CBSE NCERT Solutions for Class 7 Mathematics Chapter 11

Back of Chapter Questions

Exercise 11.1

1. The length and the breadth of a rectangular piece of land are 500 m and 300 m respectively. Find

(i) its area

(ii) the cost of the land, if 1 m^2 of the land costs ₹ 10,000.

Solution:

(i) We know that area of rectangle is given by,

$\text{Area} = \text{Length} \times \text{Breadth}$

$\Rightarrow \text{Area} = 500 \times 300$

$\Rightarrow \text{Area} = 1{,}50{,}000\ m^2$

(ii) It is given that,

Cost of 1 m^2 land = ₹ 10000

⇒ Cost of 150000 m^2 land = 10000×150000

⇒ Cost of the land = ₹ 1,50,00,000

2. Find the area of a square park whose perimeter is 320 m.

Solution:

Given: Perimeter = 320 m

$4 \times$ Length of the side of park $= 320$

$\Rightarrow$ Length of the side of park $= \frac{320}{4} = 80$ m

$\text{Area} = (\text{Length of the side of park})^2$

$\Rightarrow \text{Area} = (80)^2$

$\Rightarrow \text{Area} = 6400\ m^2$

$\therefore$ The area of a square park is 6400 m^2.

3. Find the breadth of a rectangular plot of land, if its area is 440 m^2 and the length is 22 m. Also find its perimeter.

Solution:

$\text{Area} = \text{Length} \times \text{Breadth} = 440\ m^2$

$\Rightarrow 22 \times \text{Breadth} = 440$

$\Rightarrow \text{Breadth} = \frac{440}{22} = 20 \text{ m}$

$\text{Perimeter} = 2\ (\text{Length} + \text{Breadth})$

$\Rightarrow \text{Perimeter} = 2\ (22 + 20)$

$\Rightarrow \text{Perimeter} = 2\ (42) = 84 \text{ m}$

4. The perimeter of a rectangular sheet is 100 cm. If the length is 35 cm, find its breadth. Also find the area.

Solution:

Given: Perimeter $= 100$ cm

$\text{Perimeter} = 2\ (\text{Length} + \text{Breadth}) = 100 \text{ cm}$

$\Rightarrow 2\ (35 + \text{Breadth}) = 100$

$\Rightarrow 35 + \text{Breadth} = \frac{100}{2} = 50$

$\Rightarrow \text{Breadth} = 50 - 35 = 15 \text{ cm}$

$\text{Area} = \text{Length} \times \text{Breadth}$

$\Rightarrow \text{Area} = 35 \times 15 = 525 \text{ cm}^2$

5. The area of a square park is the same as of a rectangular park. If the side of the square park is 60 m and the length of the rectangular park is 90 m, find the breadth of the rectangular park.

Solution:

Area of square park = Area of rectangular park

Area of square park $= 3600 \text{ m}^2$

Area of square park $= (\text{One of its sides})^2 = (60)^2 = 3600 \text{ m}^2$

Area of rectangular park $= \text{Length} \times \text{Breadth} = 3600$

$\Rightarrow 90 \times \text{Breadth} = 3600$

$\Rightarrow \text{Breadth} = 40$

6. A wire is in the shape of a rectangle. Its length is 40 cm and breadth is 22 cm. If the same wire is re-bent in the shape of a square, what will be the measure of each side. Also find which shape encloses more area?

Solution:

Given: Perimeter of rectangle = Perimeter of square

$\Rightarrow 2\,(\text{Length} + \text{Breadth}) = 4 \times \text{Side}$

$\Rightarrow 2\,(40 + 22) = 4 \times \text{Side}$

$\Rightarrow 2 \times 62 = 4 \times \text{Side}$

$\Rightarrow \text{Side} = \frac{124}{4} = 31 \text{ cm}$

Area of rectangle $= 40 \times 22 = 880 \text{ cm}^2$

Area of square $= (\text{Side})^2 = 31 \times 31 = 961 \text{ cm}^2$

Therefore, the square-shaped wire encloses more area.

7. The perimeter of a rectangle is 130 cm. If the breadth of the rectangle is 30 cm, find its length. Also find the area of the rectangle.

Solution:

Given: Perimeter $= 130$ cm

Perimeter $= 2\,(\text{Length} + \text{Breadth}) = 130$

$\Rightarrow 2\,(\text{Length} + 30) = 130$

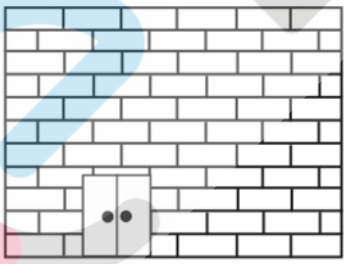
$\Rightarrow \text{Length} + 30 = 65$

$\Rightarrow \text{Length} = 65 - 30 = 35 \text{ cm}$

Area $=$ Length $\times$ Breadth

$\Rightarrow$ Area $= 35 \times 30 = 1050 \text{ cm}^2$

8. A door of length 2 m and breadth 1 m is fitted in a wall. The length of the wall is 4.5 m and the breadth is 3.6 m (see the given figure). Find the cost of white washing the wall, if the rate of white washing the wall is ₹ 20 per m^2.



Solution:

Area of wall $= 4.5 \times 3.6 = 16.2 \text{ m}^2$

Area of door $= 2 \times 1 = 2 \text{ m}^2$

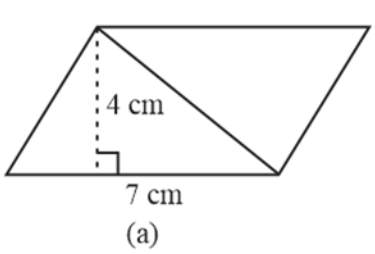
Area to be white-washed $= 16.2 - 2 = 14.2 \text{ m}^2$

It is given that cost of white-washing $1 \text{ m}^2 =$ ₹ 20

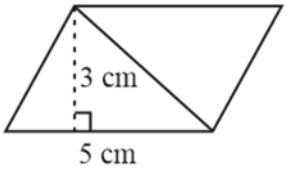
$\therefore$ Cost of white-washing $14.2\ m^2 = 14.2 \times 20 = ₹\ 284$

Exercise 11.2:

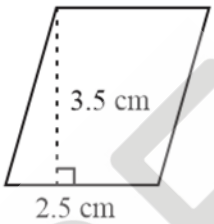
1. Find the area of each of the following parallelograms:



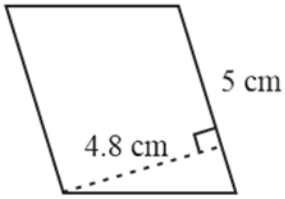
(a)



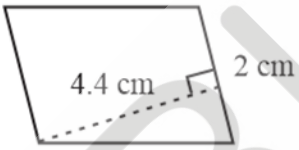
(b)



(c)



(d)



(e)

Solution:

(a) We know that area of parallelogram = Base × Height

Given

Height = 4 cm

Base = 7 cm

$\Rightarrow$ Area of parallelogram = $7 \times 4 = 28\ cm^2$

(b) We know that area of parallelogram = Base × Height

Given:

Height = 3 cm

Base = 5 cm

$\Rightarrow$ Area of parallelogram = $5 \times 3 = 15\ cm^2$

(c) We know that area of parallelogram = Base × Height

Given:

Height = 3.5 cm

Base = 2.5 cm

$\Rightarrow$ Area of parallelogram = $2.5 \times 3.5 = 8.75\ cm^2$

(d) We know that area of parallelogram = Base × Height

Given:

Height = 4.8 cm

Base = 5 cm

⇒ Area of parallelogram = $5 \times 4.8 = 24\ cm^2$

(e) We know that area of parallelogram = Base × Height

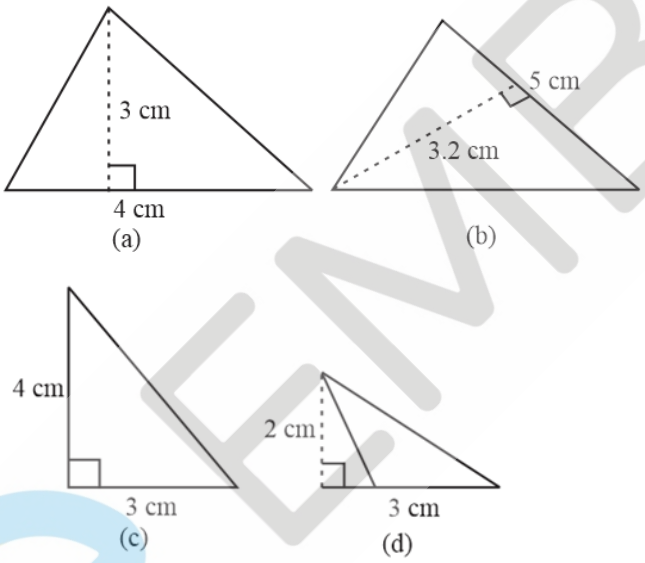
Given:

Height = 4.4 cm

Base = 2 cm

⇒ Area of parallelogram = $2 \times 4.4 = 8.8\ cm^2$

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



Solution:

(a) Area of Triangle = $\frac{1}{2} \times$ Base × Height

Given:

Base = 4 cm, height = 3 cm

⇒ Area = $\frac{1}{2} \times 4 \times 3 = 6\ cm^2$

(b) Area of Triangle = $\frac{1}{2} \times$ Base × Height

Given:

Base $= 5$ cm, height $= 3.2$ cm

$\Rightarrow$ Area $= \frac{1}{2} \times 5 \times 3.2 = 8$ cm^2

(c) Area of Triangle $= \frac{1}{2} \times$ Base $\times$ Height

Given:

Base $= 4$ cm, height $= 3$ cm

$\Rightarrow$ Area $= \frac{1}{2} \times 4 \times 3 = 6$ cm^2

(d) Area of Triangle $= \frac{1}{2} \times$ Base $\times$ Height

Given:

Base $= 3$ cm, height $= 2$ cm

$\Rightarrow$ Area $= \frac{1}{2} \times 2 \times 3 = 3$ cm^2

3. Find the missing values:

So No	Base	Height	Area of parallelogram
a.	20 cm	–	246 cm^2
b.	–	15 cm	154.5 cm^2
c.	–	8.4 cm	48.72 cm^2
d.	15.6 cm	–	16.38 cm^2

Solution:

(a) h =?

Given: b $= 20$ cm, Area $= 246$ cm^2

Area of parallelogram $=$ Base $\times$ Height

$\Rightarrow 20 \times h = 246$

$\Rightarrow h = \frac{246}{20} = 12.3$ cm

Therefore, the height of such parallelogram is 12.3 cm.

(b) b =?

Given: h $= 15$ cm, Area $= 154.5$ cm^2

Area of parallelogram $=$ Base $\times$ Height

$\Rightarrow b \times 15 = 154.5$

$\Rightarrow b = 10.3$ cm

Therefore, the base of such parallelogram is 10.3 cm.

(c) b =?

Given: $h = 8.4$ cm, Area $= 48.72$ cm^2

Area of parallelogram = Base × Height

$\Rightarrow b \times 8.4 = 48.72$

$\Rightarrow b = \frac{48.72}{8.4} = 5.8$ cm

Therefore, the base of such parallelogram is 5.8 cm.

(d) Given: $b = 15.6$ cm, Area $= 16.38$ cm^2

h =?

Area of parallelogram = Base × Height

$\Rightarrow 15.6 \times h = 16.38$

$\Rightarrow h = \frac{16.38}{15.6} = 1.05$ cm

Therefore, the height of such parallelogram is 1.05 cm.

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

Solution:

(a) Given: $b = 15$ cm, Area $= 87$ cm^2

h =?

We know that: Area of Triangle $= \frac{1}{2} \times$ Base × Height

Area $= \frac{1}{2} \times b \times h = 87$ cm^2

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

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

Therefore, the height of such triangle is 11.6 cm.

(b) b =?

Given: h = 31.4 mm, Area = 1256 cm^2

We know that: Area of Triangle = $\frac{1}{2}$ × Base × Height

Area = $\frac{1}{2} \times b \times h = 1256\ cm^2$

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

$\Rightarrow b = \frac{1256 \times 2}{31.4} = 80\ cm$

Therefore, the base of such triangle is 80 mm.

(c) Given: b = 22 cm, Area = 170.5 cm^2

h =?

We know that: Area of Triangle = $\frac{1}{2}$ × Base × Height

Area = $\frac{1}{2} \times b \times h = 170.5\ cm^2$

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

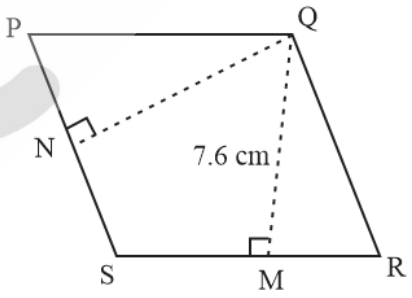
$\Rightarrow h = \frac{170.5 \times 2}{22} = 15.5\ cm$

Therefore, the height of such triangle is 15.5 cm.

5. PQRS is a parallelogram (see the given 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



Solution:

(a) We know that: Area of parallelogram = Base × Height

$\Rightarrow$ Area $=$ SR $\times$ QM

$\Rightarrow$ Area $= 7.6 \times 12 = 91.2$ cm^2

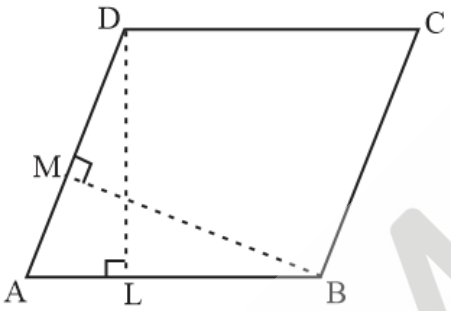
(b) Area of parallelogram = Base × Height

$\Rightarrow$ Area $=$ PS $\times$ QN $= 91.2$ cm^2

$\Rightarrow$ QN $\times 8 = 91.2$

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

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



Solution:

We know that: Area of parallelogram $=$ Base $\times$ Height

$\Rightarrow$ Area $=$ AB $\times$ DL

$\Rightarrow 1470 = 35 \times$ DL

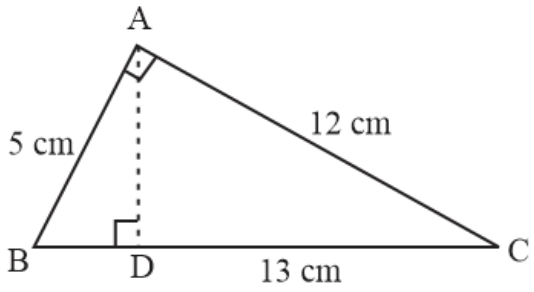
$\Rightarrow$ DL $= \frac{1470}{35} = 42$cm

Also, $1470 =$ AD $\times$ BM

$\Rightarrow 1470 = 49 \times$ BM

$\Rightarrow$ BM $= \frac{1470}{49} = 30$ cm

7. ΔABC is right angled at A (see the given figure). AD is perpendicular to BC. If AB $= 5$ cm, BC $= 13$ cm and AC $= 12$ cm, Find the area of ΔABC. Also find the length of AD.



Solution:

We know that: Area $= \frac{1}{2} \times$ Base $\times$ Height

We see that AC is the height and AB is the base

$\Rightarrow$ Area $= \frac{1}{2} \times 5 \times 12 = 30$ cm^2

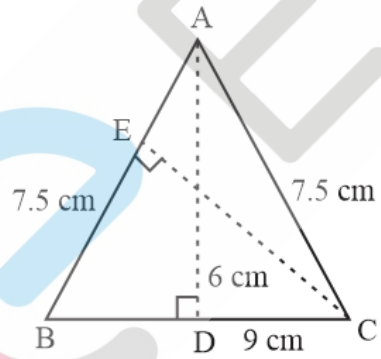
Also, area of the triangle $= \frac{1}{2} \times$ AD $\times$ BC

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

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

$\Rightarrow$ AD $= 4.6$ cm

8. ΔABC is isosceles with $AB = AC = 7.5$ cm and $BC = 9$ cm (see the given figure). The height AD from A to BC, is 6 cm. Find the area of ΔABC. What will be the height from C to AB i.e., CE?



Solution:

Area of Δ ABC $= \frac{1}{2} \times$ Base $\times$ Height

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

$\Rightarrow$ Area $= \frac{1}{2} \times 9 \times 6 = 27$ cm^2

$\Rightarrow$ Area of Δ ABC $= \frac{1}{2} \times$ Base $\times$ Height

$\Rightarrow$ Area $= \frac{1}{2} \times AB \times CE$

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

$\Rightarrow CE = 7.2$ cm

Exercise 11.3

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

(a) 14 cm

(b) 28 mm

(c) 21 cm

Solution:

(a) $r = 14$ cm

$\Rightarrow$ Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 14 = 88$ cm

(b) $r = 28$ mm

$\Rightarrow$ Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 28 = 176$ mm

(c) $r = 21$ cm

$\Rightarrow$ Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 21 = 132$ cm

2. Find the area of the following circles, given that:

(a) radius $= 14$ mm (Take $\pi = \frac{22}{7}$)

(b) diameter $= 49$ m

(c) radius $= 5$ cm

Solution:

(a) $r = 14$ mm

$\Rightarrow$ Area $= \pi r^2 = \frac{22}{7} \times 14 \times 14 = 616$ mm^2

(b) $d = 49$ m

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

$\Rightarrow$ Area $= \pi r^2 = \frac{22}{7} \times \frac{49}{2} \times \frac{49}{2} = 1886.5$ m^2

(c) $r = 5$ cm

$\Rightarrow$ Area $= \pi r^2 = \frac{22}{7} \times 5 \times 5 = 78.57 \text{ cm}^2$

3. If the circumference of a circular sheet is 154m, find its radius. Also find the area of the sheet. (Take $\pi = \frac{22}{7}$)

Solution:

Given: Circumference $= 2\pi r = 154$ m

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

$\Rightarrow r = 154 \times \frac{7}{44} = \frac{49}{2} = 24.5$ m

Area $= \pi r^2 = \frac{22}{7} \times r^2$

$\Rightarrow$ Area $= \frac{22}{7} \times \frac{49}{2} \times \frac{49}{2} = 1886.5 \text{ m}^2$

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

Solution:

Given: $d = 21$ m

So, $r = \frac{21}{2}$ m

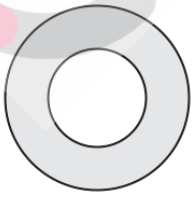
$\Rightarrow$ Circumference $= 2\pi r = 2 \times \frac{22}{7} \times \frac{21}{2} = 66$ m

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

It is given that cost of 1 m rope $=$ ₹ 4

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

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 $\pi = 3.14$)



Solution:

Outer radius of circular sheet $= 4$ cm

Inner radius of circular sheet $= 3$ cm

Remaining area $= \pi \times \text{outer radius}^2 - \pi \times \text{inner radius}^2$

$\Rightarrow$ Remaining area $= (3.14 \times 4 \times 4) - (3.14 \times 3 \times 3)$

$\Rightarrow$ Remaining area $= 50.24 - 28.26$

$\Rightarrow$ Remaining area $= 21.98\ \text{cm}^2$

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 $\pi = 3.14$)

Solution:

We know that: The length of the lace required is equal to the circumference

Circumference $= 2\pi r$

Circumference $= 2 \times 3.14 \times \frac{d}{2}$

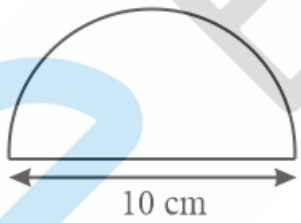
$\Rightarrow$ Circumference $= 2 \times 3.14 \times \frac{1.5}{2}$

$\Rightarrow$ Circumference $= 4.71$ m

Cost of 1 m lace $=$ ₹ 15

$\Rightarrow$ Cost of 4.71 m lace $= 4.71 \times 15 =$ ₹ 70.65

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



Solution:

Given: Radius $= 5$ cm

Length of curved part $= \pi r$

$\Rightarrow$ Length of curved part $= \frac{22}{7} \times 5$

Length of curved part $= 15.71$ cm

Total perimeter $=$ Length of curved part $+$ Length of diameter

$\Rightarrow$ Total perimeter $= 15.71 + 10 = 25.71$ cm

8. Find the cost of polishing a circular table-top of diameter 1.6 m, if the rate of polishing is ₹ $15/m^2$. (Take $\pi = 3.14$)

Solution:

Diameter $= 1.6$ m

Radius $= \frac{1.6}{2} = 0.8$ m

$\Rightarrow$ Area $= 3.14 \times 0.8 \times 0.8$

$\Rightarrow$ Area $= 2.0096$ m^2

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

$\Rightarrow$ Cost for polishing 2.0096 m^2 area $= 15 \times 2.0096 =$ ₹ 30.14

Therefore, it will cost ₹ 30.14 for polishing such circular table.

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

Solution:

We know that: Circumference $= 2\pi r = 44$ cm

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

$\Rightarrow r = 7$ cm

Area $= \pi r^2 = \frac{22}{7} \times 7 \times 7 = 154$ cm^2

If the wire is bent into a square,

then the length of each side would be $= \frac{44}{4} = 11$ cm

Area of square $= (11)^2 = 121$ cm^2

Therefore, we see that circle encloses more area.

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 following figure). Find the area of the remaining sheet. (Take $\pi = \frac{22}{7}$)

Solution:

Area of bigger circle $= \frac{22}{7} \times 14 \times 14 = 616\ \text{cm}^2$

Area of 2 small circles $= 2 \times \pi r^2 = 2 \times \frac{22}{7} \times 3.5 \times 3.5 = 77\ \text{cm}^2$

Area of rectangle $=$ Length $\times$ Breadth

$\Rightarrow$ Area $= 3 \times 1 = 3\ \text{cm}^2$

Remaining area of sheet $= 616 - 77 - 3 = 536\ \text{cm}^2$

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

Solution:

Area of square-shaped sheet $= (\text{Side})^2$

$\Rightarrow$ Area $= (6)^2 = 36\ \text{cm}^2$

Area of circle $= 3.14 \times 2 \times 2 = 12.56\ \text{cm}^2$

Remaining area of sheet $= 36 - 12.56 = 23.44\ \text{cm}^2$

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

Solution:

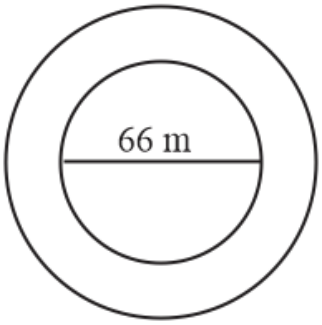
We know that: circumference $= 2\pi r = 31.4$ cm

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

$\Rightarrow r = 5$ cm

Area $= 3.14 \times 5 \times 5 = 78.50\ \text{cm}^2$

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? ($\pi = 3.14$)



Solution:

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

Radius of flower bed and path together $= 33 + 4 = 37$ m

Area of flower bed and path together $= 3.14 \times 37 \times 37 = 4298.66$ m^2

$\Rightarrow$ Area of flower bed $= 3.14 \times 33 \times 33 = 3419.46$ m^2

Area of path = Area of flower bed and path together − Area of flower bed

$\Rightarrow$ Area of path $= 4298.66 - 3419.46$

$\Rightarrow$ Area of path $= 879.20$ m^2

14. A circular flower garden has an area of 314 m^2. 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 $\pi = 3.14$)

Solution:

Given: Area $= 314$ m^2

Area $= \pi r^2 = 314$ m^2

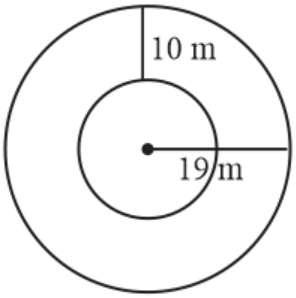
$\Rightarrow 3.14 \times r^2 = 314$

$\Rightarrow r^2 = 100$

$\Rightarrow r = 10$ m

Yes, the sprinkler will water the whole garden.

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



Solution:

Given: Radius of outer circle $= 19$ m

Circumference $= 2\pi r$

$\Rightarrow$ Circumference $= 2 \times 3.14 \times 19 = 119.32$ m

We see that: radius of inner circle $= 19 - 10 = 9$ m

Circumference $= 2\pi r$

$\Rightarrow$ Circumference $= 2 \times 3.14 \times 9 = 56.52$ m

16. How many times a wheel of radius 28 cm must rotate to go 352 m?

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

Solution:

Given: $r = 28$ cm

Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 28 = 176$ cm

Number of rotations $= \frac{\text{Total distance to be covered}}{\text{Circumference of wheel}}$

$\Rightarrow$ Number of rotations $= \frac{352 \text{ m}}{176 \text{ cm}}$

$\Rightarrow$ Number of rotations $= \frac{35200}{176} = 200$

Therefore, it will rotate 200 times.

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? (Take $\pi = 3.14$)

Solution:

We know that: Distance travelled by the tip of minute hand = Circumference of the clock

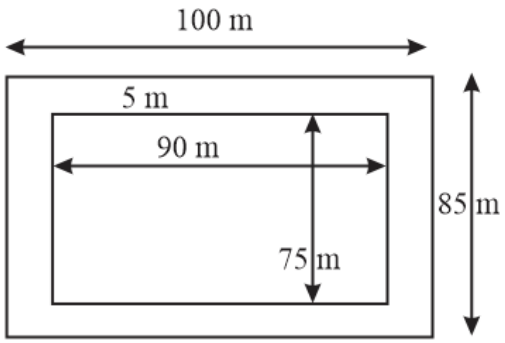
Circumference $= 2\pi r = 2 \times 3.14 \times 15$

$\Rightarrow$ Circumference $= 94.2$ cm

Exercise 11.4

1. A garden is 90 m long and 75 m broad. A path 5 m wide is to be built outside and around it. Find the area of the path. Also find the area of the garden in hectare.

Solution:



Given: Length (l) of garden $= 90$ m and

Breadth (b) of garden $= 75$ m

$\Rightarrow$ Area of garden $= l \times b = 90 \times 75 = 6750\ m^2$

From the figure, it can be observed that the new length and breadth of the garden, when path is also included, are 100 m and 85 m respectively.

$\Rightarrow$ Area of the garden including the path $= 100 \times 85 = 8500\ m^2$

Area of path $=$ Area of the garden including the path $-$ Area of garden

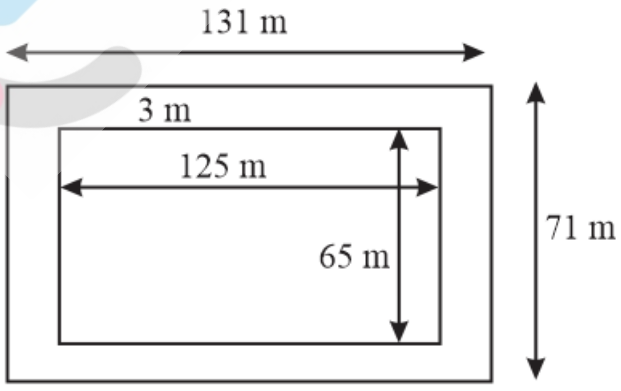
$\Rightarrow$ Area of path $= 8500 - 6750 = 1750\ m^2$

1 hectare $= 10000\ m^2$

Therefore, area of garden in hectare $= \frac{6750}{10000} = 0675$ hectare

2. A 3 m wide path runs outside and around a rectangular park of length 125 m and breadth 65 m. Find the area of the path.

Solution:



Given: Length (l) of park $= 125$ m and

Breadth (b) of park $= 65$ m

Area of park $= l \times b$

$\Rightarrow$ Area $= 125 \times 65 = 8125$ m^2

From the figure, it can be observed that the new length and breadth of the park, when path is also included, are 131 m and 71 m respectively.

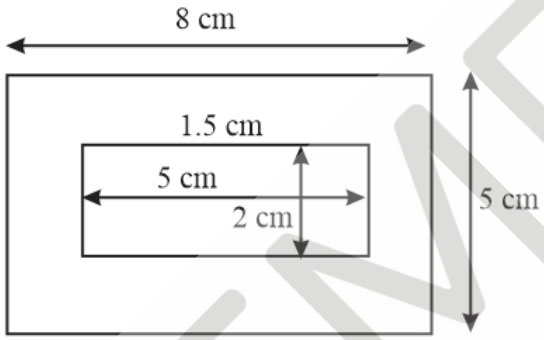
$\Rightarrow$ Area of the park including the path $= 131 \times 71 = 9301$ m^2

Area of path $=$ Area of the park including the path $-$ Area of park

$\Rightarrow$ Area of path $= 9301 - 8125 = 1176$ m^2

3. A picture is painted on a cardboard 8 cm long and 5 cm wide such that there is a margin of 1.5 cm along each of its sides. Find the total area of the margin.

Solution:



Length (l) of cardboard $= 8$ cm

Breadth (b) of cardboard $= 5$ cm

Area of cardboard including margin $= l \times b$

$\Rightarrow$ Area $= 8 \times 5 = 40$ cm^2

From the figure, it can be observed that the new length and breadth of the cardboard, when margin is not included, are 5 cm and 2 cm respectively.

Area of the cardboard not including the margin $= 5 \times 2 = 10$ cm^2

Area of the margin $=$ Area of cardboard including the margin $-$ Area of cardboard not including the margin

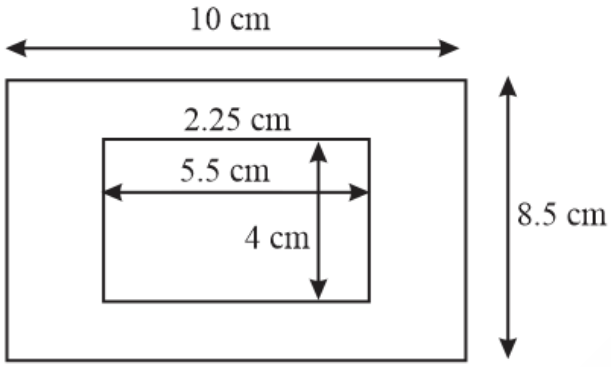
$\Rightarrow$ Area of the margin $= 40 - 10 = 30$ cm^2

4. A verandah of width 2.25 m is constructed all along outside a room which is 5.5 m long and 4 m wide. Find:

(i) The area of the verandah

(ii) The cost of cementing the floor of the verandah at the rate of ₹ 200 per m^2.

Solution:



(i) Length (l) of room = 5.5 m

Breadth (b) of room = 4 m

Area of room = l × b

⇒ Area = 5.5 × 4 = 22 m^2

From the figure, it can be observed that the new length and breadth of the room, when verandah is also included, are 10 m and 8.5 m respectively.

Area of the room including the verandah = 10 × 8.5 = 85 m^2

Area of verandah = Area of the room including the verandah − Area of room

⇒ Area of verandah = 85 − 22 = 63 m^2

(ii) Cost of cementing 1 m^2 area of the floor of the verandah = ₹ 200

⇒ Cost of cementing 63 m^2 area of the floor of the verandah = 200 × 63

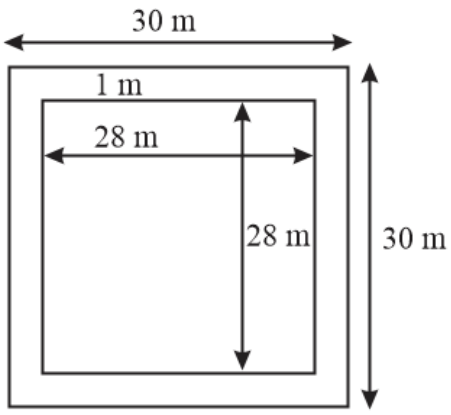
⇒ Cost of cementing 63 m^2 area of the floor of the verandah = ₹ 12600

5. A path 1 m wide is built along the border and inside a square garden of side 30 m. Find:

(i) The area of the path

(ii) The cost of planting grass in the remaining portion of the garden at the rate of ₹ 40 per m^2.

Solution:



(i) Given: Side (a) of square garden $= 30$ m

$\Rightarrow$ Area of square garden including path $= a^2 = (30)^2 = 900\ m^2$

From the figure, it can be observed that the side of the square garden, when path is not included, is 28 m.

$\Rightarrow$ Area of the square garden not including the path $= (28)^2 = 784\ m^2$

Area of path $=$ Area of the square garden including the path $-$ Area of square garden not including the path

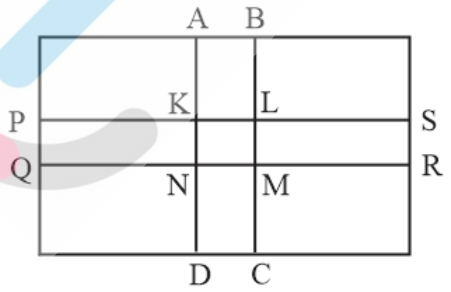
$\Rightarrow$ Area of path $= 900 - 784 = 116\ m^2$

(ii) Cost of planting grass in $1\ m^2$ area of the garden $= ₹\ 40$

$\Rightarrow$ Cost of planting grass in $784\ m^2$ area of the garden $= 784 \times 40 =$ ₹ 31360

6. Two cross roads, each of width 10 m, cut at right angles through the center of a rectangular park of length 700 m and breadth 300 m and parallel to its sides. Find the area of the roads. Also find the area of the park excluding cross roads. Give the answer in hectares.

Solution:



Length (l) of park $= 700$ m

Breadth (b) of park $= 300$ m

Area of park $= 700 \times 300$

$\Rightarrow$ Area of park $= 210000\ m^2$

Length of road PQRS $= 700$ m

Length of road ABCD $= 300$ m

Width of each road $= 10$ m

Area of the roads $=$ area (PQRS) $+$ area (ABCD) $-$ area (KLMN)

$\Rightarrow$ Area of the roads $= (700 \times 10) + (300 \times 10) - (10 \times 10)$

$\Rightarrow$ Area of the roads $= 7000 + 3000 - 100$

$\Rightarrow$ Area of the roads $= 10000 - 100 = 9900\ m^2 = 0.99$ hectare

$\Rightarrow$ Area of park excluding roads $= 210000 - 9900$

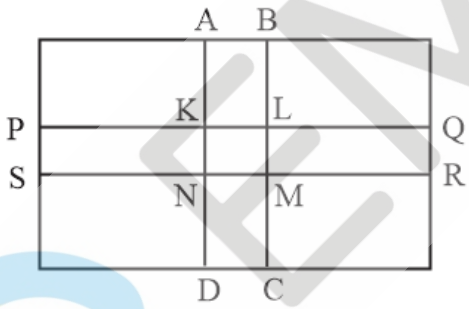
$\Rightarrow$ Area of park excluding roads $= 200100\ m^2 = 20.01$ hectare

7. Through a rectangular field of length 90 m and breadth 60 m, two roads are constructed which are parallel to the sides and cut each other at right angles through the center of the fields. If the width of each road is 3 m, find

(i) the area covered by the roads.

(ii) the cost of constructing the roads at the rate of ₹ 110 per m^2.

Solution:



Length (l) of field $= 90$ m

Breadth (b) of field $= 60$ m

Area of field $= 90 \times 60$

$\Rightarrow$ Area of field $= 5400\ m^2$

Length of road PQRS $= 90$ m

Length of road ABCD $= 60$ m

Width of each road $= 3$ m

Area of the roads $=$ area (PQRS) $+$ area (ABCD) $-$ area(KLMN)

$\Rightarrow$ Area of the roads $= (90 \times 3) + (60 \times 3) - (3 \times 3)$

$\Rightarrow$ Area of the roads $= 270 + 180 - 9 = 441\ m^2$

Cost for constructing 1 m^2 road $= ₹\ 110$

$\Rightarrow$ Cost for constructing 441 m^2 road $= 110 \times 441 = ₹\ 48510$

8. Pragya wrapped a cord around a circular pipe of radius 4 cm (adjoining figure) and cut off the length required of the cord. Then she wrapped it around a square box of side 4 cm (also shown). Did she have any cord left? ($\pi = 3.14$).

Solution:

Perimeter of the square $= 4 \times$ Side of the square

$\Rightarrow$ Perimeter of the square $= 4 \times 4 = 16$ cm

Perimeter of circular pipe $= 2\pi r$

$\Rightarrow$ Perimeter of circular pipe $= 2 \times 3.14 \times 4 = 25.12$ cm

$\Rightarrow$ Length of chord left with Pragya $= 25.12 - 16 = 9.12$ cm

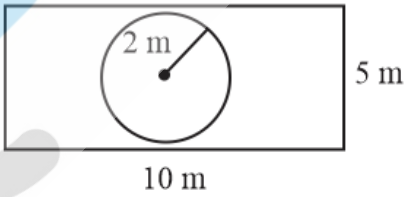
9. The adjoining figure represents a rectangular lawn with a circular flower bed in the middle. Find:

(i) the area of the whole land

(ii) the area of the flower bed

(iii) the area of the lawn excluding the area of the flower bed

(iv) the circumference of the flower bed.



Solution:

(i) Area of whole land $=$ Length $\times$ Breadth

$\Rightarrow$ Area of whole land $= 10 \times 5 = 50\ m^2$

(ii) Area of flower bed $= 2\pi r$

$\Rightarrow$ Area of flower bed $= 3.14 \times 2 \times 2 = 12.56\ m^2$

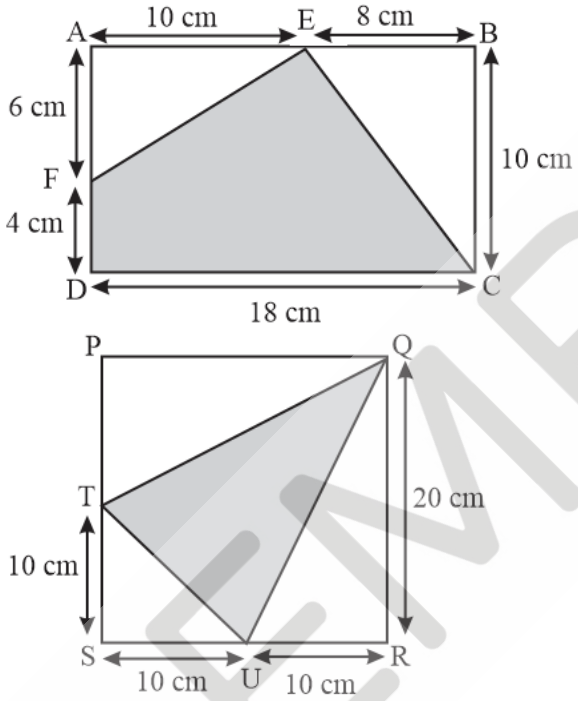
(iii) Area of lawn excluding the flower bed = Area of whole land − Area of flower bed

$\Rightarrow$ Area of lawn excluding the flower bed $= 50 - 12.56 = 37.44\ m^2$

(iv) Circumference of flower bed $= 2\pi r$

$\Rightarrow$ Circumference of flower bed $= 2 \times 3.14 \times 2 = 12.56\ m$

10. In the following figures, find the area of the shaded portions:



Solution:

(i) Area of EFDC = area (ABCD) − area (BCE) − area (AFE)

$\Rightarrow$ Area of EFDC $= (18 \times 10) - \frac{1}{2}(10 \times 8) - \frac{1}{2}(6 \times 10)$

$\Rightarrow$ Area of EFDC $= 180 - 40 - 30 = 110\ cm^2$

(ii) area (QTU) = area (PQ₹) − area (TSU) − area (RUQ) − area (PQT)

$\Rightarrow$ area $(QTU) = (20 \times 20) - \frac{1}{2}(10 \times 10) - \frac{1}{2}(20 \times 10) - \frac{1}{2}(20 \times 10)$

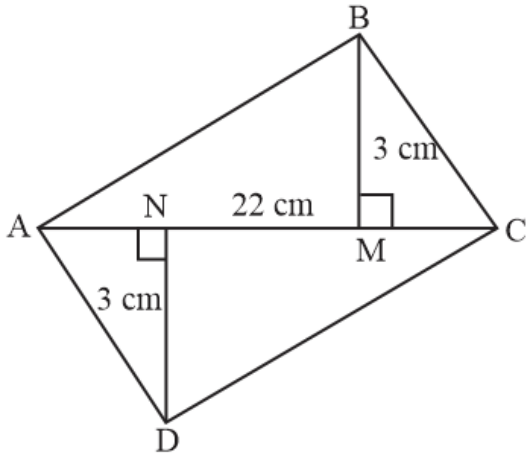
$\Rightarrow$ area $(QTU) = 400 - 50 - 100 - 100 = 150\ cm^2$

11. Find the area of the quadrilateral ABCD.

Here, $AC = 22\ cm, BM = 3\ cm,$

$DN = 3$ cm, and

$BM \perp AC, DN \perp AC$



Solution:

$\text{area (ABCD)} = \text{area (ABC)} + \text{area (ADC)}$

$\Rightarrow \text{area (ABCD)} = \frac{1}{2}(3 \times 22) + \frac{1}{2}(3 \times 22)$

$\Rightarrow \text{area(ABCD)} = 33 + 33 = 66 \text{ cm}^2$