EXERCISE 11.1 PAGE: 208

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:-

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 × Breadth

= 500 × 300

= 150000 m^2

(ii) Cost of the land for 1 m^2 = ₹ 10000

Cost of the land for 150000 m^2 = 10000 × 150000

= ₹ 1500000000

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

Solution:-

From the question, it is given that

Perimeter of the square park = 320 m

4 × Length of the side of park = 320 m

Then,

Length of the side of the park = 320/4

= 80 m

So, the area of the square park = (Length of the side of the park)^2

= 80^2

= 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:-

From the question, it is given that

Area of the rectangular plot = 440 m^2

Length of the rectangular plot = 22 m

We know that,

Area of the rectangle = Length × Breadth

440 = 22 × Breadth

Breadth = 440/22

Breadth = 20 m

Then,

Perimeter of the rectangle = 2(Length + Breadth)

= 2 (22 + 20)

= 2(42)

= 84 m

∴ Perimeter of the rectangular plot is 84 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:-

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 + Breadth)

(100/2) = 35 + Breadth

50 – 35 = Breadth

Breadth = 15 cm

Then,

Area of the rectangle = Length × Breadth

= 35 × 15

= 525 cm^2

∴ Area of the rectangular sheet is 525 cm^2

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:-

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 m^2

Area of the rectangular park = 3600 m^2 … [∵ given]

Length × Breadth = 3600

90 × Breadth = 3600

Breadth = 3600/90

Breadth = 40 m

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:-

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 (Length + Breadth) = 4 × side

2 (40 + 22) = 4 × side

2 (62) = 4 × side

124 = 4 × side

Side = 124/4

Side = 31 cm

So, the area of the rectangle = (Length × Breadth)

= 40 × 22

= 880 cm^2

Area of square = $side^2$

= 31^2

= 31 × 31

= 961 cm^2

∴ 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:-

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 (length + 30)

130/2 = length + 30

Length + 30 = 65

Length = 65 – 30

Length = 35 cm

Then,

Area of the rectangle = Length × Breadth

= 35 × 30

= 1050 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 (Fig). Find the cost of whitewashing the wall if the rate of whitewashing the wall is ₹ 20 per m^2.

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 × Breadth

= 2 × 1

= 2 m^2

Area of the wall = Length × Breadth

= 4.5 × 3.6

= 16.2 m^2

So, area to be whitewashed = 16.2 – 2 = 14.2 m^2

Cost of whitewashing 1 m^2 area = ₹ 20

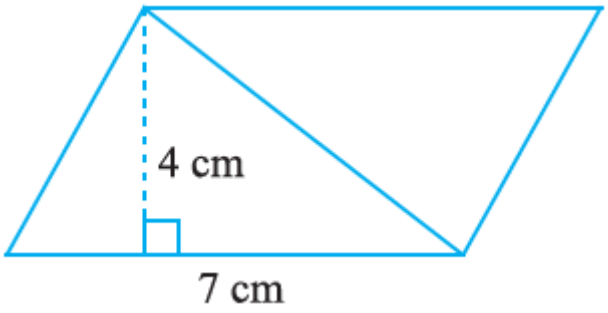
Hence, the cost of whitewashing 14.2 m^2 area = 14.2 × 20

= ₹ 284

EXERCISE 11.2 PAGE: 216

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

(a)



Solution:-

From the figure,

Height of parallelogram = 4 cm

Base of parallelogram = 7 cm

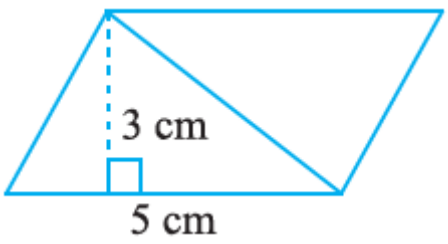
Then,

Area of parallelogram = Base × Height

= 7 × 4

= 28 cm^2

(b)



Solution:-

From the figure,

Height of parallelogram = 3 cm

Base of parallelogram = 5 cm

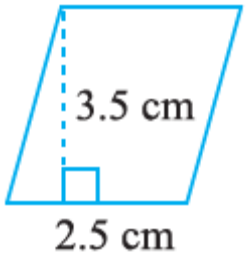
Then,

Area of parallelogram = Base × Height

= 5 × 3

= 15 cm^2

(c)



Solution:-

From the figure,

Height of parallelogram = 3.5 cm

Base of parallelogram = 2.5 cm

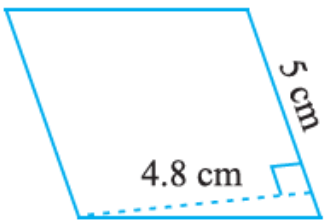
Then,

Area of parallelogram = Base × Height

= 2.5 × 3.5

= 8.75 cm^2

(d)



Solution:-

From the figure,

Height of parallelogram = 4.8 cm

Base of parallelogram = 5 cm

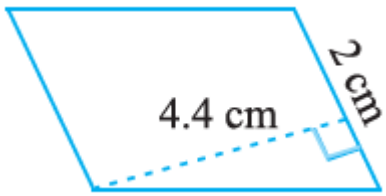
Then,

Area of parallelogram = Base × Height

= 5 × 4.8

= 24 cm^2

(e)



Solution:-

From the figure,

Height of parallelogram = 4.4 cm

Base of parallelogram = 2 cm

Then,

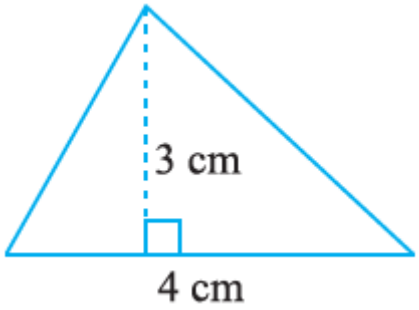
Area of parallelogram = Base × Height

= 2 × 4.4

= 8.8 cm^2

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

(a)



Solution:-

From the figure,

Base of triangle = 4 cm

Height of height = 3 cm

Then,

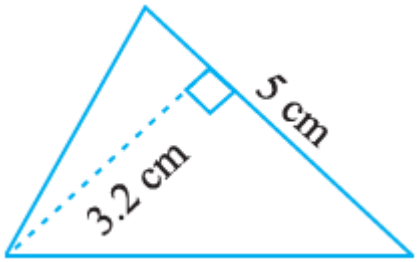
Area of triangle = ½ × Base × Height

= ½ × 4 × 3

= 1 × 2 × 3

= 6 cm^2

(b)



Solution:-

From the figure,

Base of triangle = 3.2 cm

Height of height = 5 cm

Then,

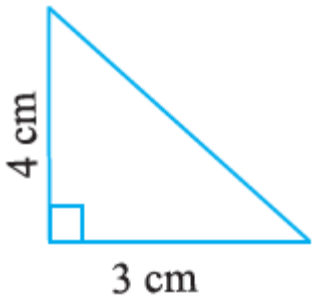
Area of triangle = ½ × Base × Height

= ½ × 3.2 × 5

= 1 × 1.6 × 5

= 8 cm^2

(c)



Solution:-

From the figure,

Base of triangle = 3 cm

Height of height = 4 cm

Then,

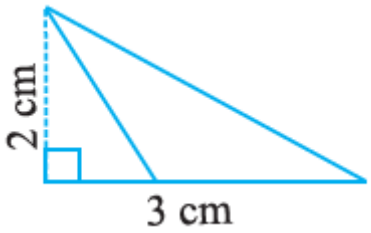
Area of triangle = ½ × Base × Height

= ½ × 3 × 4

= 1 × 3 × 2

= 6 cm^2

(d)



Solution:-

From the figure,

Base of triangle = 3 cm

Height of height = 2 cm

Then,

Area of triangle = ½ × Base × Height

= ½ × 3 × 2

= 1 × 3 × 1

= 3 cm^2

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:-

(a)

From the table,

Base of parallelogram = 20 cm

Height of parallelogram =?

Area of the parallelogram = 246 cm^2

Then,

Area of parallelogram = Base × Height

246 = 20 × height

Height = 246/20

Height = 12.3 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 × Height

154.5 = base × 15

Base = 154.5/15

Base = 10.3 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 × Height

48.72 = base × 8.4

Base = 48.72/8.4

Base = 5.8 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 × Height

16.38 = 15.6 × height

Height = 16.38/15.6

Height = 1.05 cm

∴ 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

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)

From the table,

Height of triangle =?

Base of triangle = 15 cm

Area of the triangle = 16.38 cm^2

Then,

Area of triangle = ½ × Base × Height

87 = ½ × 15 × height

Height = (87 × 2)/15

Height = 174/15

Height = 11.6 cm

∴ 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 = ½ × Base × Height

1256 = ½ × base × 31.4

Base = (1256 × 2)/31.4

Base = 2512/31.4

Base = 80 mm = 8 cm

∴ 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 = ½ × Base × Height

170.5 = ½ × 22 × height

170.5 = 1 × 11 × height

Height = 170.5/11

Height = 15.5 cm

∴ Height of the triangle is 15.5 cm.

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

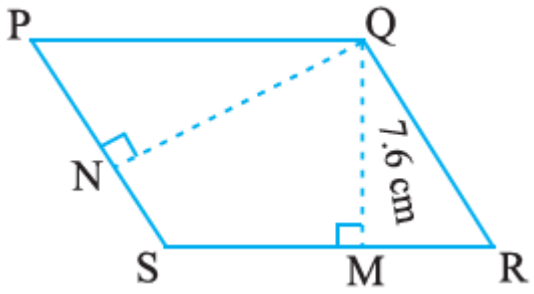


Fig 11.23

Solution:-

From the question, it is given that

SR = 12 cm, QM = 7.6 cm

(a) We know that,

Area of the parallelogram = Base × Height

= SR × QM

= 12 × 7.6

= 91.2 cm^2

(b) Area of the parallelogram = Base × Height

91.2 = PS × QN

91.2 = 8 × QN

QN = 91.2/8

QN = 11.4 cm

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 cm and AD = 49 cm, find the length of BM and DL.

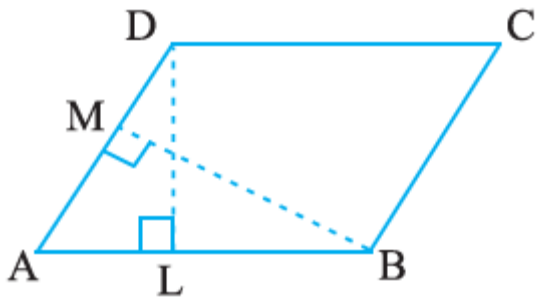


Fig 11.24

Solution:-

From the question, it is given that

Area of the parallelogram = 1470 cm^2

AB = 35 cm

AD = 49 cm

Then,

We know that,

Area of the parallelogram = Base × Height

1470 = AB × BM

1470 = 35 × DL

DL = 1470/35

DL = 42 cm

And,

Area of the parallelogram = Base × Height

1470 = AD × BM

1470 = 49 × BM

BM = 1470/49

BM = 30 cm

7. ΔABC 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 ΔABC. Also, find the length of AD.

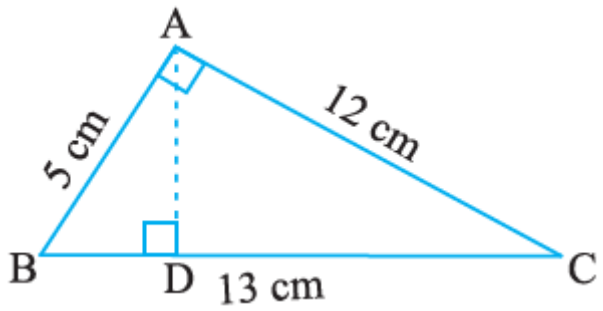


Fig 11.25

Solution:-

From the question, it is given that

AB = 5 cm, BC = 13 cm, AC = 12 cm

Then,

We know that,

Area of the ΔABC = ½ × Base × Height

= ½ × AB × AC

= ½ × 5 × 12

= 1 × 5 × 6

= 30 cm^2

Now,

Area of ΔABC = ½ × Base × Height

30 = ½ × AD × BC

30 = ½ × AD × 13

(30 × 2)/13 = AD

AD = 60/13

AD = 4.6 cm

8. ΔABC is isosceles with AB = AC = 7.5 cm and BC = 9 cm (Fig 11.26). 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?

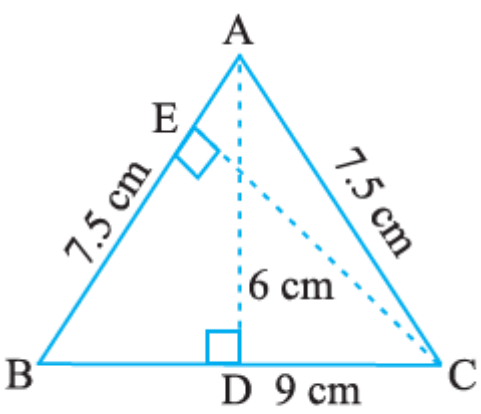


Fig 11.26

Solution:-

From the question, it is given that

AB = AC = 7.5 cm, BC = 9 cm, AD = 6cm

Then,

Area of ΔABC = ½ × Base × Height

= ½ × BC × AD

= ½ × 9 × 6

= 1 × 9 × 3

= 27 cm^2

Now,

Area of ΔABC = ½ × Base × Height

27 = ½ × AB × CE

27 = ½ × 7.5 × CE

(27 × 2)/7.5 = CE

CE = 54/7.5

CE = 7.2 cm

EXERCISE 11.3 PAGE: 223

1. Find the circumference of the circle with the following radius. (Take π = 22/7)

(a) 14 cm

Solution:-

Given, the radius of the circle = 14 cm

Circumference of the circle = 2πr

= 2 × (22/7) × 14

= 2 × 22 × 2

= 88 cm

(b) 28 mm

Solution:-

Given, the radius of the circle = 28 mm

Circumference of the circle = 2πr

= 2 × (22/7) × 28

= 2 × 22 × 4

= 176 mm

(c) 21 cm

Solution:-

Given, the radius of the circle = 21 cm

Circumference of the circle = 2πr

= 2 × (22/7) × 21

= 2 × 22 × 3

= 132 cm

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

(a) Radius = 14 mm (Take π = 22/7)

Solution:

Given, the radius of the circle = 14 mm

Then,

Area of the circle = πr^2

= $22/7 \times 14^2$

= $22/7 \times 196$

= 22×28

= $616\ mm^2$

(b) Diameter = 49 m

Solution:

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

We know that radius (r) = d/2

= 49/2

= 24.5 m

Then,

Area of the circle = πr^2

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

= $22/7 \times 600.25$

= 22×85.75

= $1886.5\ m^2$

(c) Radius = 5 cm

Solution:

Given, the radius of the circle = 5 cm

Then,

Area of the circle = πr^2

= $22/7 \times 5^2$

= $22/7 \times 25$

= $550/7$

= $78.57\ cm^2$

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

Solution:-

From the question, it is given that

Circumference of the circle = 154 m

Then,

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

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

$154 = 44/7 \times r$

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

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

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

$r = 49/2$

$r = 24.5$ m

Now,

Area of the circle = πr^2

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

= $22/7 \times 600.25$

= 22×85.75

= $1886.5\ m^2$

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

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 π = 22/7)

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 m

Then,

Circumference of the circle = 2πr

= 2 × (22/7) × 10.5

= 462/7

= 66 m

So, the length of rope required = 2 × 66 = 132 m

Cost of 1 m rope = ₹ 4 [given]

Cost of 132 m rope = ₹ 4 × 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 π = 3.14)

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 × 7

= 21.98 cm^2

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

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 π = 3.14)

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 m

Then,

Circumference of the circle = 2πr

= 2 × 3.14 × 0.75

= 4.71 m

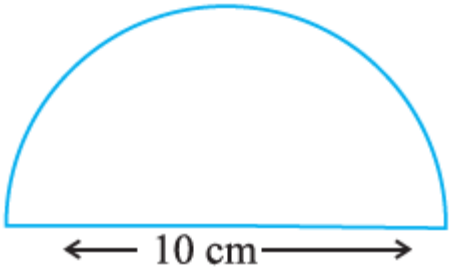
So, the length of the lace = 4.71 m

Cost of 1 m lace = ₹ 15 [given]

Cost of 4.71 m lace = ₹ 15 × 4.71

= ₹ 70.65

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



Solution:-

From the question, it is given that

Diameter of semi-circle = 10 cm

We know that radius (r) = d/2

= 10/2

= 5 cm

Then,

Circumference of the semi-circle = πr + 2r

= 3.14(5) + 2(5)

= 5 [3.14+ 2]

= 5 [5.14]

Therefore, the perimeter of the semicircle = 25.7 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 π = 3.14)

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 m

Then,

Area of the circular table-top = πr^2

$= 3.14 \times 0.8^2$

$= 3.14 \times 0.8 \times 0.8$

$= 2.0096\ m^2$

Cost for polishing 1 m^2 area = ₹ 15 [given]

Cost for polishing 2.0096 m^2 area = ₹ 15×2.0096

= ₹ 30.144

Hence, the cost of polishing 2.0096 m^2 area is ₹ 30.144.

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 π = 22/7)

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 = $2\pi r$

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

$44 = 44/7 \times r$

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

$r = 7$ cm

Area of the circle = πr^2

$= 22/7 \times 7^2$

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

$= 22 \times 7$

$= 154\ cm^2$

Now,

If the wire is bent into a square,

The length of each side of the square = 44/4

= 11 cm

Area of the square = Length of the side of square^2

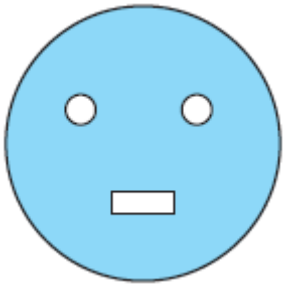
= 11^2

= 121 cm^2

By comparing the two areas of the square and circle,

Clearly, the 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 1cm are removed. (As shown in the adjoining figure.) Find the area of the remaining sheet. (Take π = 22/7)



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,

Area of the circular card sheet = πr^2

= 22/7 × 14^2

= 22/7 × 14 × 14

= 22 × 2 × 14

= 616 cm^2

Area of the 2 small circles = 2 × πr^2

= 2 × (22/7 × 3.5^2)

= 2 × (22/7 × 3.5 × 3.5)

= 2 × ((22/7) × 12.25)

= 2 × 38.5

= 77 cm^2

Area of the rectangle = Length × Breadth

= 3 × 1

= 3 cm^2

Now,

The area of the remaining part = Card sheet area – (Area of two small circles + Rectangle area)

= 616 – (77 + 3)

= 616 – 80

= 536 cm^2

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 π = 3.14)

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,

Area of the square = $side^2$

= 6^2

= 36 cm^2

Area of the circle = πr^2

= 3.14×2^2

= $3.14 \times 2 \times 2$

= 3.14×4

= 12.56 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 cm^2

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

Solution:-

From the question, it is given that

Circumference of a circle = 31.4 cm

We know that,

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 cm

Then,

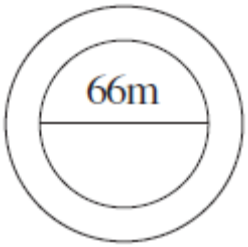
Area of the circle = πr^2

= 3.14×5^2

= 3. 14 × 25

= 78.5 cm

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? (π = 3.14)



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 m

Area of flower bed = πr^2

= 3.14×33^2

= 3.14×1089

= 3419.46 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 m

Area of the flower bed and path together = πr^2

= 3.14×37^2

= 3.14×1369

= 4298.66 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 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 π = 3.14)

Solution:-

From the question, it is given that

Area of the circular flower garden = 314 m^2

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

Area of the circular flower garden = πr^2

$314 = 3.14 \times r^2$

$314/3.14 = r^2$

$r^2 = 100$

$r = \sqrt{100}$

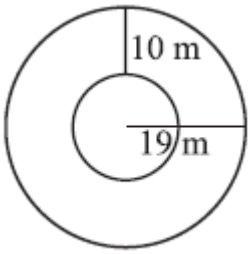
$r = 10$ m

∴ 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.

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



Solution:-

From the figure,

Radius of inner circle = outer circle radius – 10

= 19 – 10

= 9 m

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

= 2 × 3.14 × 9

= 56.52 m

Then,

Radius of outer circle = 19 m

Circumference of the outer circle = 2πr

= 2 × 3.14 × 19

= 119.32 m

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

Solution:-

From the question, it is given that

Radius of the wheel = 28 cm

Circumference of the wheel = 2πr

= 2 × 22/7 × 28

= 2 × 22 × 4

= 176 cm

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

= Total distance to be covered/ Circumference of the wheel

= 352 m/176 cm

= 35200 cm/ 176 cm

= 200

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 π = 3.14)

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

= 2πr

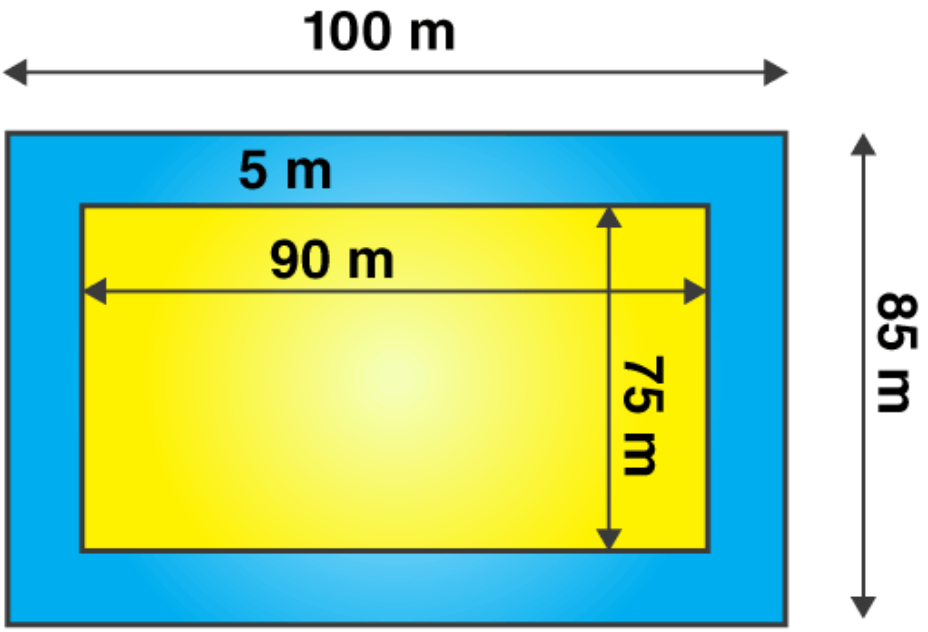
= 2 × 3.14 × 15

= 94.2 cm

EXERCISE 11.4 PAGE: 226

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:-



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 × Breadth

= 90 × 75

= 6750 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 m^2

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

= 8500 – 6750

= 1750 m^2

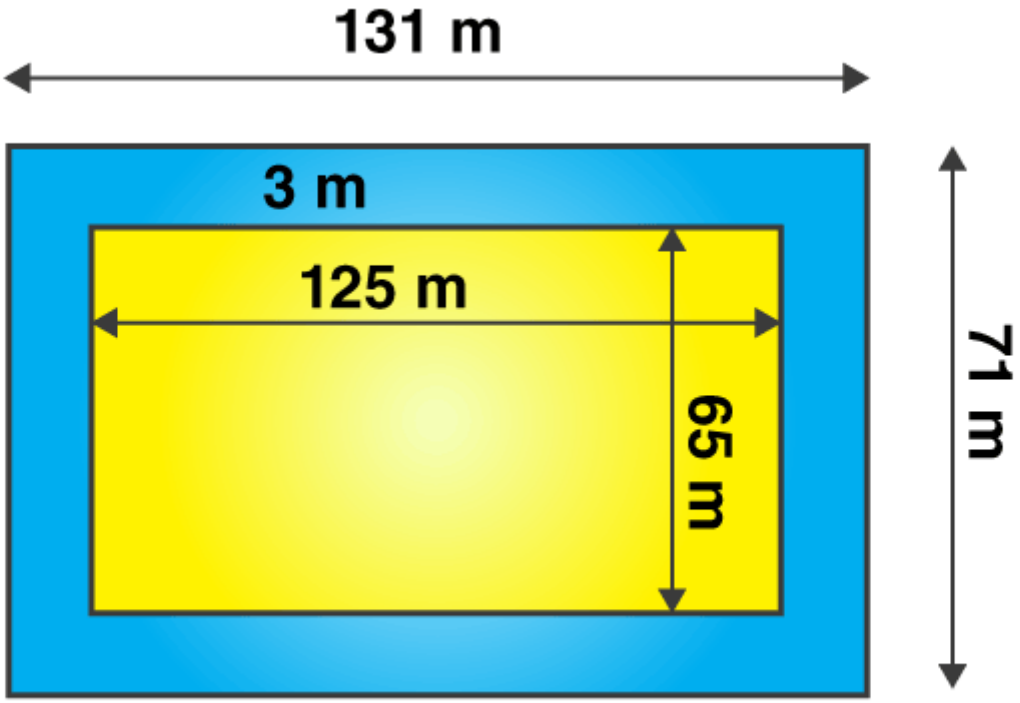
For 1 hectare = 10000 m^2

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

= 0.675 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:-



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 × Breadth

= 125 × 65

= 8125 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 × 71

= 9301 m^2

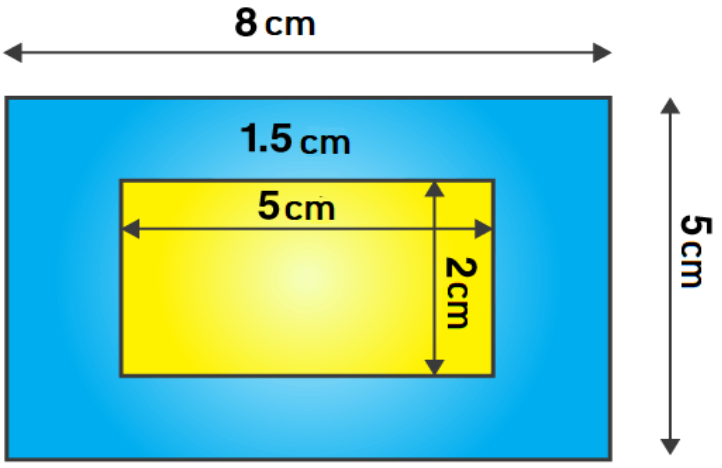
The area of path = New area of the park including path – Area of the park

= 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:-



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 × Breadth

= 8 × 5

= 40 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.

New area of the cardboard = 5 × 2

= 10 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

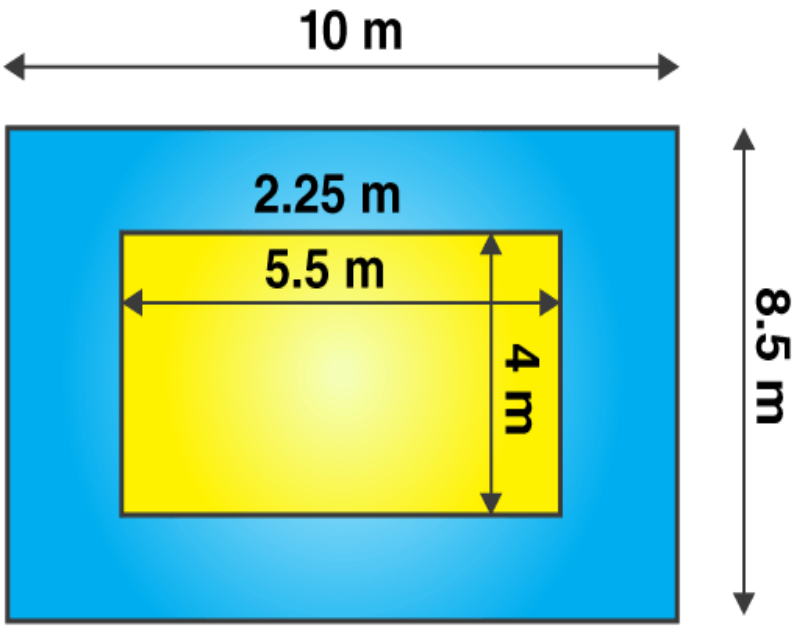
= 30 cm^2

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)

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 × Breadth

= 5.5 × 4

= 22 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 m^2

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

= 85 – 22

= 63 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

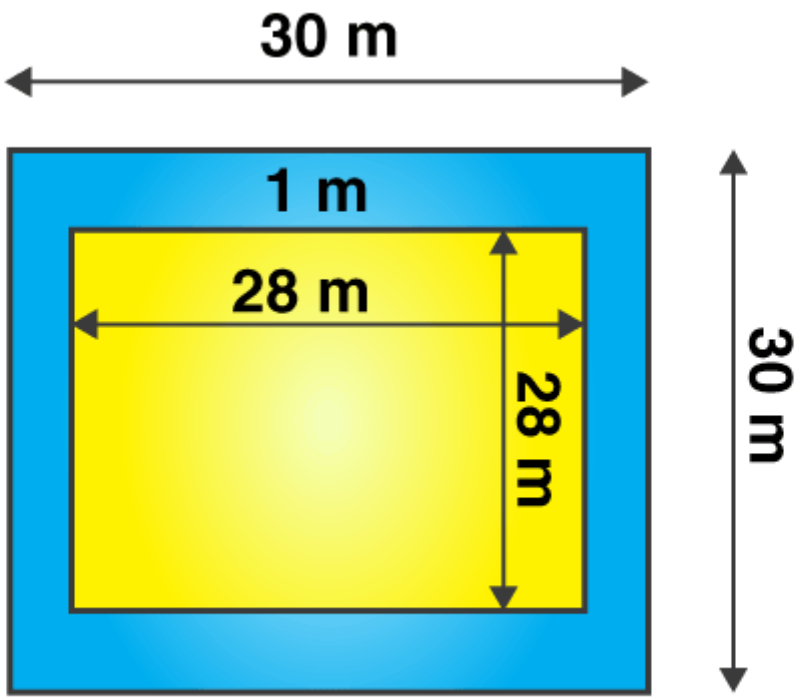
= ₹ 12600

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)

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 × 30

= 900 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 × 28

= 784 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 m^2

(ii)

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

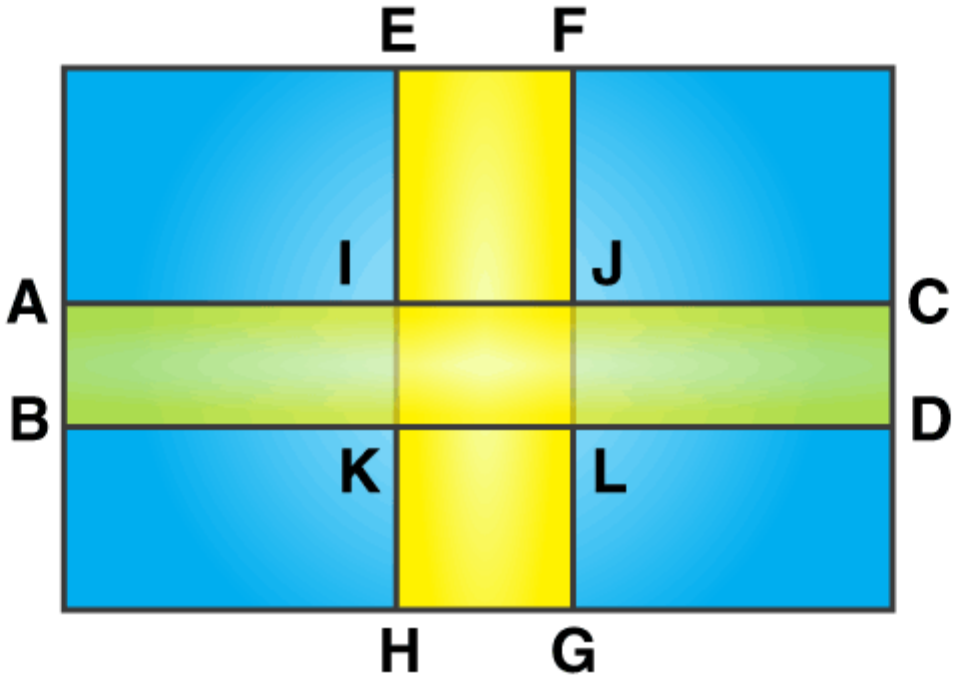
= ₹ 40 per m^2

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

= ₹ 31360

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:-



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 × Breadth

= 700 × 300

= 210000 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 × Breadth

= 700 × 10

= 7000 m^2

Area of the EFGH cross road = Length × Breadth

= 300 × 10

= 3000 m^2

Area of the IJKL at centre = Length × Breadth

= 10 × 10

= 100 m^2

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

= 7000 + 3000 – 100

= 10000 – 100

= 9900 m^2

We know that for 1 hectare = 10000 m^2

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

= 0.99 hectare

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

= 210000 – 9900

= 200100 m^2

= 200100/10000

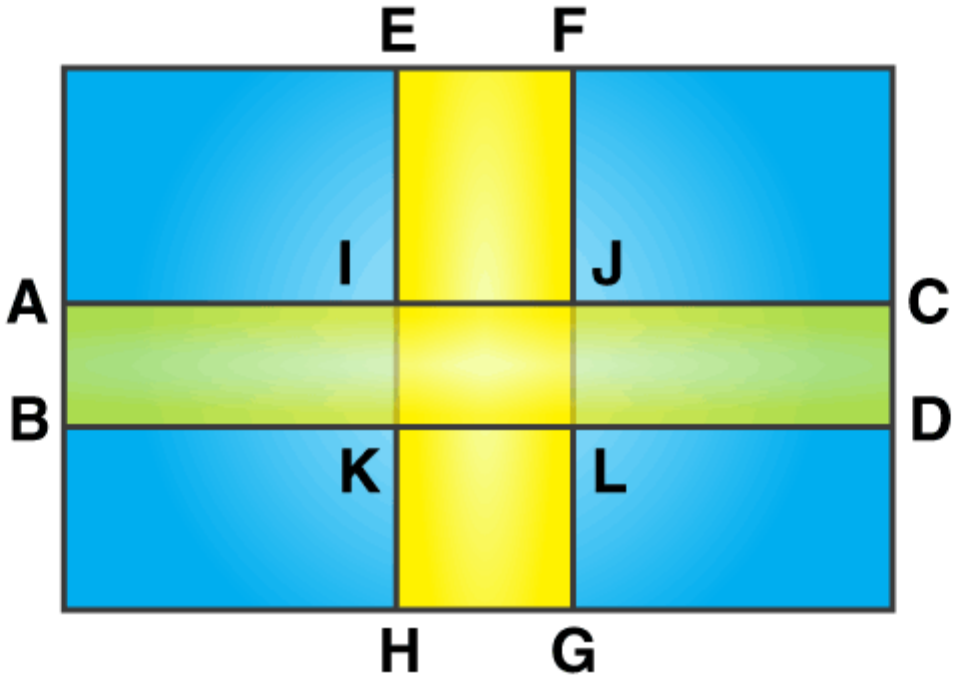
= 20.01 hectare

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 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:-



(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 × Breadth

= 90 × 60

= 5400 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 × Breadth

= 90 × 3

= 270 m^2

Area of the EFGH cross road = length × breadth

= 60 × 3

= 180 m^2

Area of the IJKL at centre = Length × Breadth

= 3 × 3

= 9 m^2

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

= 270 + 180 – 9

= 450 – 9

= 441 m^2

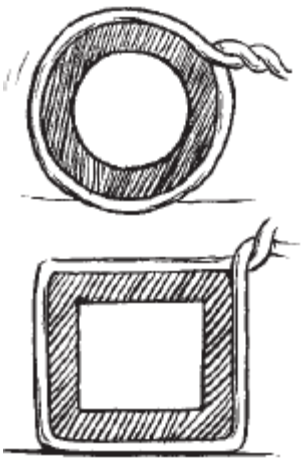
(ii)

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

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? (π = 3.14)



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 = 2πr

= 2 × 3.14 × 4

= 25.12 cm

Perimeter of the square = 4 × Side of the square

= 4 × 4

= 16 cm

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

= 25.12 – 16

= 9.12 cm

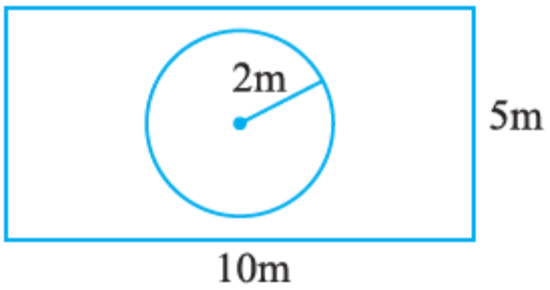
Yes, 9.12 cm cord is left.

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)

From the figure,

Length of rectangular lawn = 10 m

Breadth of rectangular lawn = 5 m

Area of the rectangular lawn = Length × Breadth

= 10 × 5

= 50 m^2

(ii)

From the figure,

Radius of the flower bed = 2 m

Area of the flower bed = πr^2

= 3.14 × 2^2

= 3.14 × 4

= 12.56 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 m^2

(iv)

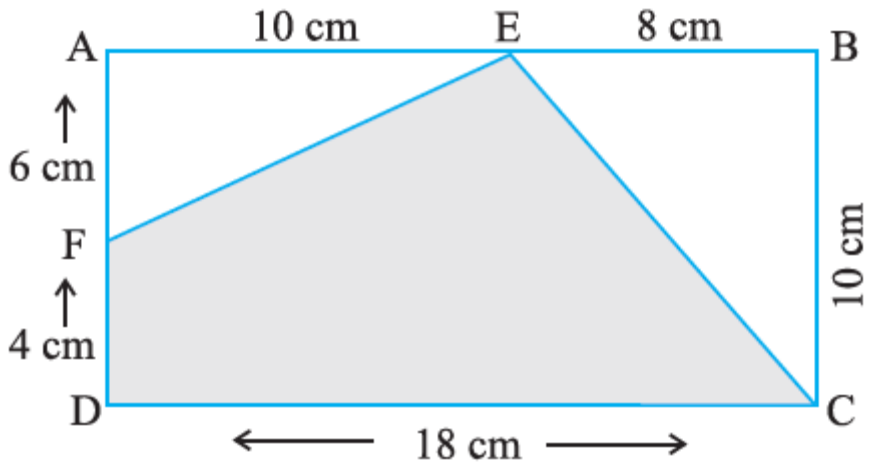
The circumference of the flower bed = 2πr

= 2 × 3.14 × 2

= 12.56 m

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

(i)



Solution:-

To find the area of EFDC, first, we have to find the area of ΔAEF, ΔEBC and rectangle ABCD.

Area of ΔAEF = ½ × Base × Height

= ½ × 6 × 10

= 1 × 3 × 10

= 30 cm^2

Area of ΔEBC = ½ × Base × Height

= ½ × 8 × 10

= 1 × 4 × 10

= 40 cm^2

Area of rectangle ABCD = Length × Breadth

= 18 × 10

= 180 cm^2

Then,

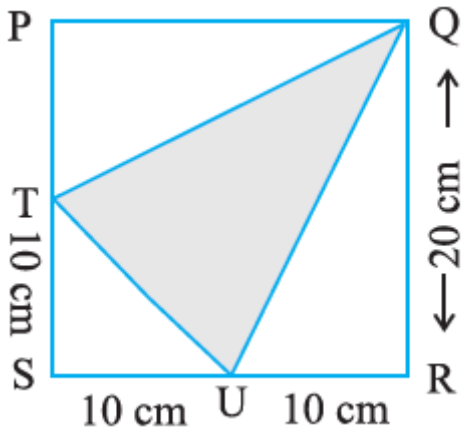
Area of EFDC = ABCD area – (ΔAEF + ΔEBC)

= 180 – (30 + 40)

= 180 – 70

= 110 cm^2

(ii)



Solution:-

To find the area of ΔQTU, first, we have to find the area of ΔSTU, ΔTPQ, ΔQRU and square PQRS.

Area of ΔSTU = ½ × Base × Height

= ½ × 10 × 10

= 1 × 5 × 10

= 50 cm^2

Area of ΔTPQ = ½ × Base × Height

= ½ × 10 × 20

= 1 × 5 × 20

= 100 cm^2

Area of ΔQRU = ½ × Base × Height

= ½ × 10 × 20

= 1 × 5 × 20

= 100 cm^2

Area of square PQRS = $Side^2$

= 20 × 20

= 400 cm^2

Then,

Area of ΔQTU = PQRS area – (ΔSTU + ΔTPQ + ΔQRU)

= 400 – (50 + 100 + 100)

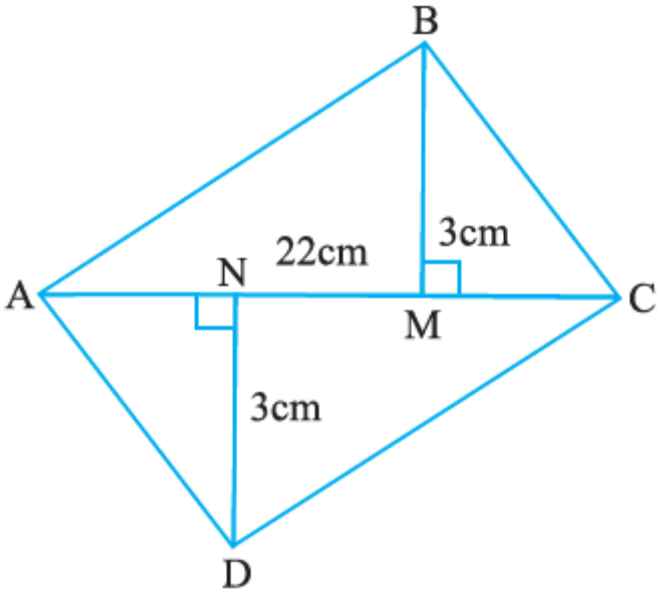
= 400 – 250

= 150 cm^2

11. Find the area of the quadrilateral ABCD.

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

DN = 3 cm, and BM ⊥ AC, DN ⊥ AC



Solution:-

From the question, it is given that

AC = 22 cm, BM = 3 cm DN = 3 cm and BM ⊥ AC, DN ⊥ AC

To find the area of quadrilateral ABCD, first, we have to find the area of ΔABC, and ΔADC Area of ΔABC = ½ × Base × Height

= ½ × 22 × 3

= 1 × 11 × 3

= 33 cm^2

Area of ΔADC = ½ × Base × Height

= ½ × 22 × 3

= 1 × 11 × 3

= 33 cm^2

Then,

Area of quadrilateral ABCD = Area of ΔABC + Area of ΔADC

= 33 + 33

= 66 cm^2