

Chapter 9: Perimeter and Area

NCERT · Class 7 · Maths

Exercise 11.1 · Textbook page 208

Question 1

The length and 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

Solution:-

From the question, it is given that

Length of the rectangular piece of land = 500 m

Breadth of the rectangular piece of land = 300 m

Then,

(i) Area of rectangle = Length $\times$ Breadth

$$= 500 \times 300$$

$$= 150000 \text{ m}^2$$

(ii) Cost of the land for $1 \text{ m}^2 = ₹ 10000$

$$\text{Cost of the land for } 150000 \text{ m}^2 = 10000 \times 150000$$

$$= ₹ 1500000000$$

Question 2

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

Solution

Solution:-

From the question, it is given that

$$\text{Perimeter of the square park} = 320 \text{ m}$$

$$4 \times \text{Length of the side of park} = 320 \text{ m}$$

Then,

$$\text{Length of the side of the park} = 320/4$$

$$= 80 \text{ m}$$

$$\text{So, the area of the square park} = (\text{Length of the side of the park})^2$$

$$= 80^2$$

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

Question 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

Solution:-

From the question, it is given that

$$\text{Area of the rectangular plot} = 440 \text{ m}^2$$

$$\text{Length of the rectangular plot} = 22 \text{ m}$$

We know that,

$$\text{Area of the rectangle} = \text{Length} \times \text{Breadth}$$

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

$$\text{Breadth} = 440/22$$

$$\text{Breadth} = 20 \text{ m}$$

Then,

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

$$= 2 (22 + 20)$$

$$= 2(42)$$

$$= 84 \text{ m}$$

∴ Perimeter of the rectangular plot is 84 m.

Question 4

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

Also, find the area.

Solution

Solution:-

From the question, it is given that

Perimeter of the rectangular sheet = 100 cm

Length of the rectangular sheet = 35 cm

We know that,

Perimeter of the rectangle = 2 (Length + Breadth)

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

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

$$50 - 35 = \text{Breadth}$$

$$\text{Breadth} = 15 \text{ cm}$$

Then,

Area of the rectangle = Length × Breadth

$$= 35 \times 15$$

$$= 525 \text{ cm}^2$$

∴ Area of the rectangular sheet is 525 cm²

Question 5

The area of a square park is the same as that 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

Solution:-

From the question, it is given that

The area of a square park is the same as that of a rectangular park.

Side of the square park = 60 m

Length of the rectangular park = 90 m

We know that,

Area of the square park = (One of the sides of the square)²

$$= 60^2$$

$$= 3600 \text{ m}^2$$

Area of the rectangular park = 3600 m² ... [∵ given]

$$\text{Length} \times \text{Breadth} = 3600$$

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

$$\text{Breadth} = 3600/90$$

$$\text{Breadth} = 40 \text{ m}$$

Question 6

A wire is in the shape of a rectangle. Its length is 40 cm, and its breadth is 22 cm. If the same wire is rebent in the shape of a square, what will be the measure of each side?

Also, find which shape encloses more area.

Solution

Solution:-

By reading the question, we can conclude that the perimeter of the square is the same as the perimeter of the rectangle.

From the question, it is given that

Length of the rectangle = 40 cm

Breadth of the square = 22 cm

Then,

Perimeter of the rectangle = Perimeter of the Square

$$2 (\text{Length} + \text{Breadth}) = 4 \times \text{side}$$

$$2 (40 + 22) = 4 \times \text{side}$$

$$2 (62) = 4 \times \text{side}$$

$$124 = 4 \times \text{side}$$

$$\text{Side} = 124/4$$

$$\text{Side} = 31 \text{ cm}$$

So, the area of the rectangle = (Length $\times$ Breadth)

$$= 40 \times 22$$

$$= 880 \text{ cm}^2$$

Area of square = side²

$$= 31^2$$

$$= 31 \times 31$$

$$= 961 \text{ cm}^2$$

$\therefore$ Square-shaped wire encloses more area.

Question 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

Solution:-

From the question, it is given that

Perimeter of the rectangle = 130 cm

Breadth of the rectangle = 30

We know that

Perimeter of rectangle = 2 (Length + Breadth)

$$130 = 2 (\text{length} + 30)$$

$$130/2 = \text{length} + 30$$

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

$$\text{Length} = 65 - 30$$

$$\text{Length} = 35 \text{ cm}$$

Then,

Area of the rectangle = Length $\times$ Breadth

$$= 35 \times 30$$

$$= 1050 \text{ cm}^2$$

Question 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 (Fig). Find the cost of whitewashing the wall if the rate of whitewashing the wall is ₹ 20 per m^2 .



Solution

Solution:-

From the question, it is given that

Length of the door = 2 m

Breadth of the door = 1 m

Length of the wall = 4.5 m

Breadth of the wall = 3.6 m

Then,

Area of the door = Length $\times$ Breadth

$$= 2 \times 1$$

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

Area of the wall = Length $\times$ Breadth

$$= 4.5 \times 3.6$$

$$= 16.2 \text{ m}^2$$

$$\text{So, area to be whitewashed} = 16.2 - 2 = 14.2 \text{ m}^2$$

Cost of whitewashing 1 m² area = ₹ 20

Hence, the cost of whitewashing 14.2 m² area = 14.2×20

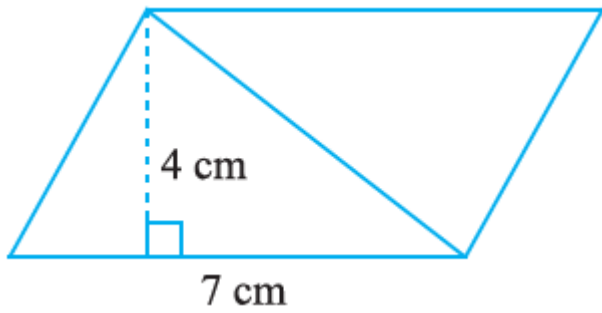
$$= ₹ 284$$

Exercise 11.2 · Textbook page 216

Question 1

Find the area of each of the following parallelograms.

(a)

**Solution****Solution:-**

From the figure,

Height of parallelogram = 4 cm

Base of parallelogram = 7 cm

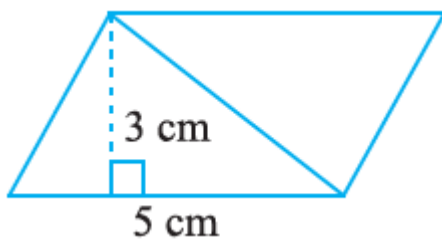
Then,

Area of parallelogram = Base $\times$ Height

$$= 7 \times 4$$

$$= 28 \text{ cm}^2$$

(b)

**Solution:-**

From the figure,

Height of parallelogram = 3 cm

Base of parallelogram = 5 cm

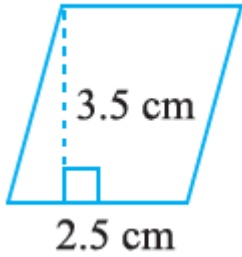
Then,

Area of parallelogram = Base $\times$ Height

$$= 5 \times 3$$

$$= 15 \text{ cm}^2$$

(c)



Solution:-

From the figure,

Height of parallelogram = 3.5 cm

Base of parallelogram = 2.5 cm

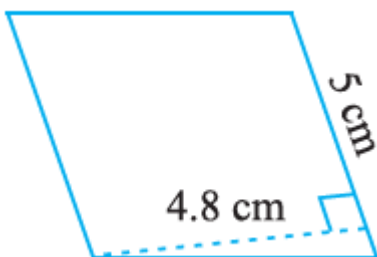
Then,

Area of parallelogram = Base $\times$ Height

$$= 2.5 \times 3.5$$

$$= 8.75 \text{ cm}^2$$

(d)



Solution:-

From the figure,

Height of parallelogram = 4.8 cm

Base of parallelogram = 5 cm

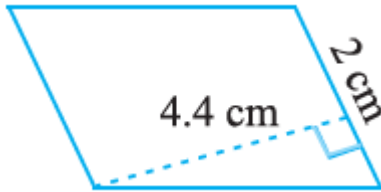
Then,

Area of parallelogram = Base $\times$ Height

$$= 5 \times 4.8$$

$$= 24 \text{ cm}^2$$

(e)



Solution:-

From the figure,

Height of parallelogram = 4.4 cm

Base of parallelogram = 2 cm

Then,

Area of parallelogram = Base $\times$ Height

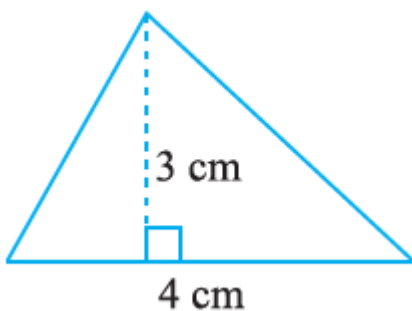
$$= 2 \times 4.4$$

$$= 8.8 \text{ cm}^2$$

Question 2

Find the area of each of the following triangles.

(a)



Solution**Solution:-**

From the figure,

Base of triangle = 4 cm

Height of height = 3 cm

Then,

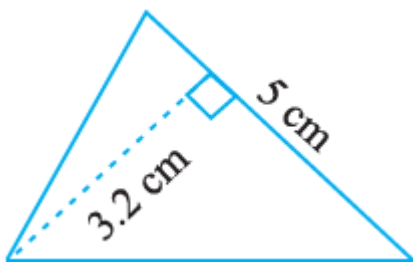
Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 4 \times 3$$

$$= 1 \times 2 \times 3$$

$$= 6 \text{ cm}^2$$

(b)

**Solution:-**

From the figure,

Base of triangle = 3.2 cm

Height of height = 5 cm

Then,

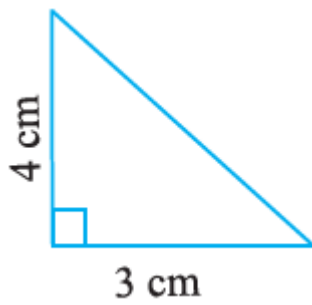
Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 3.2 \times 5$$

$$= 1 \times 1.6 \times 5$$

$$= 8 \text{ cm}^2$$

(c)

**Solution:-**

From the figure,

Base of triangle = 3 cm

Height of triangle = 4 cm

Then,

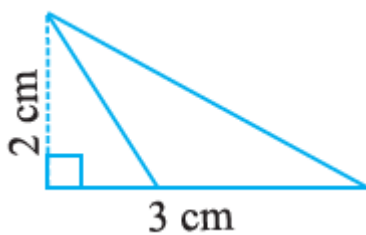
Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 3 \times 4$$

$$= 1 \times 3 \times 2$$

$$= 6 \text{ cm}^2$$

(d)

**Solution:-**

From the figure,

Base of triangle = 3 cm

Height of triangle = 2 cm

Then,

Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 3 \times 2$$

$$= 1 \times 3 \times 1$$

$$= 3 \text{ cm}^2$$

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.		8.4 cm	48.72 cm ²
d.	15.6 cm		16.38 cm ²

Solution

Solution:-

(a)

From the table,

Base of parallelogram = 20 cm

Height of parallelogram = ?

Area of the parallelogram = 246 cm²

Then,

Area of parallelogram = Base $\times$ Height

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

$$\text{Height} = 246/20$$

$$\text{Height} = 12.3 \text{ cm}$$

∴ Height of the parallelogram is 12.3 cm.

(b)

From the table,

Base of parallelogram = ?

Height of parallelogram = 15 cm

Area of the parallelogram = 154.5 cm^2

Then,

Area of parallelogram = Base $\times$ Height

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

$$\text{Base} = 154.5/15$$

$$\text{Base} = 10.3 \text{ cm}$$

∴ Base of the parallelogram is 10.3 cm.

(c)

From the table,

Base of parallelogram = ?

Height of parallelogram = 8.4 cm

Area of the parallelogram = 48.72 cm^2

Then,

Area of parallelogram = Base $\times$ Height

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

$$\text{Base} = 48.72/8.4$$

$$\text{Base} = 5.8 \text{ cm}$$

∴ Base of the parallelogram is 5.8 cm.

(d)

From the table,

Base of parallelogram = 15.6 cm

Height of parallelogram = ?

Area of the parallelogram = 16.38 cm^2

Then,

Area of parallelogram = Base $\times$ Height

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

Height = $16.38/15.6$

Height = 1.05 cm

$\therefore$ Height of the parallelogram is 1.05 cm.

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	8.4 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

Solution

Solution:-

(a)

From the table,

Height of triangle =?

Base of triangle = 15 cm

Area of the triangle = 16.38 cm^2

Then,

Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

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

Height = $(87 \times 2)/15$

Height = $174/15$

Height = 11.6 cm

$\therefore$ Height of the triangle is 11.6 cm.

(b)

From the table,

Height of triangle = 31.4 mm

Base of triangle =?

Area of the triangle = 1256 mm^2

Then,

Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

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

Base = $(1256 \times 2)/31.4$

Base = $2512/31.4$

Base = 80 mm = 8 cm

$\therefore$ Base of the triangle is 80 mm or 8 cm.

(c)

From the table,

Height of triangle =?

Base of triangle = 22 cm

Area of the triangle = 170.5 cm^2

Then,

Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

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

$170.5 = 1 \times 11 \times \text{height}$

Height = $170.5/11$

Height = 15.5 cm

$\therefore$ Height of the triangle is 15.5 cm.

Question 5

PQRS is a parallelogram (Fig 11.23). 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

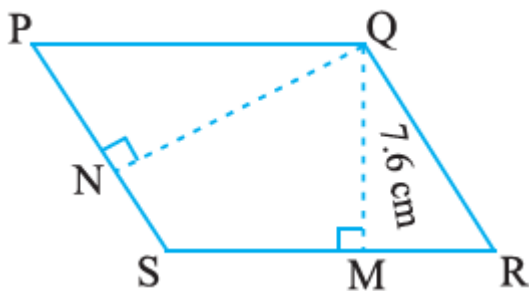


Fig 11.23

Solution

Solution:-

From the question, it is given that

SR = 12 cm, QM = 7.6 cm

(a) We know that,

Area of the parallelogram = Base $\times$ Height

$$= SR \times QM$$

$$= 12 \times 7.6$$

$$= 91.2 \text{ cm}^2$$

(b) Area of the parallelogram = Base $\times$ Height

$$91.2 = PS \times QN$$

$$91.2 = 8 \times QN$$

$$QN = 91.2/8$$

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

Question 6

DL and BM are the heights on sides AB and AD, respectively, of parallelogram ABCD (Fig 11.24). 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.

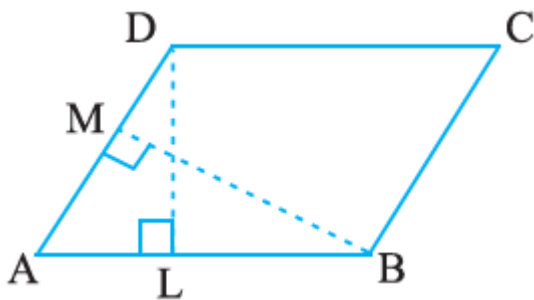


Fig 11.24

Solution

Solution:-

From the question, it is given that

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

$$AB = 35 \text{ cm}$$

$$AD = 49 \text{ cm}$$

Then,

We know that,

Area of the parallelogram = Base $\times$ Height

$$1470 = AB \times BM$$

$$1470 = 35 \times DL$$

$$DL = 1470/35$$

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

And,

Area of the parallelogram = Base $\times$ Height

$$1470 = AD \times BM$$

$$1470 = 49 \times BM$$

$$BM = 1470/49$$

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

Question 7

$\triangle ABC$ is right-angled at A (Fig 11.25). AD is perpendicular to BC. If AB = 5 cm, BC = 13 cm, and AC = 12 cm, find the area of $\triangle ABC$. Also, find the length of AD.

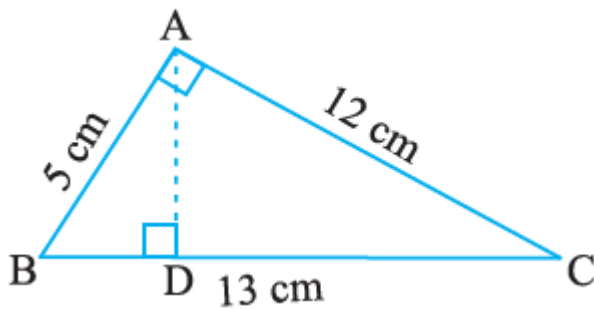


Fig 11.25

Solution

Solution:-

From the question, it is given that

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

Then,

We know that,

Area of the $\triangle ABC = \frac{1}{2} \times \text{Base} \times \text{Height}$

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

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

$$= 1 \times 5 \times 6$$

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

Now,

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

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

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

$$(30 \times 2)/13 = AD$$

$$AD = 60/13$$

$$AD = 4.6 \text{ cm}$$

Question 8

$\triangle ABC$ is isosceles with $AB = AC = 7.5 \text{ cm}$ and $BC = 9 \text{ cm}$ (Fig 11.26). 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 ?

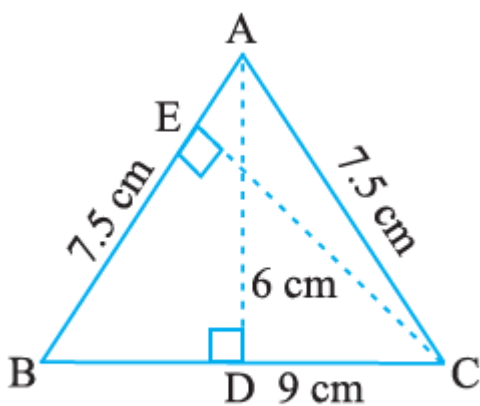


Fig 11.26

Solution

Solution:-

From the question, it is given that

$$AB = AC = 7.5 \text{ cm}, BC = 9 \text{ cm}, AD = 6 \text{ cm}$$

Then,

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

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

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

$$= 1 \times 9 \times 3$$

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

Now,

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

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

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

$$(27 \times 2)/7.5 = CE$$

$$CE = 54/7.5$$

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

Exercise 11.3 · Textbook page 223

Question 1

Find the circumference of the circle with the following radius. (Take $\pi = 22/7$)

(a) 14 cm

Solution

Solution:-

Given, the radius of the circle = 14 cm

Circumference of the circle = $2\pi r$

$$= 2 \times (22/7) \times 14$$

$$= 2 \times 22 \times 2$$

$$= 88 \text{ cm}$$

(b) 28 mm

Solution:-

Given, the radius of the circle = 28 mm

Circumference of the circle = $2\pi r$

$$= 2 \times (22/7) \times 28$$

$$= 2 \times 22 \times 4$$

$$= 176 \text{ mm}$$

(c) 21 cm

Solution:-

Given, the radius of the circle = 21 cm

Circumference of the circle = $2\pi r$

$$= 2 \times (22/7) \times 21$$

$$= 2 \times 22 \times 3$$

$$= 132 \text{ cm}$$

Question 2

Find the area of the following circles, given that

(a) Radius = 14 mm (Take $\pi = 22/7$)

Solution

Given, the radius of the circle = 14 mm

Then,

$$\text{Area of the circle} = \pi r^2$$

$$= 22/7 \times 14^2$$

$$= 22/7 \times 196$$

$$= 22 \times 28$$

$$= 616 \text{ mm}^2$$

(b) Diameter = 49 m

Given, the diameter of the circle (d) = 49 m

We know that radius (r) = d/2

$$= 49/2$$

$$= 24.5 \text{ m}$$

Then,

$$\text{Area of the circle} = \pi r^2$$

$$= 22/7 \times (24.5)^2$$

$$= 22/7 \times 600.25$$

$$= 22 \times 85.75$$

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

(c) Radius = 5 cm

Given, the radius of the circle = 5 cm

Then,

$$\text{Area of the circle} = \pi r^2$$

$$= 22/7 \times 5^2$$

$$= 22/7 \times 25$$

$$= 550/7$$

$$= 78.57 \text{ cm}^2$$

Question 3

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

Solution

Solution:-

From the question, it is given that

Circumference of the circle = 154 m

Then,

We know that the circumference of the circle = $2\pi r$

$$154 = 2 \times (22/7) \times r$$

$$154 = 44/7 \times r$$

$$r = (154 \times 7)/44$$

$$r = (14 \times 7)/4$$

$$r = (7 \times 7)/2$$

$$r = 49/2$$

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

Now,

$$\text{Area of the circle} = \pi r^2$$

$$= 22/7 \times (24.5)^2$$

$$= 22/7 \times 600.25$$

$$= 22 \times 85.75$$

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

So, the radius of the circle is 24.5, and the area of the circle is 1886.5.

Question 4

A gardener wants to fence a circular garden of diameter 21m. Find the length of the rope he needs to purchase, if he makes 2 rounds of the fence. Also, find the cost of the rope, if it costs ₹ 4 per meter. (Take $\pi = 22/7$)



Solution

Solution:-

From the question, it is given that

Diameter of the circular garden = 21 m

We know that radius (r) = $d/2$

$$= 21/2$$

$$= 10.5 \text{ m}$$

Then,

Circumference of the circle = $2\pi r$

$$= 2 \times (22/7) \times 10.5$$

$$= 462/7$$

$$= 66 \text{ m}$$

So, the length of rope required = $2 \times 66 = 132 \text{ m}$

Cost of 1 m rope = ₹ 4 [given]

Cost of 132 m rope = ₹ 4 × 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 $\pi = 3.14$)

Solution**Solution:-**

From the question, it is given that

Radius of circular sheet $R = 4$ cm

A circle of radius to be removed $r = 3$ cm

Then,

The area of the remaining sheet $= \pi R^2 - \pi r^2$

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

$$= 3.14 (4^2 - 3^2)$$

$$= 3.14 (16 - 9)$$

$$= 3.14 \times 7$$

$$= 21.98 \text{ cm}^2$$

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

Question 6

Saima wants to put 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**Solution:-**

From the question, it is given that

Diameter of the circular table $= 1.5$ m

We know that radius $(r) = d/2$

$$= 1.5/2$$

$$= 0.75 \text{ m}$$

Then,

$$\text{Circumference of the circle} = 2\pi r$$

$$= 2 \times 3.14 \times 0.75$$

$$= 4.71 \text{ m}$$

$$\text{So, the length of the lace} = 4.71 \text{ m}$$

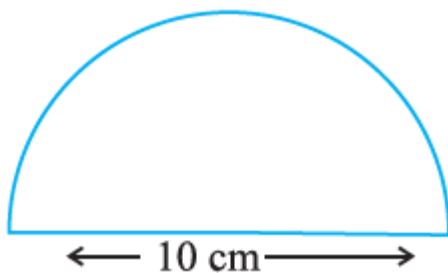
$$\text{Cost of 1 m lace} = ₹ 15 \text{ [given]}$$

$$\text{Cost of 4.71 m lace} = ₹ 15 \times 4.71$$

$$= ₹ 70.65$$

Question 7

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



Solution

Solution:-

From the question, it is given that

$$\text{Diameter of semi-circle} = 10 \text{ cm}$$

$$\text{We know that radius (r)} = d/2$$

$$= 10/2$$

$$= 5 \text{ cm}$$

Then,

$$\text{Circumference of the semi-circle} = \pi r + 2r$$

$$= 3.14(5) + 2(5)$$

$$= 5 [3.14 + 2]$$

$$= 5 [5.14]$$

Therefore, the perimeter of the semicircle = 25.7 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 $\pi = 3.14$)

Solution

Solution:-

From the question, it is given that

Diameter of the circular table-top = 1.6 m

We know that radius (r) = $d/2$

$$= 1.6/2$$

$$= 0.8 \text{ m}$$

Then,

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

$$= 3.14 \times 0.8^2$$

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

$$= 2.0096 \text{ m}^2$$

$$\text{Cost for polishing } 1 \text{ m}^2 \text{ area} = ₹ 15 \text{ [given]}$$

$$\text{Cost for polishing } 2.0096 \text{ m}^2 \text{ area} = ₹ 15 \times 2.0096$$

$$= ₹ 30.144$$

Hence, the cost of polishing 2.0096 m² area is ₹ 30.144.

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 $\pi = 22/7$)

Solution**Solution:-**

From the question, it is given that

Length of wire that Shazli took = 44 cm

Then,

If the wire is bent into a circle,

We know that the circumference of the circle = $2\pi r$

$$44 = 2 \times (22/7) \times r$$

$$44 = 44/7 \times r$$

$$(44 \times 7)/44 = r$$

$$r = 7 \text{ cm}$$

$$\text{Area of the circle} = \pi r^2$$

$$= 22/7 \times 7^2$$

$$= 22/7 \times 7 \times 7$$

$$= 22 \times 7$$

$$= 154 \text{ cm}^2$$

Now,

If the wire is bent into a square,

$$\text{The length of each side of the square} = 44/4$$

$$= 11 \text{ cm}$$

$$\text{Area of the square} = \text{Length of the side of square}^2$$

$$= 11^2$$

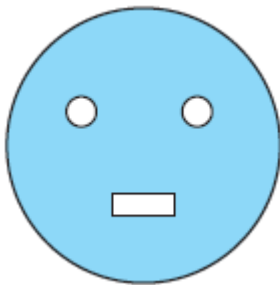
$$= 121 \text{ cm}^2$$

By comparing the two areas of the square and circle,

Clearly, the circle encloses 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 $\pi = 22/7$)



Solution

Solution:-

From the question, it is given that

Radius of the circular card sheet = 14 cm

Radius of the two small circles = 3.5 cm

Length of the rectangle = 3 cm

Breadth of the rectangle = 1 cm

First, we have to find out the area of the circular card sheet, two circles and the rectangle to find out the remaining area.

Now,

$$\text{Area of the circular card sheet} = \pi r^2$$

$$= 22/7 \times 14^2$$

$$= 22/7 \times 14 \times 14$$

$$= 22 \times 2 \times 14$$

$$= 616 \text{ cm}^2$$

$$\text{Area of the 2 small circles} = 2 \times \pi r^2$$

$$= 2 \times (22/7 \times 3.5^2)$$

$$= 2 \times (22/7 \times 3.5 \times 3.5)$$

$$= 2 \times ((22/7) \times 12.25)$$

$$= 2 \times 38.5$$

$$= 77 \text{ cm}^2$$

$$\text{Area of the rectangle} = \text{Length} \times \text{Breadth}$$

$$= 3 \times 1$$

$$= 3 \text{ cm}^2$$

Now,

$$\text{The area of the remaining part} = \text{Card sheet area} - (\text{Area of two small circles} + \text{Rectangle area})$$

$$= 616 - (77 + 3)$$

$$= 616 - 80$$

$$= 536 \text{ cm}^2$$

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 leftover aluminium sheet? (Take $\pi = 3.14$)

Solution

Solution:-

From the question, it is given that

Radius of circle = 2 cm

Square sheet side = 6 cm

First, we have to find out the area of the square aluminium sheet and circle to find out the remaining area.

Now,

$$\text{Area of the square} = \text{side}^2$$

$$= 6^2$$

$$= 36 \text{ cm}^2$$

$$\text{Area of the circle} = \pi r^2$$

$$= 3.14 \times 2^2$$

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

$$= 3.14 \times 4$$

$$= 12.56 \text{ cm}^2$$

Now,

The area of the remaining part = Area of the aluminium square sheet – The area of the circle

$$= 36 - 12.56$$

$$= 23.44 \text{ cm}^2$$

Question 12

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

Solution

Solution:-

From the question, it is given that

$$\text{Circumference of a circle} = 31.4 \text{ cm}$$

We know that,

$$\text{Circumference of a circle} = 2\pi r$$

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

$$31.4 = 6.28 \times r$$

$$31.4/6.28 = r$$

$$r = 5 \text{ cm}$$

Then,

$$\text{Area of the circle} = \pi r^2$$

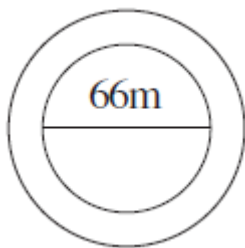
$$= 3.14 \times 5^2$$

$$= 3.14 \times 25$$

$$= 78.5 \text{ cm}$$

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? ($\pi = 3.14$)



Solution

Solution:-

From the question, it is given that

Diameter of the flower bed = 66 m

Then,

Radius of the flower bed = $d/2$

$$= 66/2$$

$$= 33 \text{ m}$$

$$\text{Area of flower bed} = \pi r^2$$

$$= 3.14 \times 33^2$$

$$= 3.14 \times 1089$$

$$= 3419.46 \text{ m}$$

Now, we have to find the area of the flower bed and path together.

So, the radius of the flower bed and path together = $33 + 4 = 37 \text{ m}$

$$\text{Area of the flower bed and path together} = \pi r^2$$

$$= 3.14 \times 37^2$$

$$= 3.14 \times 1369$$

$$= 4298.66 \text{ m}$$

Finally,

Area of the path = Area of the flower bed and path together – Area of the flower bed

$$= 4298.66 - 3419.46$$

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

Question 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

Solution:-

From the question, it is given that

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

The sprinkler at the centre of the garden can cover an area that has a radius = 12 m

$$\text{Area of the circular flower garden} = \pi r^2$$

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

$$314/3.14 = r^2$$

$$r^2 = 100$$

$$r = \sqrt{100}$$

$$r = 10 \text{ m}$$

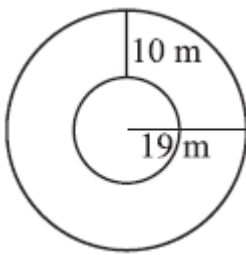
∴ Radius of the circular flower garden is 10 m.

The sprinkler can cover an area of a radius of 12 m.

Hence, the sprinkler will water the whole garden.

Question 15

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



Solution

Solution:-

From the figure,

Radius of inner circle = outer circle radius – 10

$$= 19 - 10$$

$$= 9 \text{ m}$$

Circumference of the inner circle = $2\pi r$

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

$$= 56.52 \text{ m}$$

Then,

Radius of outer circle = 19 m

Circumference of the outer circle = $2\pi r$

$$= 2 \times 3.14 \times 19$$

$$= 119.32 \text{ m}$$

Question 16

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

Solution

Solution:-

From the question, it is given that

Radius of the wheel = 28 cm

Circumference of the wheel = $2\pi r$

$$= 2 \times 22/7 \times 28$$

$$= 2 \times 22 \times 4$$

$$= 176 \text{ cm}$$

Now, we have to find the number of rotations of the wheel.

= Total distance to be covered/ Circumference of the wheel

$$= 352 \text{ m}/176 \text{ cm}$$

$$= 35200 \text{ cm}/176 \text{ cm}$$

$$= 200$$

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? (Take $\pi = 3.14$)

Solution

Solution:-

From the question, it is given that

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

Then,

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

$$= 2\pi r$$

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

$$= 94.2 \text{ cm}$$

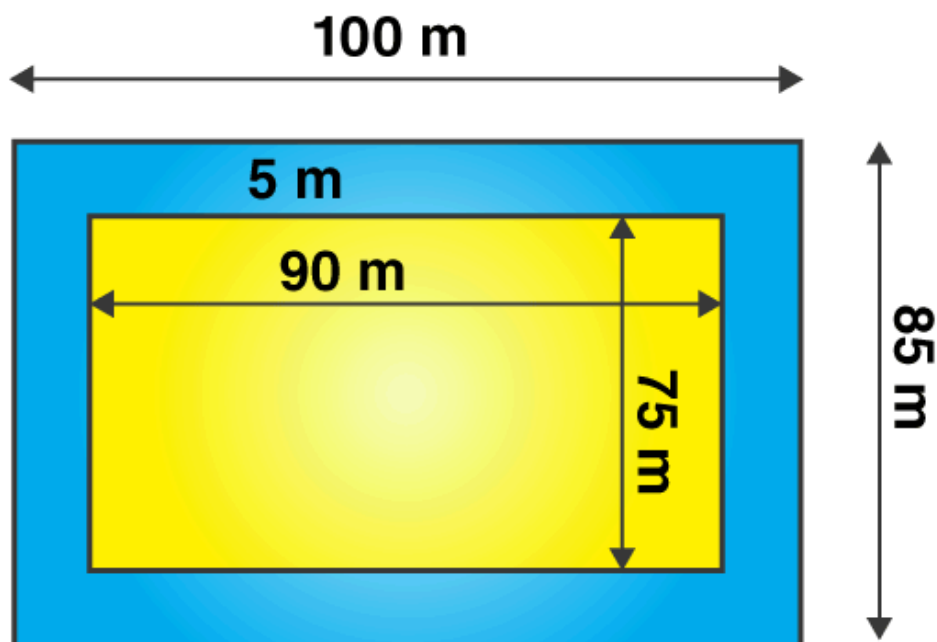
Exercise 11.4 · Textbook page 226

Question 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 hectares.

Solution

Solution:-



From the question, it is given that

Length of the garden (L) = 90 m

Breadth of the garden (B) = 75 m

Then,

Area of the garden = Length $\times$ Breadth

$$= 90 \times 75$$

$$= 6750 \text{ m}^2$$

From the figure,

The new length and breadth of the garden when the path is included are 100 m and 85 m, respectively.

New area of the garden = 100×85

$$= 8500 \text{ m}^2$$

The area of path = New area of the garden including path – Area of garden

$$= 8500 - 6750$$

$$= 1750 \text{ m}^2$$

For 1 hectare = 10000 m^2

Hence, the area of the garden in hectares = $6750/10000$

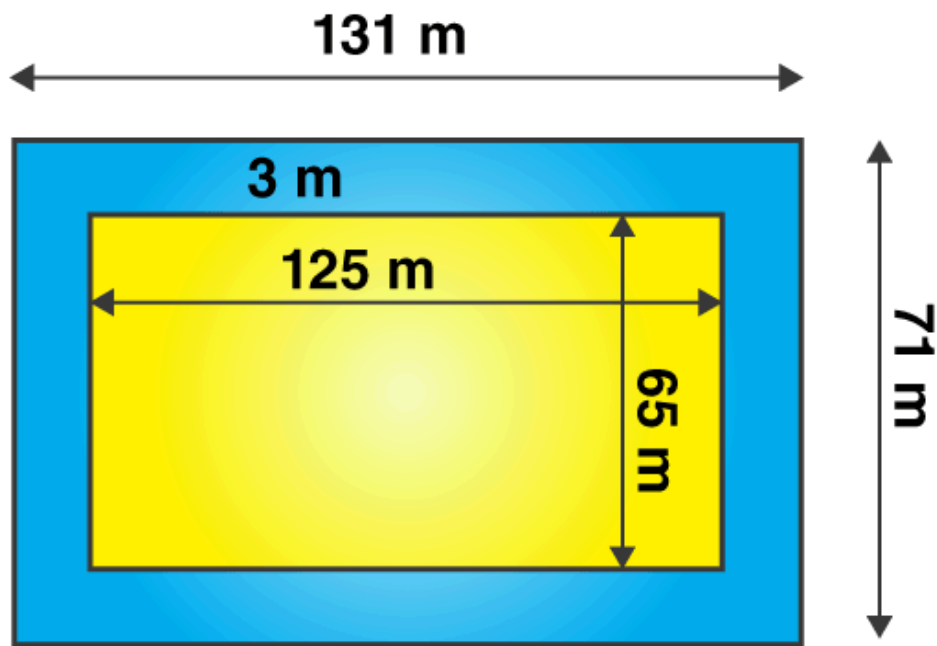
$$= 0.675 \text{ hectare}$$

Question 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

Solution:-



From the question, it is given that

Length of the park (L) = 125 m

Breadth of the park (B) = 65 m

Then,

Area of the park = Length $\times$ Breadth

$$= 125 \times 65$$

$$= 8125 \text{ m}^2$$

From the figure,

The new length and breadth of the park when the path is included are 131 m and 71 m, respectively.

New area of the park = 131 $\times$ 71

$$= 9301 \text{ m}^2$$

The area of path = New area of the park including path – Area of the park

$$= 9301 - 8125$$

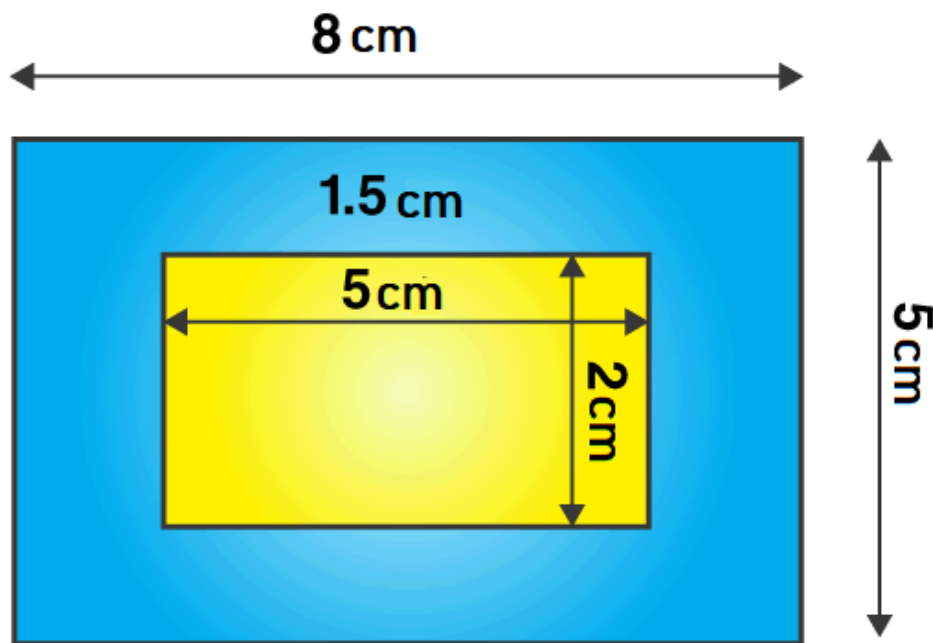
$$= 1176 \text{ m}^2$$

Question 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

Solution:-



From the question, it is given that

Length of the cardboard (L) = 8 cm

Breadth of the cardboard (B) = 5 cm

Then,

Area of the cardboard = Length $\times$ Breadth

$$= 8 \times 5$$

$$= 40 \text{ cm}^2$$

From the figure,

The new length and breadth of the cardboard when the margin is not included are 5 cm and 2 cm, respectively.

$$\text{New area of the cardboard} = 5 \times 2$$

$$= 10 \text{ cm}^2$$

The area of margin = Area of the cardboard when the margin is included – Area of the cardboard when the margin is not included

$$= 40 - 10$$

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

Question 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.

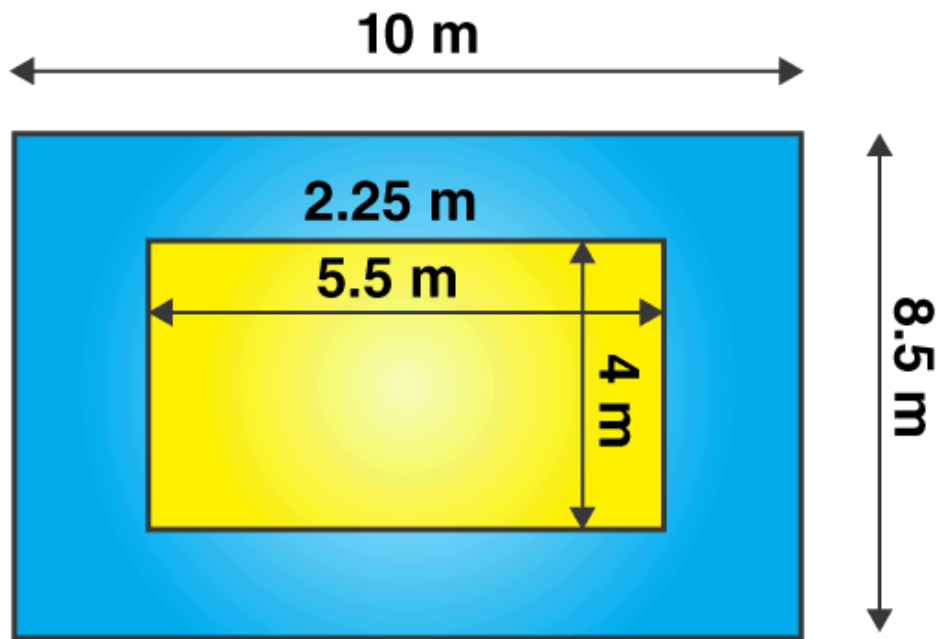
Find:

(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

Solution:-



(i)

From the question, it is given that

Length of the room (L) = 5.5 m

Breadth of the room (B) = 4 m

Then,

Area of the room = Length $\times$ Breadth

$$= 5.5 \times 4$$

$$= 22 \text{ m}^2$$

From the figure,

The new length and breadth of the room when the verandah is included are 10 m and 8.5 m, respectively.

The new area of the room when the verandah is included = 10×8.5

$$= 85 \text{ m}^2$$

The area of verandah = Area of the room when verandah is included – Area of the room

$$= 85 - 22$$

$$= 63 \text{ m}^2$$

(ii)

Given, the cost of cementing the floor of the verandah at the rate of ₹ 200 per m^2

Then the cost of cementing the 63 m^2 area of floor of the verandah = 200×63

$$= ₹ 12600$$

Question 5

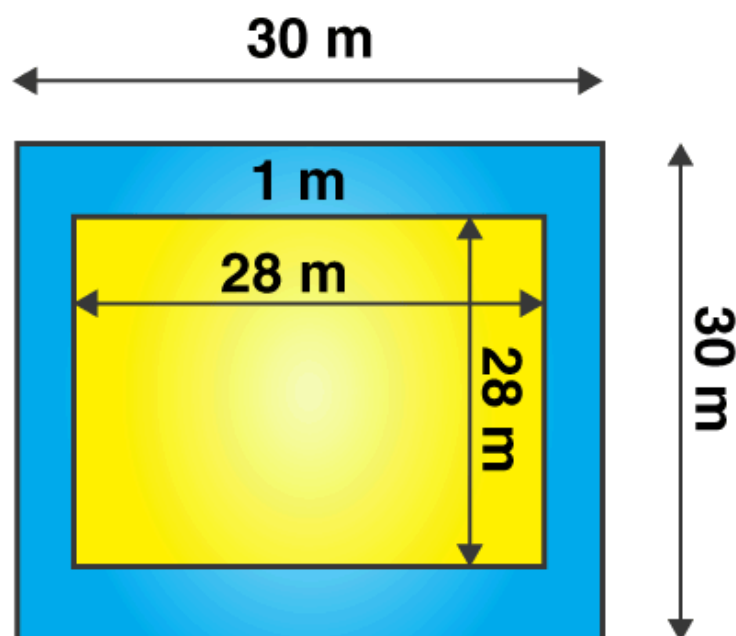
A path 1 m wide is built along the border and inside a square garden of side 30 m. Find:

(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

Solution:-



(i)

From the question, it is given that

Side of the square garden (s) = 30 m

Then,

Area of the square garden = S^2

$$= 30^2$$

$$= 30 \times 30$$

$$= 900 \text{ m}^2$$

From the figure,

The new side of the square garden, when the path is not included, is 28 m.

The new area of the room when the verandah is included = 28^2

$$= 28 \times 28$$

$$= 784 \text{ m}^2$$

The area of the path = Area of the square garden when the path is included – Area of the square garden when the path is not included

$$= 900 - 784$$

$$= 116 \text{ m}^2$$

(ii)

Given, the cost of planting the grass in the remaining portion of the garden at the rate of

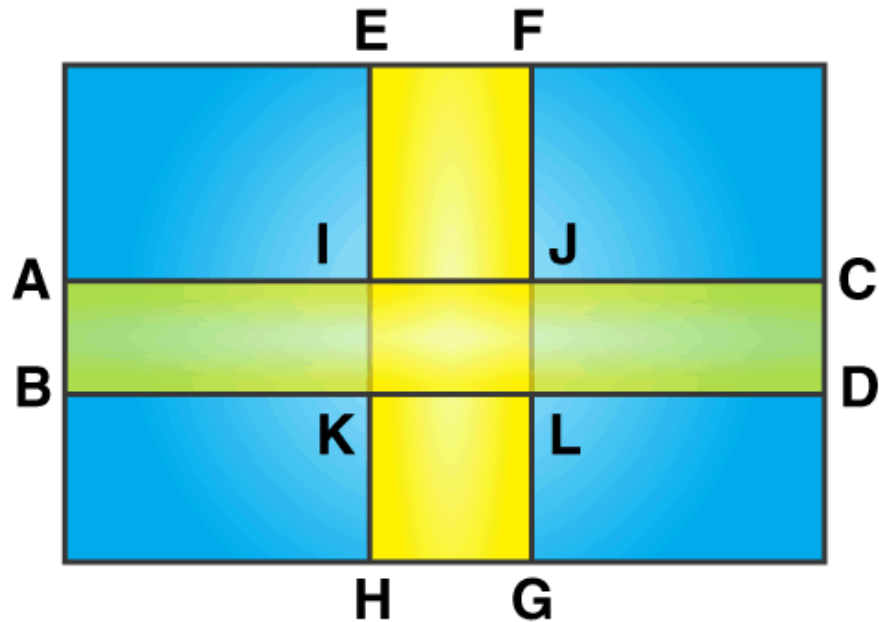
$$= ₹ 40 \text{ per m}^2$$

Then the cost of planting the grass in 784 m^2 area of the garden = 784×40

$$= ₹ 31360$$

Question 6

Two crossroads, each of width 10 m, cut at right angles through the centre 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 the crossroads. Give the answer in hectares.

Solution**Solution:-**

From the question, it is given that

Length of the park (L) = 700 m

Breadth of the park (B) = 300 m

Then,

Area of the park = Length $\times$ Breadth

$$= 700 \times 300$$

$$= 210000 \text{ m}^2$$

Let us assume that ABCD is the one crossroad and EFGH is another crossroad in the park.

The length of ABCD cross road = 700 m

The length of EFGH cross road = 300 m

Both crossroads have the same width = 10 m

Then,

Area of the ABCD cross road = Length $\times$ Breadth

$$= 700 \times 10$$

$$= 7000 \text{ m}^2$$

Area of the EFGH cross road = Length $\times$ Breadth

$$= 300 \times 10$$

$$= 3000 \text{ m}^2$$

Area of the IJKL at centre = Length $\times$ Breadth

$$= 10 \times 10$$

$$= 100 \text{ m}^2$$

Area of the roads = Area of ABCD + Area of EFGH – Area of IJKL

$$= 7000 + 3000 - 100$$

$$= 10000 - 100$$

$$= 9900 \text{ m}^2$$

We know that for 1 hectare = 10000 m^2

Hence, the area of roads in hectares = $9900/10000$

$$= 0.99 \text{ hectare}$$

Finally, the area of the park excluding roads = Area of the park – Area of the roads

$$= 210000 - 9900$$

$$= 200100 \text{ m}^2$$

$$= 200100/10000$$

$$= 20.01 \text{ hectare}$$

Question 7

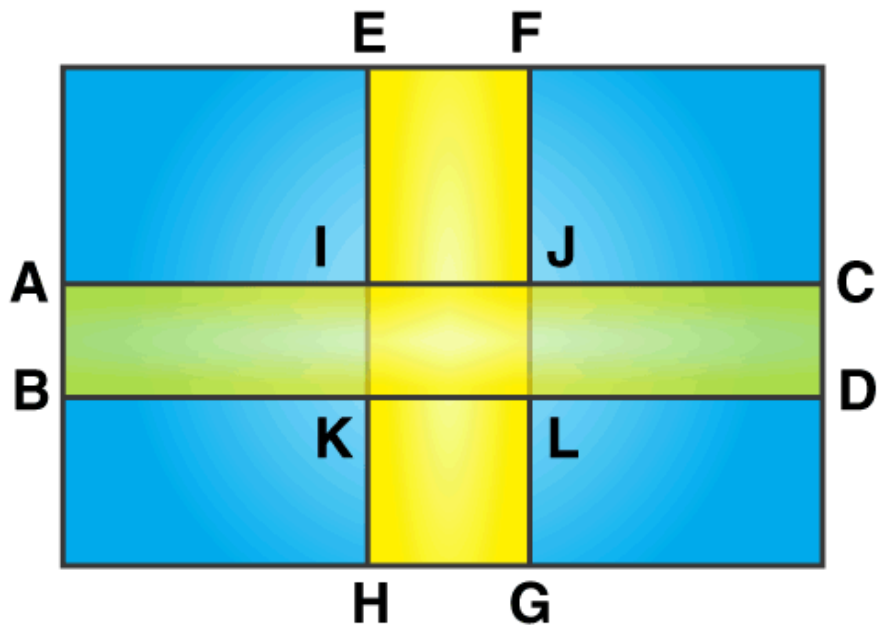
Through a rectangular field of length 90 m and breadth 60 m, two roads are constructed which are parallel to the sides and cut each other at right angles through the centre of the fields. If the width of each road is 3 m, find

(i) the area covered by the roads.

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

Solution

Solution:-



(i)

From the question, it is given that

Length of the field (L) = 90 m

Breadth of the field (B) = 60 m

Then,

Area of the field = Length $\times$ Breadth

$$= 90 \times 60$$

$$= 5400 \text{ m}^2$$

Let us assume that ABCD is the one crossroad and EFGH is another crossroad in the park.

The length of ABCD cross road = 90 m

The length of EFGH cross road = 60 m

Both crossroads have the same width = 3 m

Then,

Area of the ABCD cross road = Length $\times$ Breadth

$$= 90 \times 3$$

$$= 270 \text{ m}^2$$

Area of the EFGH cross road = length $\times$ breadth

$$= 60 \times 3$$

$$= 180 \text{ m}^2$$

Area of the IJKL at centre = Length $\times$ Breadth

$$= 3 \times 3$$

$$= 9 \text{ m}^2$$

Area of the roads = Area of ABCD + Area of EFGH – Area of IJKL

$$= 270 + 180 - 9$$

$$= 450 - 9$$

$$= 441 \text{ m}^2$$

(ii)

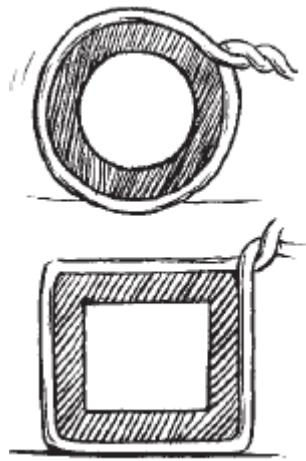
Given, the cost of constructing the roads at the rate of ₹ 110 per m^2 .

Then the cost of constructing the 441 m^2 roads = 441×110

$$= ₹ 48510$$

Question 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 cords left? ($\pi = 3.14$)



Solution

Solution:-

From the question, it is given that

Radius of a circular pipe = 4 cm

Side of a square = 4 cm

Then,

Perimeter of the circular pipe = $2\pi r$

$$= 2 \times 3.14 \times 4$$

$$= 25.12 \text{ cm}$$

Perimeter of the square = $4 \times \text{Side of the square}$

$$= 4 \times 4$$

$$= 16 \text{ cm}$$

So, the length of cord left with Pragya = Perimeter of the circular pipe – Perimeter of the square

$$= 25.12 - 16$$

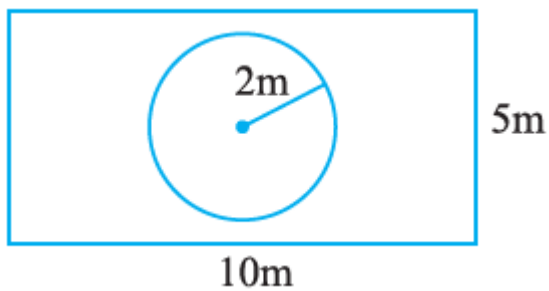
$$= 9.12 \text{ cm}$$

Yes, 9.12 cm cord is left.

Question 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**

Solution:-

(i)

From the figure,

Length of rectangular lawn = 10 m

Breadth of rectangular lawn = 5 m

Area of the rectangular lawn = Length $\times$ Breadth

$$= 10 \times 5$$

$$= 50 \text{ m}^2$$

(ii)

From the figure,

Radius of the flower bed = 2 m

Area of the flower bed = πr^2

$$= 3.14 \times 2^2$$

$$= 3.14 \times 4$$

$$= 12.56 \text{ m}^2$$

(iii)

The area of the lawn, excluding the area of the flower bed = Area of the rectangular lawn –

Area of the flower bed

$$= 50 - 12.56$$

$$= 37.44 \text{ m}^2$$

(iv)

The circumference of the flower bed = $2\pi r$

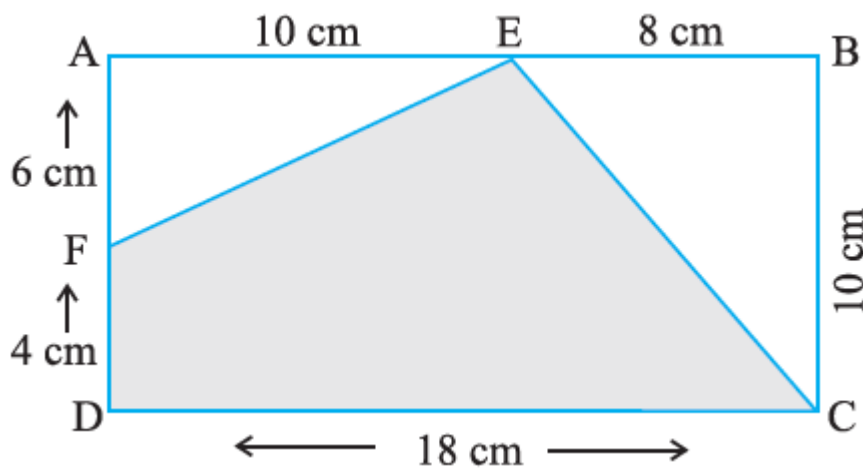
$$= 2 \times 3.14 \times 2$$

$$= 12.56 \text{ m}$$

Question 10

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

(i)



Solution

Solution:-

To find the area of EFDC, first, we have to find the area of $\triangle AEF$, $\triangle EBC$ and rectangle ABCD.

$$\text{Area of } \triangle AEF = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 6 \times 10$$

$$= 1 \times 3 \times 10$$

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

$$\text{Area of } \triangle EBC = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 8 \times 10$$

$$= 1 \times 4 \times 10$$

$$= 40 \text{ cm}^2$$

$$\text{Area of rectangle ABCD} = \text{Length} \times \text{Breadth}$$

$$= 18 \times 10$$

$$= 180 \text{ cm}^2$$

Then,

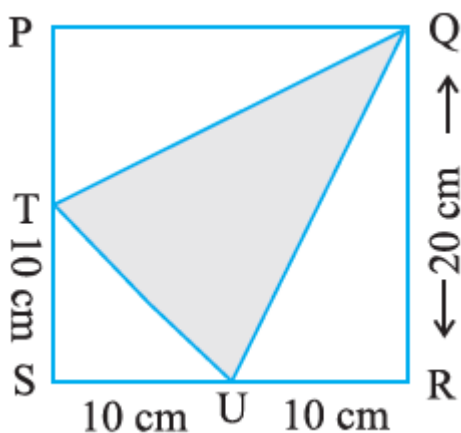
$$\text{Area of EFDC} = \text{ABCD area} - (\triangle AEF + \triangle EBC)$$

$$= 180 - (30 + 40)$$

$$= 180 - 70$$

$$= 110 \text{ cm}^2$$

(ii)



Solution:-

To find the area of $\triangle QTU$, first, we have to find the area of $\triangle STU$, $\triangle TPQ$, $\triangle QRU$ and square PQRS.

$$\text{Area of } \triangle STU = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 10 \times 10$$

$$= 1 \times 5 \times 10$$

$$= 50 \text{ cm}^2$$

$$\text{Area of } \triangle TPQ = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 10 \times 20$$

$$= 1 \times 5 \times 20$$

$$= 100 \text{ cm}^2$$

$$\text{Area of } \triangle QRU = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 10 \times 20$$

$$= 1 \times 5 \times 20$$

$$= 100 \text{ cm}^2$$

$$\text{Area of square PQRS} = \text{Side}^2$$

$$= 20 \times 20$$

$$= 400 \text{ cm}^2$$

Then,

$$\text{Area of } \triangle QTU = \text{PQRS area} - (\triangle STU + \triangle TPQ + \triangle QRU)$$

$$= 400 - (50 + 100 + 100)$$

$$= 400 - 250$$

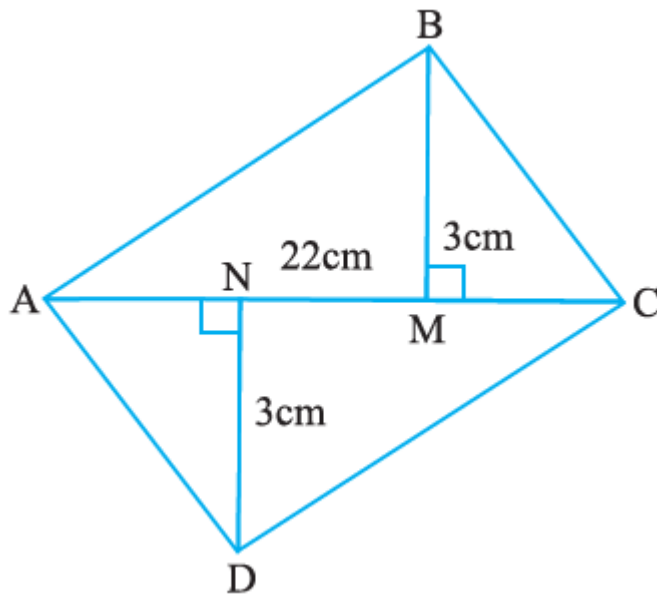
$$= 150 \text{ cm}^2$$

Question 11

Find the area of the quadrilateral ABCD.

Here, $AC = 22 \text{ cm}$, $BM = 3 \text{ cm}$,

$DN = 3 \text{ cm}$, and $BM \perp AC$, $DN \perp AC$



Solution

Solution:-

From the question, it is given that

AC = 22 cm, BM = 3 cm DN = 3 cm and $BM \perp AC$, $DN \perp AC$

To find the area of quadrilateral ABCD, first, we have to find the area of $\triangle ABC$, and $\triangle ADC$ Area of

$\triangle ABC = \frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 22 \times 3$$

$$= 1 \times 11 \times 3$$

$$= 33 \text{ cm}^2$$

Area of $\triangle ADC = \frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 22 \times 3$$

$$= 1 \times 11 \times 3$$

$$= 33 \text{ cm}^2$$

Then,

Area of quadrilateral ABCD = Area of $\triangle ABC$ + Area of $\triangle ADC$

$$= 33 + 33$$

$$= 66 \text{ cm}^2$$

Disclaimer:

Dropped Topics – 11.1 Introduction, 11.2 Squares and rectangles, 11.2.1 Triangles as parts of rectangles, 11.2.2 Generalising for other congruent parts of rectangles, 11.6 Conversion of units and 11.7 Applications.
