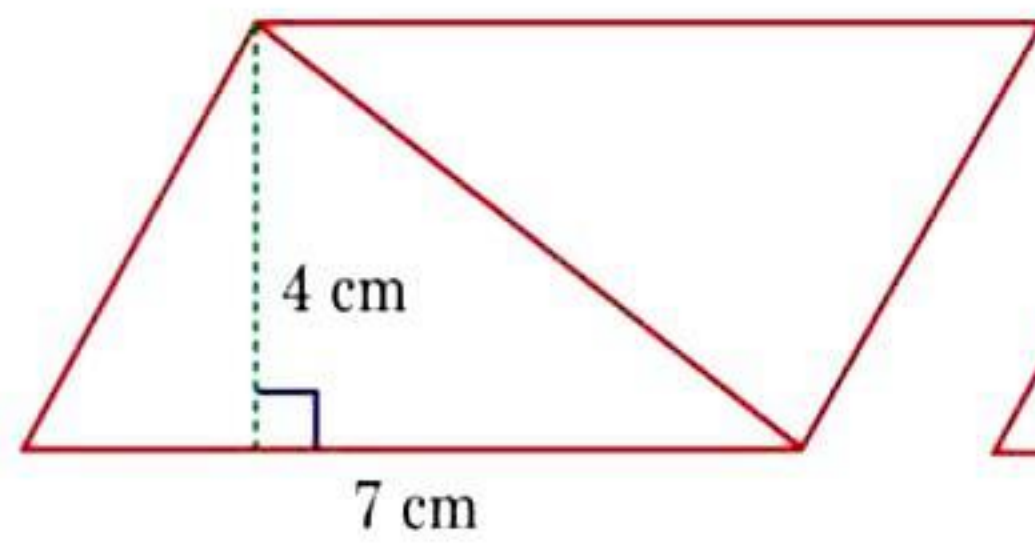


Mathematics

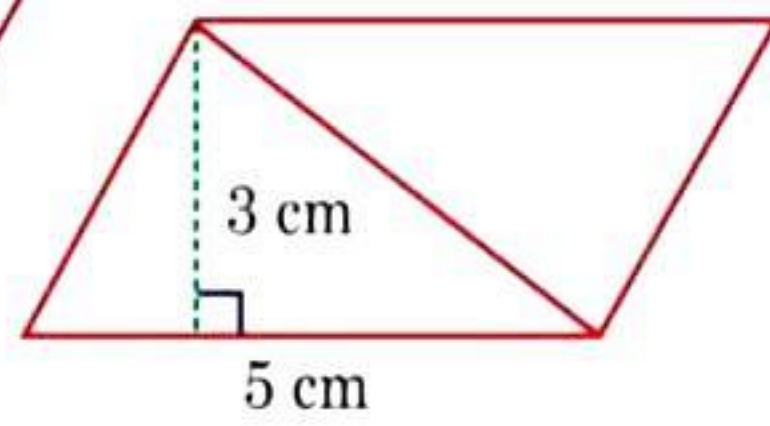
(Chapter - 9) (Perimeter and Area) (Exercise 9.1) (Class - VII)

Question 1:

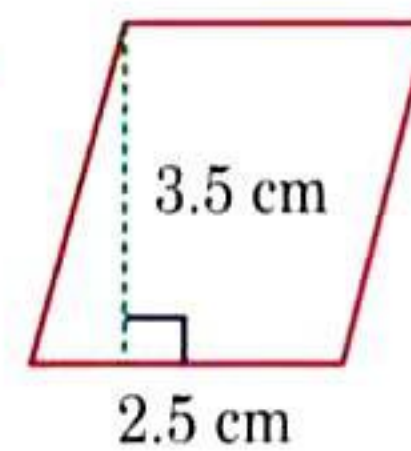
Find the area of each of the following parallelograms:



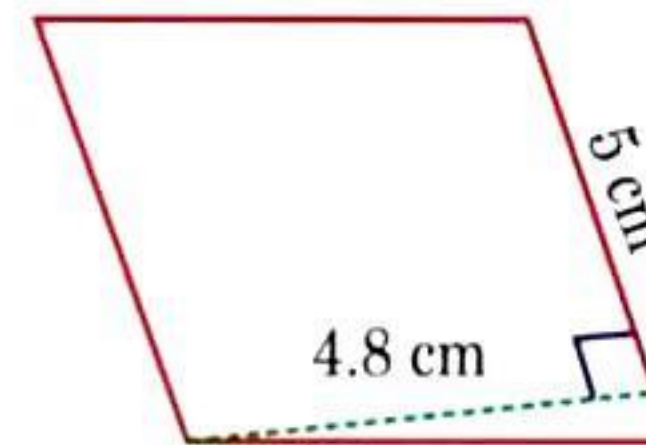
(a)



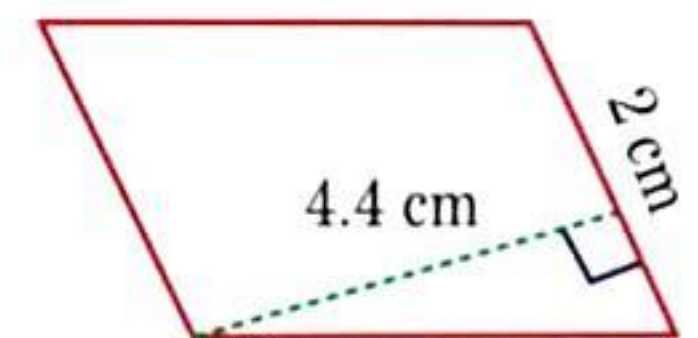
(b)



(c)



(d)



(e)

Answer 1:

We know that the area of parallelogram = base x height

(a) Here base = 7 cm and height = 4 cm

$$\therefore \text{Area of parallelogram} = 7 \times 4 = 28 \text{ cm}^2$$

(b) Here base = 5 cm and height = 3 cm

$$\therefore \text{Area of parallelogram} = 5 \times 3 = 15 \text{ cm}^2$$

(c) Here base = 2.5 cm and height = 3.5 cm

$$\therefore \text{Area of parallelogram} = 2.5 \times 3.5 = 8.75 \text{ cm}^2$$

(d) Here base = 5 cm and height = 4.8 cm

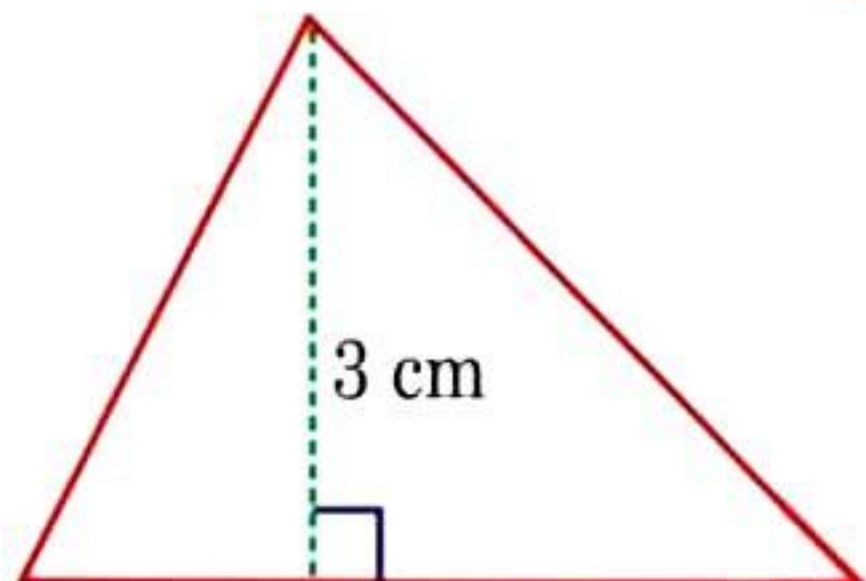
$$\therefore \text{Area of parallelogram} = 5 \times 4.8 = 24 \text{ cm}^2$$

(e) Here base = 2 cm and height = 4.4 cm

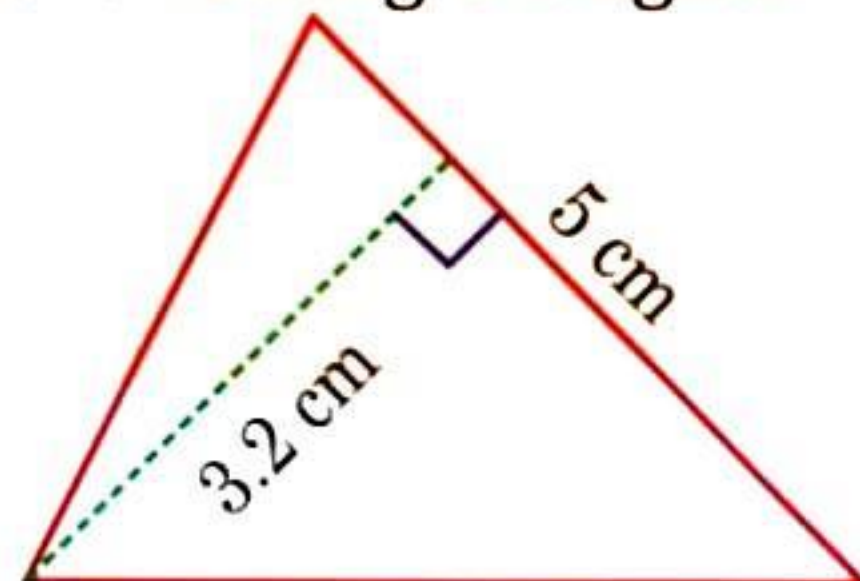
$$\therefore \text{Area of parallelogram} = 2 \times 4.4 = 8.8 \text{ cm}^2$$

Question 2:

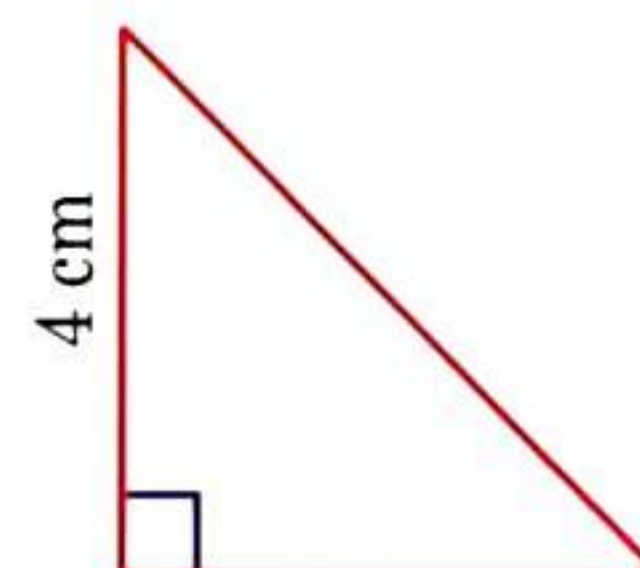
Find the area of each of the following triangles:



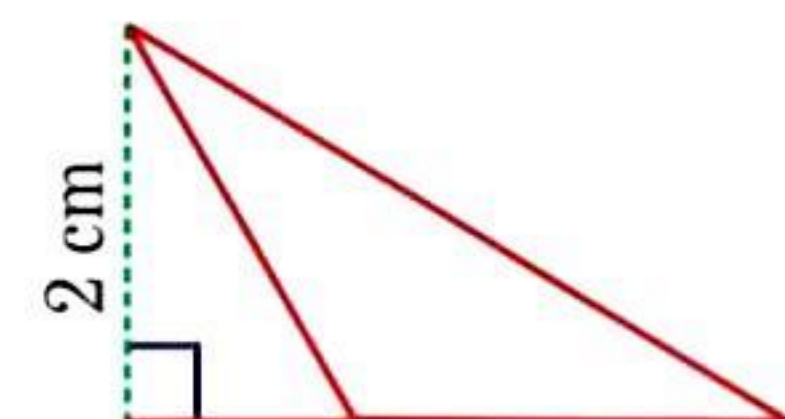
(a)



(b)



(c)



(d)

Answer 2:

We know that the area of triangle = $\frac{1}{2}$ x base x height

(a) Here, base = 4 cm and height = 3 cm

$$\therefore \text{Area of triangle} = \frac{1}{2} \times 4 \times 3 = 6 \text{ cm}^2$$

(b) Here, base = 5 cm and height = 3.2 cm

$$\therefore \text{Area of triangle} = \frac{1}{2} \times 5 \times 3.2 = 8 \text{ cm}^2$$

(c) Here, base = 3 cm and height = 4 cm

$$\therefore \text{Area of triangle} = \frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$$

(d) Here, base = 3 cm and height = 2 cm

$$\therefore \text{Area of triangle} = \frac{1}{2} \times 3 \times 2 = 3 \text{ cm}^2$$

Question 3:

Find the missing values:

S. No.	Base	Height	Area of the parallelogram
a.	20 cm		246 cm ²
b.		15 cm	154.5 cm ²
c.		84 cm	48.72 cm ²
d.	15.6 cm		16.38 cm ²

Answer 3:

We know that the area of parallelogram = base x height

(a) Here, base = 20 cm and area = 246 cm²

$$\therefore \text{Area of parallelogram} = \text{base} \times \text{height}$$

$$\Rightarrow 246 = 20 \times \text{height}$$

$$\Rightarrow \text{height} = \frac{246}{20} = 12.3 \text{ cm}$$

(b) Here, height = 15 cm and area = 154.5 cm²

$$\therefore \text{Area of parallelogram} = \text{base} \times \text{height}$$

$$\Rightarrow 154.5 = \text{base} \times 15$$

$$\Rightarrow \text{base} = \frac{154.5}{15} = 10.3 \text{ cm}$$

(c) Here, height = 8.4 cm and area = 48.72 cm²

$$\therefore \text{Area of parallelogram} = \text{base} \times \text{height}$$

$$\Rightarrow 48.72 = \text{base} \times 8.4$$

$$\Rightarrow \text{base} = \frac{48.72}{8.4} = 5.8 \text{ cm}$$

(d) Here, base = 15.6 cm and area = 16.38 cm²

$$\therefore \text{Area of parallelogram} = \text{base} \times \text{height}$$

$$\Rightarrow 16.38 = 15.6 \times \text{height}$$

$$\Rightarrow \text{height} = \frac{16.38}{15.6} = 1.05 \text{ cm}$$

Thus, the missing values are:

S. No.	Base	Height	Area of the parallelogram
a.	20 cm	12.3 cm	246 cm ²
b.	10.3 cm	15 cm	154.5 cm ²
c.	5.8 cm	84 cm	48.72 cm ²
d.	15.6 cm	1.05	16.38 cm ²

Question 4:

Find the missing values:

Base	Height	Area of triangle
15 cm	-----	87 cm ²
-----	31.4 mm	1256 mm ²
22 cm	-----	170.5 cm ²

Answer 4:

We know that the area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

In first row, base = 15 cm and area = 87 cm²

$$\therefore 87 = \frac{1}{2} \times 15 \times \text{height}$$

$$\Rightarrow \text{height} = \frac{87 \times 2}{15} = 11.6 \text{ cm}$$

In second row, height = 31.4 mm and area = 1256 mm²

$$\therefore 1256 = \frac{1}{2} \times \text{base} \times 31.4$$

$$\Rightarrow \text{base} = \frac{1256 \times 2}{31.4} = 80 \text{ mm}$$

In third row, base = 22 cm and area = 170.5 cm²

$$\therefore 170.5 = \frac{1}{2} \times 22 \times \text{height}$$

$$\Rightarrow \text{height} = \frac{170.5 \times 2}{22} = 15.5 \text{ cm}$$

Thus, the missing values are:

Base	Height	Area of triangle
15 cm	11.6 cm	87 cm ²
80 mm	31.4 mm	1256 mm ²
22 cm	15.5 cm	170.5 cm ²

Question 5:

PQRS is a parallelogram (see figure). QM is the height from Q to SR and QN is the height from Q to PS. If SR = 12 cm and QM = 7.6 cm. Find:

(a) the area of the parallelogram PQRS

(b) QN, if PS = 8 cm

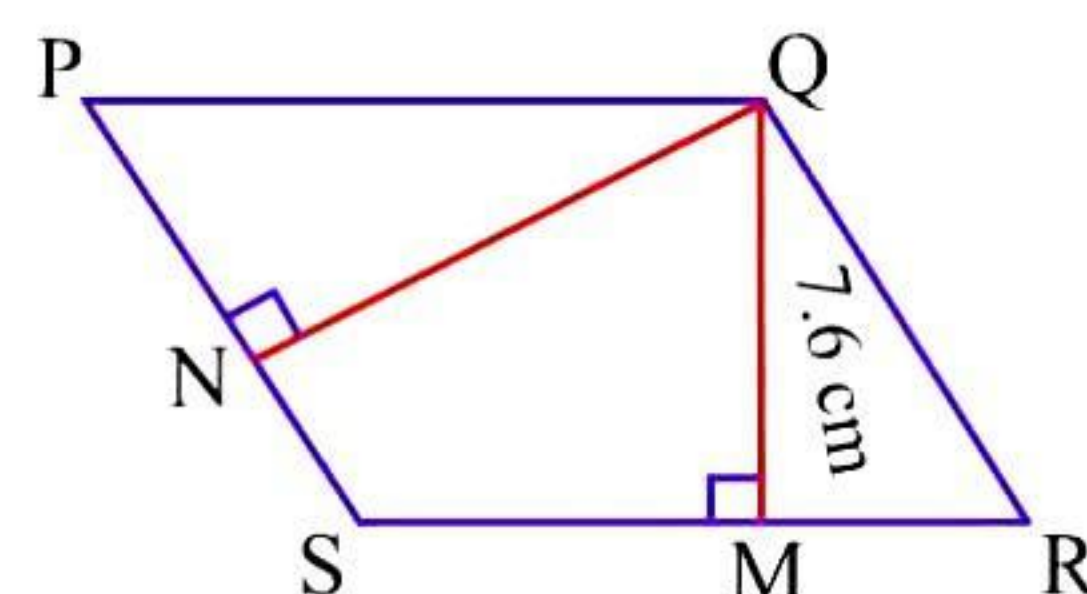
Answer 5:

Given: SR = 12 cm, QM = 7.6 cm, PS = 8 cm.

(a) Area of parallelogram = base \times height = 12 \times 7.6 = 91.2 cm²

(b) Area of parallelogram = base \times height

$$\Rightarrow 91.2 = 8 \times \text{QN} \quad \Rightarrow \quad \text{QN} = \frac{91.2}{8} = 11.4 \text{ cm}$$



Question 6:

DL and BM are the heights on sides AB and AD respectively of parallelogram ABCD (see figure). If the area of the parallelogram is 1470 cm^2 , $AB = 35 \text{ cm}$ and $AD = 49 \text{ cm}$, find the length of BM and DL.

Answer 6:

Given: Area of parallelogram = 1470 cm^2
Base (AB) = 35 cm and base (AD) = 49 cm

Since Area of parallelogram = base \times height

$$\Rightarrow 1470 = 35 \times DL$$

$$\Rightarrow DL = \frac{1470}{35}$$

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

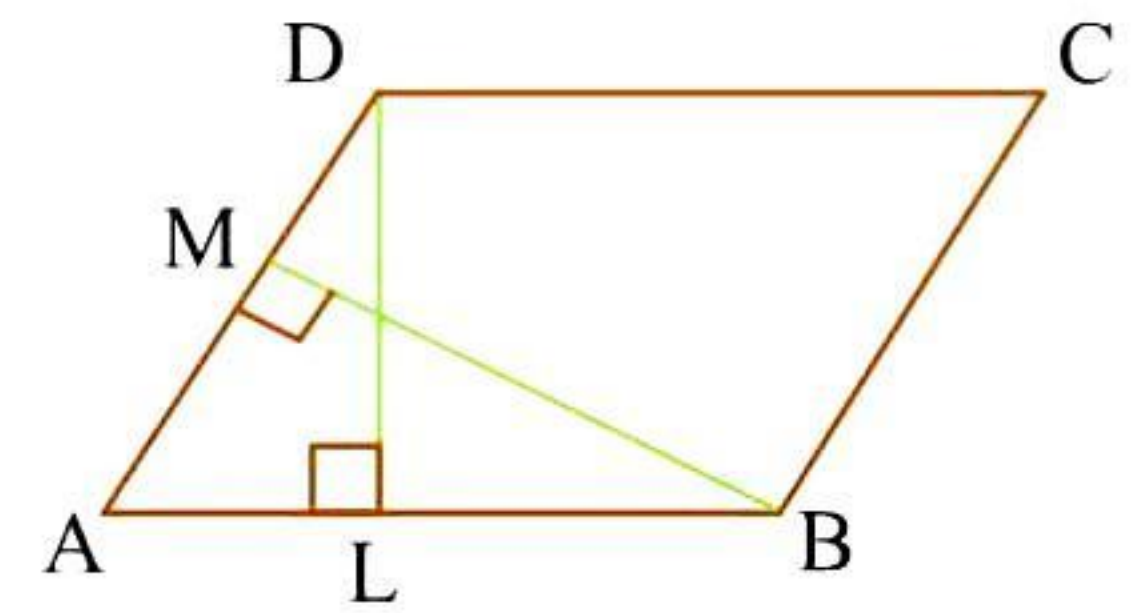
Again, Area of parallelogram = base \times height

$$\Rightarrow 1470 = 49 \times BM$$

$$\Rightarrow BM = \frac{1470}{49}$$

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

Thus, the lengths of DL and BM are 42 cm and 30 cm respectively.

**Question 7:**

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

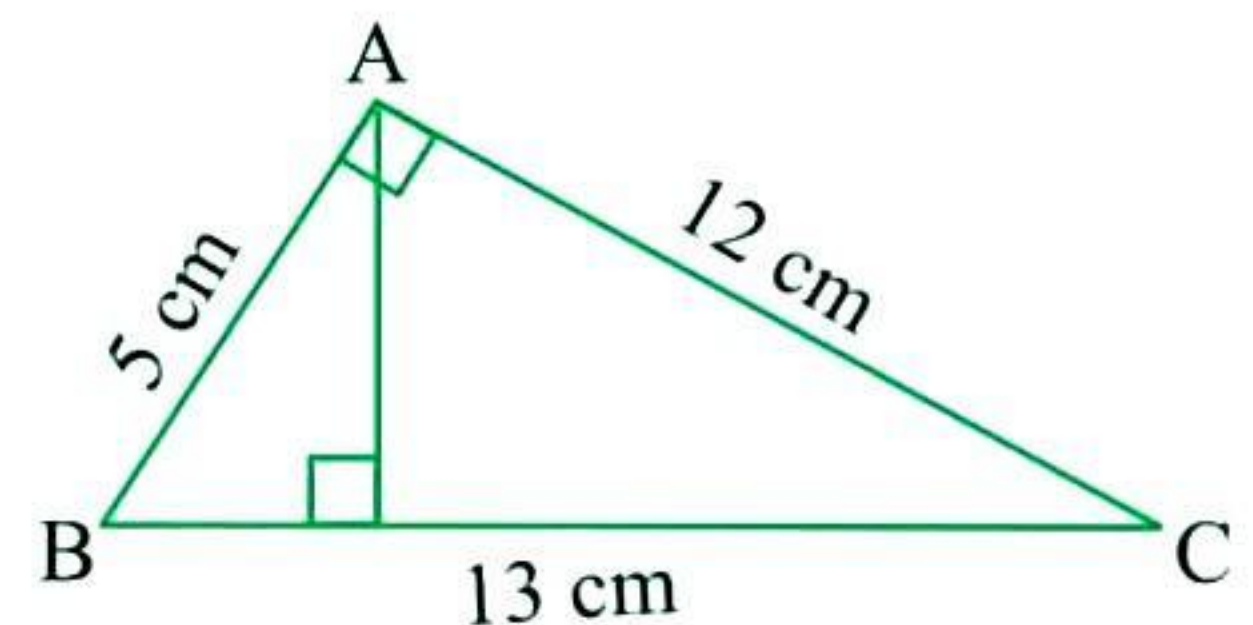
Answer 7:

In right angles triangle BAC, $AB = 5 \text{ cm}$ and $AC = 12 \text{ cm}$

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times AB \times AC \\ &= \frac{1}{2} \times 5 \times 12 = 30 \text{ cm}^2 \end{aligned}$$

Now, in $\triangle ABC$, area of triangle $ABC = \frac{1}{2} \times BC \times AD$

$$\Rightarrow 30 = \frac{1}{2} \times 13 \times AD \Rightarrow AD = \frac{30 \times 2}{13} = \frac{60}{13} \text{ cm}$$

**Question 8:**

$\triangle ABC$ is isosceles with $AB = AC = 7.5 \text{ cm}$ and $BC = 9 \text{ cm}$ (see figure). 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 i.e., CE?

Answer 8:

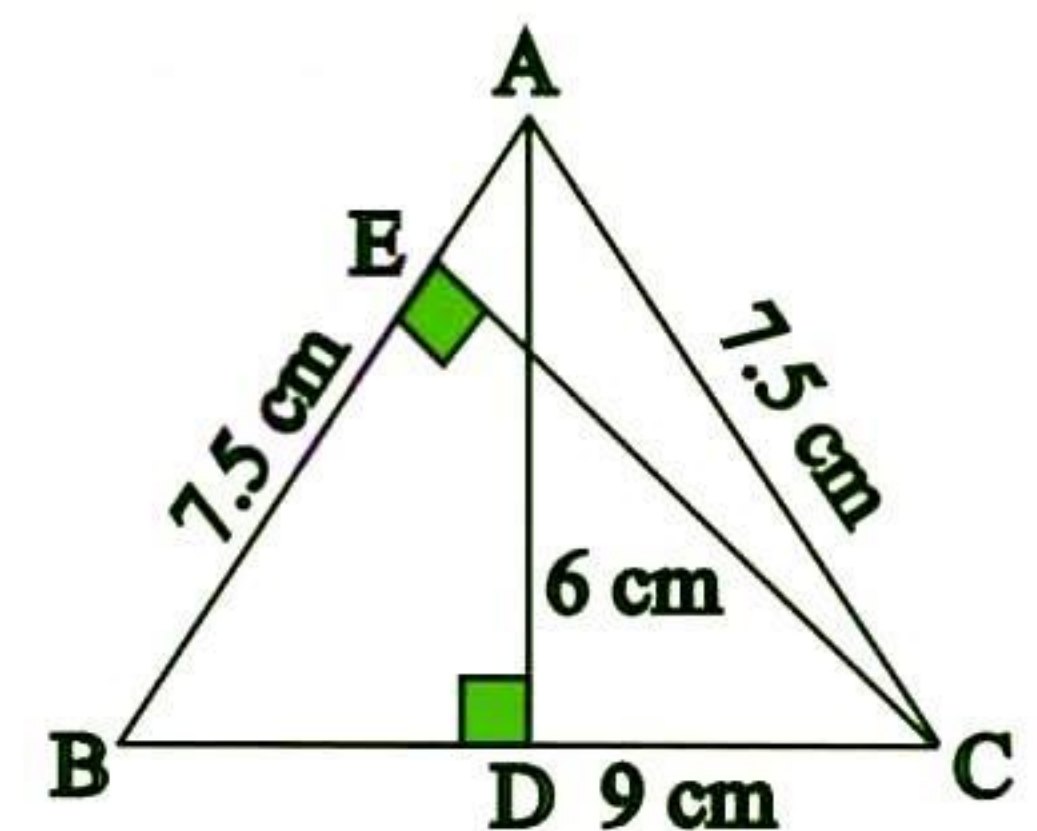
In $\triangle ABC$, $AD = 6 \text{ cm}$ and $BC = 9 \text{ cm}$

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times BC \times AD \\ &= \frac{1}{2} \times 9 \times 6 = 27 \text{ cm}^2 \end{aligned}$$

Again, Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times AB \times CE$

$$\Rightarrow 27 = \frac{1}{2} \times 7.5 \times CE \Rightarrow CE = \frac{27 \times 2}{7.5} \Rightarrow CE = 7.2 \text{ cm}$$

Thus, height from C to AB i.e., CE is 7.2 cm .



Mathematics

(Chapter - 9) (Perimeter and Area) (Exercise 9.2) (Class - VII)

Question 1:

Find the circumference of the circles with the following radius: $\left(\text{Take } \pi = \frac{22}{7}\right)$

- (a) 14 cm
- (b) 28 mm
- (c) 21 cm

Answer 1:

- (a) Circumference of the circle = $2\pi r = 2 \times \frac{22}{7} \times 14 = 88$ cm
- (b) Circumference of the circle = $2\pi r = 2 \times \frac{22}{7} \times 28 = 176$ mm
- (c) Circumference of the circle = $2\pi r = 2 \times \frac{22}{7} \times 21 = 132$ cm

Question 2:

Find the area of the following circles, given that: $\left(\text{Take } \pi = \frac{22}{7}\right)$

- (a) radius = 14 mm
- (b) diameter = 49 m
- (c) radius 5 cm

Answer 2:

- (a) Area of circle = $\pi r^2 = \frac{22}{7} \times 14 \times 14 = 22 \times 2 \times 14 = 616$ mm²
- (b) Diameter = 49 m
 \therefore Radius = $\frac{49}{2} = 24.5$ m
 \therefore Area of circle = $\pi r^2 = \frac{22}{7} \times 24.5 \times 24.5 = 22 \times 3.5 \times 24.5 = 1886.5$ m²
- (c) Area of circle = $\pi r^2 = \frac{22}{7} \times 5 \times 5 = \frac{550}{7}$ cm²

Question 3:

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

$\left(\text{Take } \pi = \frac{22}{7}\right)$

Answer 3:

Circumference of the circular sheet = 154 m

$$\Rightarrow 2\pi r = 154 \text{ m}$$

$$\Rightarrow r = \frac{154}{2\pi}$$

$$\Rightarrow r = \frac{154 \times 7}{2 \times 22} = 24.5 \text{ m}$$

$$\text{Now Area of circular sheet} = \pi r^2 = \frac{22}{7} \times 24.5 \times 24.5 = 22 \times 3.5 \times 24.5 = 1886.5 \text{ m}^2$$

Thus, the radius and area of circular sheet are 24.5 m and 1886.5 m² respectively.

Question 4:

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

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

Answer 4:

Diameter of the circular garden = 21 m

$$\therefore \text{Radius of the circular garden} = \frac{21}{2} \text{ m}$$

$$\text{Now Circumference of circular garden} = 2\pi r = 2 \times \frac{22}{7} \times \frac{21}{2} = 22 \times 3 = 66 \text{ m}$$

The gardener makes 2 rounds of fence so the total length of the rope of fencing
 $= 2 \times 2\pi r = 2 \times 66 = 132 \text{ m}$

Since, the cost of 1 meter rope = ₹ 4

Therefore, cost of 132 meter rope = $4 \times 132 = ₹ 528$

Question 5:

From a circular sheet of radius 4 cm, a circle of radius 3 cm is removed. Find the area of the remaining sheet. (Take $\pi = 3.14$)

Answer 5:

Radius of circular sheet (R) = 4 cm and

Radius of removed circle (r) = 3 cm

Area of remaining sheet = Area of circular sheet – Area of removed circle

$$= \pi R^2 - \pi r^2 = \pi (R^2 - r^2)$$

$$= \pi (4^2 - 3^2) = \pi (16 - 9)$$

$$= 3.14 \times 7 = 21.98 \text{ cm}^2$$

Thus, the area of remaining sheet is 21.98 cm^2 .

Question 6:

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 and also find its cost if one meter of the lace costs ₹15. (Take $\pi = 3.14$)

Answer 6:

Diameter of the circular table cover = 1.5 m

$$\therefore \text{Radius of the circular table cover} = \frac{1.5}{2} \text{ m}$$

$$\text{Circumference of circular table cover} = 2\pi r = 2 \times 3.14 \times \frac{1.5}{2} = 4.71 \text{ m}$$

Therefore the length of required lace is 4.71 m.

Now the cost of 1 m lace = ₹ 15

Then the cost of 4.71 m lace = $15 \times 4.71 = ₹ 70.65$

Hence, the cost of 4.71 m lace is ₹ 70.65.

Question 7:

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

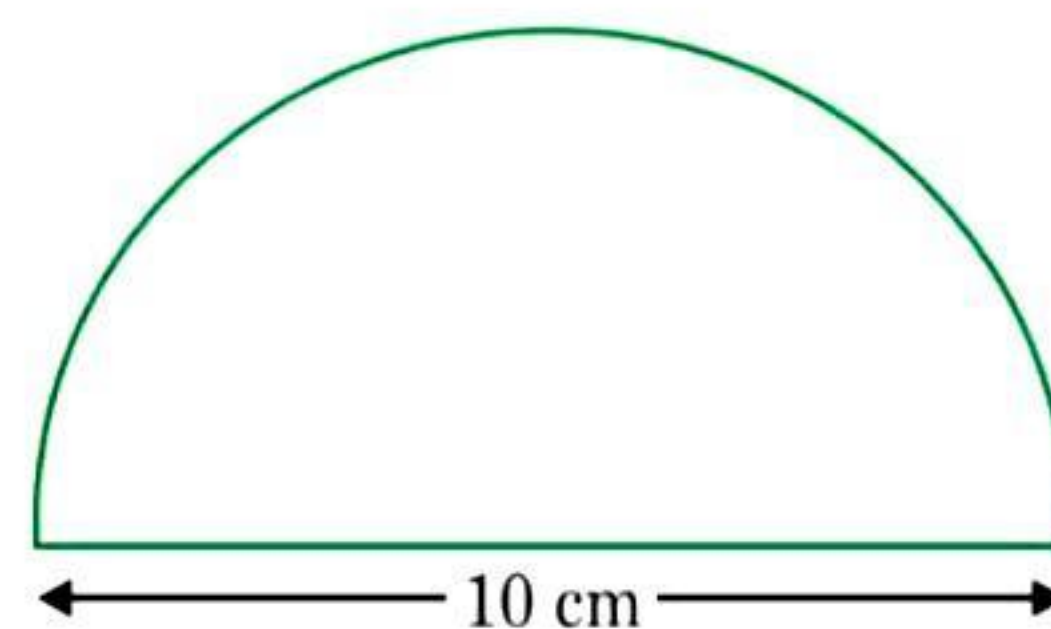
Answer 7:

$$\text{Diameter} = 10 \text{ cm}, \therefore \text{Radius} = \frac{10}{2} = 5 \text{ cm}$$

According to question,

$$\begin{aligned} \text{Perimeter of figure} &= \text{Circumference of semi-circle} + \text{diameter} \\ &= \pi r + D = \frac{22}{7} \times 5 + 10 = \frac{110}{7} + 10 = \frac{110 + 70}{7} = \frac{180}{7} = 25.71 \text{ cm} \end{aligned}$$

Thus, the perimeter of the given figure is 25.71 cm.

**Question 8:**

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

Answer 8:

$$\text{Diameter of the circular table top} = 1.6 \text{ m}$$

$$\therefore \text{Radius of the circular table top} = \frac{1.6}{2} = 0.8 \text{ m}$$

$$\text{Area of circular table top} = \pi r^2 = 3.14 \times 0.8 \times 0.8 = 2.0096 \text{ m}^2$$

$$\text{Now cost of } 1 \text{ m}^2 \text{ polishing} = ₹15$$

$$\text{Then cost of } 2.0096 \text{ m}^2 \text{ polishing} = 15 \times 2.0096 = ₹ 30.14 \text{ (approx.)}$$

Thus, the cost of polishing a circular table top is ₹ 30.14 (approx.)

Question 9:

Shazli took a wire of length 44 cm and 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 or the square? (Take $\pi = \frac{22}{7}$)

Answer 9:

$$\text{Total length of the wire} = 44 \text{ cm}$$

$$\therefore \text{The circumference of the circle} = 2\pi r = 44 \text{ cm}$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 44$$

$$\Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7 \text{ cm}$$

$$\text{Now Area of the circle} = \pi r^2 = \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$$

Now the wire is converted into square.

$$\text{Then perimeter of square} = 44 \text{ cm}$$

$$\Rightarrow 4 \times \text{side} = 44$$

$$\Rightarrow \text{Side} = \frac{44}{4} = 11 \text{ cm}$$

$$\text{Now area of square} = \text{side} \times \text{side} = 11 \times 11 = 121 \text{ cm}^2$$

Therefore, on comparing, the area of circle is greater than that of square, so the circle enclosed more area.

Question 10:

From a circular card sheet of radius 14 cm, two circles of radius 3.5 cm and a rectangle of length 3 cm and breadth 1 cm are removed (as shown in the adjoining figure). Find the area of the remaining sheet.

(Take $\pi = \frac{22}{7}$)

**Answer 10:**

Radius of circular sheet (R) = 14 cm and Radius of smaller circle (r) = 3.5 cm

Length of rectangle (l) = 3 cm and breadth of rectangle (b) = 1 cm

According to question,

Area of remaining sheet = Area of circular sheet - (Area of two smaller circle + Area of rectangle)

$$= \pi R^2 - [2(\pi r^2) + (l \times b)]$$

$$= \frac{22}{7} \times 14 \times 14 - \left[\left(2 \times \frac{22}{7} \times 3.5 \times 3.5 \right) - (3 \times 1) \right]$$

$$= 22 \times 14 \times 2 - [44 \times 0.5 \times 3.5 + 3] = 616 - 80 = 536 \text{ cm}^2$$

Therefore the area of remaining sheet is 536 cm².

Question 11:

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 $\pi = 3.14$)

Answer 11:

Radius of circle = 2 cm and side of aluminium square sheet = 6 cm

According to question,

Area of aluminium sheet left = Total area of aluminium sheet - Area of circle

$$= \text{side} \times \text{side} - \pi r^2$$

$$= 6 \times 6 - \frac{22}{7} \times 2 \times 2 = 36 - 12.56 = 23.44 \text{ cm}^2$$

Therefore, the area of aluminium sheet left is 23.44 cm².

Question 12:

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

Answer 12:

The circumference of the circle = 31.4 cm

$$\Rightarrow 2\pi r = 31.4$$

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

$$\Rightarrow r = \frac{31.4}{2 \times 3.14} = 5 \text{ cm}$$

$$\text{Then area of the circle} = \pi r^2 = 3.14 \times 5 \times 5 = 78.5 \text{ cm}^2$$

Therefore, the radius and the area of the circle are 5 cm and 78.5 cm² respectively.

Question 13:

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? (Take $\pi = 3.14$)

Answer 13:

Diameter of the circular flower bed = 66 m

$$\therefore \text{Radius of circular flower bed } (r) = \frac{66}{2} = 33 \text{ m}$$

$$\therefore \text{Radius of circular flower bed with 4 m wide path } (R) = 33 + 4 = 37 \text{ m}$$

According to the question,

Area of path = Area of bigger circle - Area of smaller circle

$$= \pi R^2 - \pi r^2 = \pi (R^2 - r^2)$$

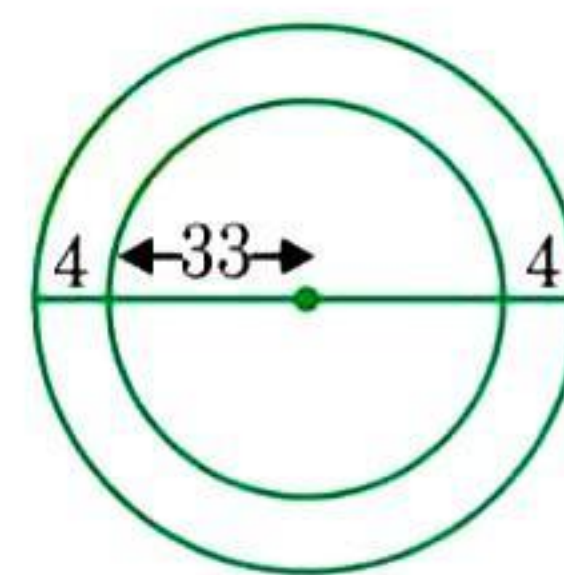
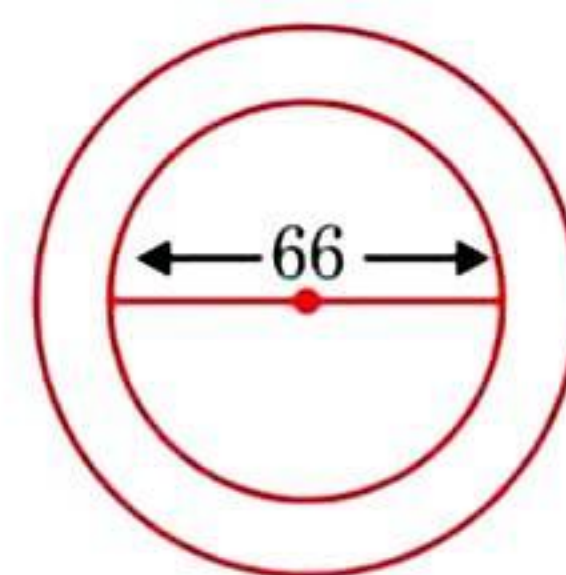
$$= \pi [(37)^2 - (33)^2]$$

$$= 3.14 [(37 + 33)(37 - 33)] \quad [\because a^2 - b^2 = (a + b)(a - b)]$$

$$= 3.14 \times 70 \times 4$$

$$= 879.20 \text{ m}^2$$

Therefore, the area of the path is 879.20 m².

**Question 14:**

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 12 m. Will the sprinkler water the entire garden? (Take $\pi = 3.14$)

Answer 14:

$$\text{Circular area by the sprinkler} = \pi r^2$$

$$= 3.14 \times 12 \times 12 = 3.14 \times 144 = 452.16 \text{ m}^2$$

$$\text{Area of the circular flower garden} = 314 \text{ m}^2$$

Since Area of circular flower garden is smaller than area by sprinkler.

Therefore, the sprinkler will water the entire garden.

Question 15:

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

Answer 15:

$$\text{Radius of outer circle } (r) = 19 \text{ m}$$

$$\therefore \text{Circumference of outer circle} = 2\pi r = 2 \times 3.14 \times 19 = 119.32 \text{ m}$$

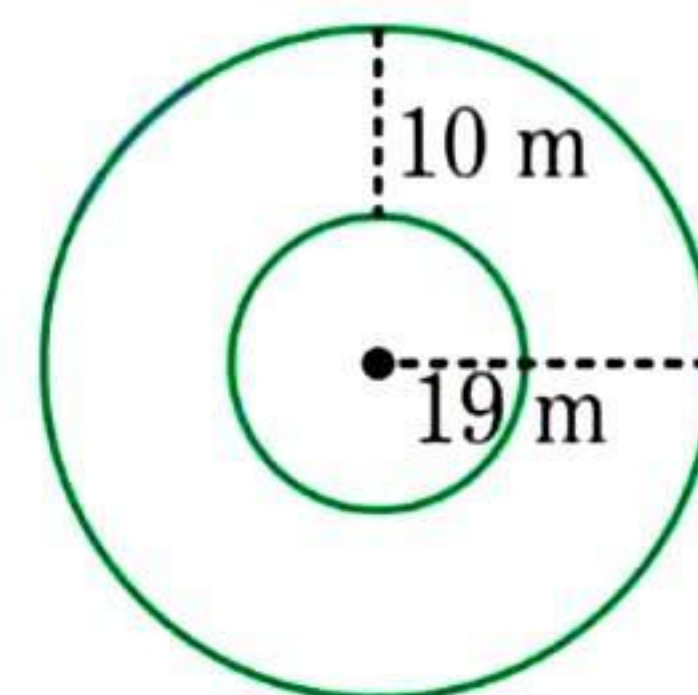
$$\text{Now radius of inner circle } (r') = 19 - 10 = 9 \text{ m}$$

$$\therefore \text{Circumference of inner circle} = 2\pi r'$$

$$= 2 \times 3.14 \times 9$$

$$= 56.52 \text{ m}$$

Therefore, the circumferences of inner and outer circles are 56.52 m and 119.32 m respectively.



Question 16:

How many times a wheel of radius 28 cm must rotate to go 352 m? $\left(\text{Take } \pi = \frac{22}{7} \right)$

Answer 16:

Let wheel must be rotate n times of its circumference.

Radius of wheel = 28 cm and Total distance = 352 m = 35200 cm

\therefore Distance covered by wheel = n x circumference of wheel

$$\Rightarrow 35200 = n \times 2\pi r$$

$$\Rightarrow 35200 = n \times 2 \times \frac{22}{7} \times 28$$

$$\Rightarrow n = \frac{35200 \times 7}{2 \times 22 \times 28}$$

$$\Rightarrow n = 200 \text{ revolutions}$$

Thus, wheel must rotate 200 times to go 352 m.

Question 17:

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

Answer 17:

In 1 hour, minute hand completes one round means makes a circle.

Radius of the circle (r) = 15 cm

Circumference of circular clock = $2\pi r$

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

$$= 94.2 \text{ cm}$$

Therefore, the tip of the minute hand moves 94.2 cm in 1 hour.