EXERCISE 11.1   **PAGE: 208**

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:-
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 park = 320/4
                          = 80 m
So, Area of the square park = (length of the side of 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 a 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 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,
Area of a square park is the same as 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 side of 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 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, perimeter of the square is same as perimeter of 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, 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)

$\qquad$ 130 = 2 (length + 30)

$\qquad$ 130/2 = length + 30

$\qquad$ Length + 30 = 65

$\qquad$ Length = 65 – 30

$\qquad$ Length = 35 cm

Then,

Area of the rectangle = Length × Breadth

$\qquad\qquad\qquad$ = 35 × 30

$\qquad\qquad\qquad$ = 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 white washing the wall, if the rate of white washing 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

$\qquad\qquad\qquad$ = 2 × 1

$\qquad\qquad\qquad$ = 2 m^2

Area of the wall = Length × Breadth

$$= 4.5 × 3.6$$

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

So, Area to be white washed = 16.2 – 2 = 14.2 m^2

Cost of white washing 1 m^2 area = ₹ 20

Hence cost of whit washing 14.2 m^2 area = 14.2 × 20

$$= ₹ 284$$

EXERCISE 11.2   **PAGE: 216**

1. Find the area of each of the following parallelograms:
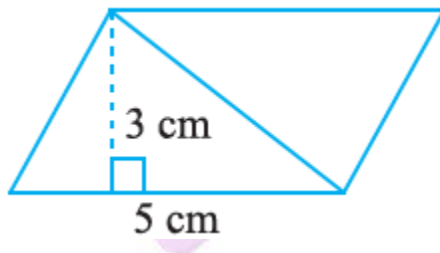**(a)**
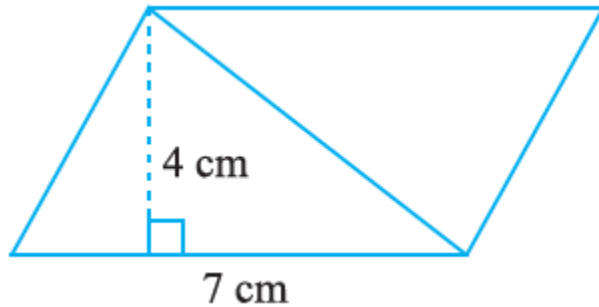
Solution:-
From the figure,
Height of parallelogram = 4 cm
Base of parallelogram = 7 cm
Then,
Area of parallelogram = base × height
                       = 7 × 4
                       = 28 cm^2

(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)
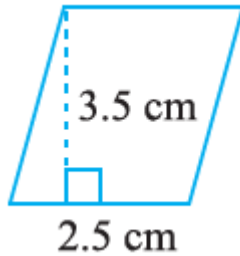
3.5 cm

2.5 cm

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)

5 cm
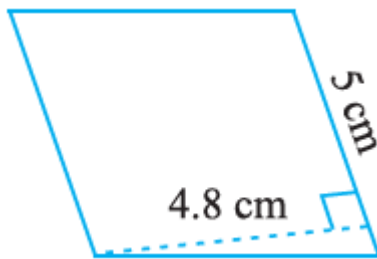
4.8 cm

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)
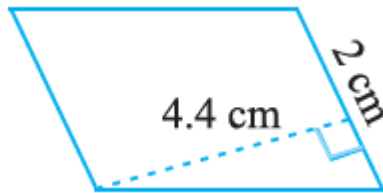
Solution:-
From the figure,
Height of parallelogram = 4.4 cm
Base of parallelogram = 2 cm
Then,
Area of parallelogram = base × height
$$= 2 × 4.4$$
$$= 8.8 \text{ cm}^2$$

2. Find the area of each of the following triangles:
(a)
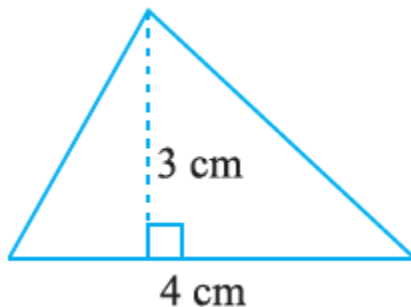
Solution:-
From the figure,
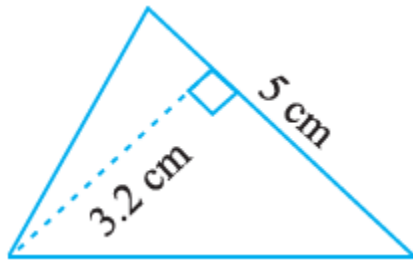Base of triangle = 4 cm
Height of height = 3 cm
Then,
Area of triangle = ½ × base × height
$$= ½ × 4 × 3$$
$$= 1 × 2 × 3$$
$$= 6 \text{ cm}^2$$

(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 cm²

(c)
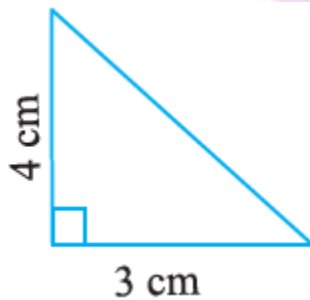
Solution:-
From the figure,
Base of triangle = 3 cm
Height of height = 4 cm
Then,
Area of triangle = ½ × base × height
= ½ × 3 × 4
= 1 × 3 × 2
= 6 cm²

(d)
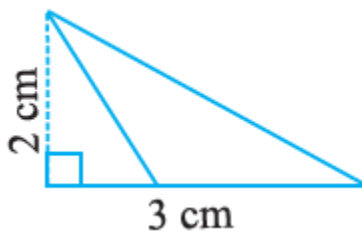
Solution:-
From the figure,
Base of triangle = 3 cm
Height of height = 2 cm
Then,
Area of triangle = ½ × base × height
= ½ × 3 × 2
= 1 × 3 × 1
= 3 cm^2

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 cm²
Then,

      Area of parallelogram = base × height

                  154.5 = base × 15

                  Base = 154.5/15

                  Height = 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 cm²
Then,

      Area of parallelogram = base × height

                  48.72 = base × 8.4

                  Base = 48.72/8.4

                  Height = 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 cm²
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 cm²
b.	10.3 cm	15 cm	154.5 cm²
c.	5.8 cm	8.4 cm	48.72 cm²
d.	15.6 cm	1.05	16.38 cm²

4. Find the missing values:

Base	Height	Area of Triangle
15 cm		87 cm²
	31.4 mm	1256 mm²
22 cm		170.5 cm²

Solution:-

(a)

From the table,

Height of triangle =?

Base of triangle = 15 cm

Area of the triangle = 16.38 cm²

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 mm²

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 cm²
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:
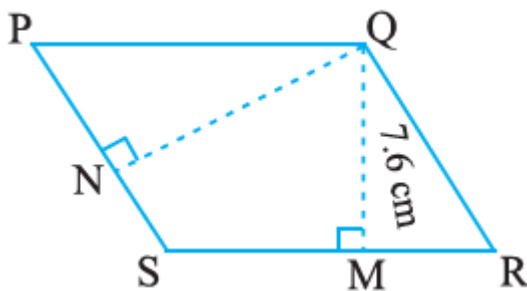**(a) The area of the parallelogram PQRS   (b) QN, if PS = 8 cm**

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 cm²

(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 cm², AB = 35 cm and AD = 49 cm, find the length of BM and DL.

Fig 11.24

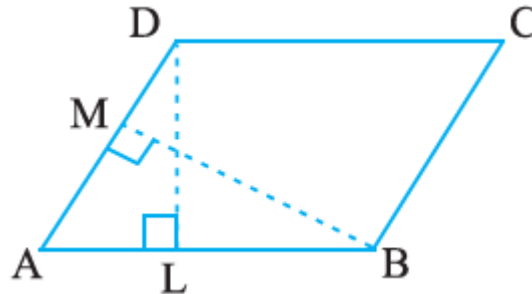**Solution:-**

From the question it is given that,

Area of the parallelogram = 1470 cm²

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.
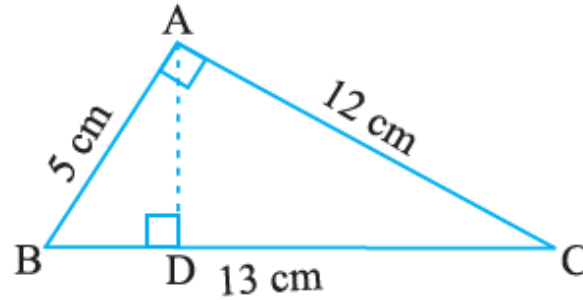
Fig 11.25

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

$$= ½ × AB × AC$$
$$= ½ × 5 × 12$$
$$= 1 × 5 × 6$$
$$= 30 \text{ cm}^2$$

Now,

Area of ΔABC = ½ × base × height

$$30 = ½ × AD × BC$$
$$30 = ½ × AD × 13$$
$$(30 × 2)/13 = AD$$
$$AD = 60/13$$
$$AD = 4.6 \text{ cm}$$

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
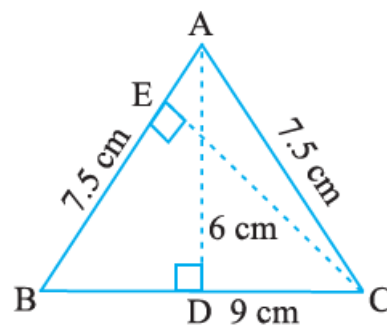
Solution:-
From the question it is given that,
AB = AC = 7.5 cm, BC = 9 cm, AD = 6cm
Then,
Area of ΔABC = ½ × base × height
            = ½ × BC × AD
            = ½ × 9 × 6
            = 1 × 9 × 3
            = 27 cm^2
Now,
Area of ΔABC = ½ × base × height
            27 = ½ × AB × CE
            27 = 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, radius of circle = 14 cm
Circumference of the circle = 2πr
$$= 2 \times (22/7) \times 14$$
$$= 2 \times 22 \times 2$$
$$= 88 \text{ cm}$$

(b) 28 cm
Solution:-
Given, radius of circle = 28 cm
Circumference of the circle = 2πr
$$= 2 \times (22/7) \times 28$$
$$= 2 \times 22 \times 4$$
$$= 176 \text{ cm}$$

(c) 21 cm
Solution:-
Given, radius of circle = 21 cm
Circumference of the circle = 2πr
$$= 2 \times (22/7) \times 21$$
$$= 2 \times 22 \times 3$$
$$= 132 \text{ cm}$$

2. Find the area of the following circles, given that:
(a) Radius = 14 mm (Take π = 22/7)
Solution:
Given, radius of circle = 14 mm
Then,
Area of the circle = πr²
$$= 22/7 \times 14^2$$
$$= 22/7 \times 196$$
$$= 22 \times 28$$
$$= 616 \text{ mm}^2$$

(b) Diameter = 49 m
Solution:
Given, diameter of circle (d) = 49 m
We know that, radius (r) = d/2
$\qquad\qquad$ = 49/2
$\qquad\qquad$ = 24.5 m
Then,
Area of the circle = πr^2
$\qquad\qquad$ = 22/7 × $(24.5)^2$
$\qquad\qquad$ = 22/7 × 600.25
$\qquad\qquad$ = 22 × 85.75
$\qquad\qquad$ = 1886.5 m^2

(c) Radius = 5 cm
Solution:
Given, radius of circle = 5 cm
Then,
Area of the circle = πr^2
$\qquad\qquad$ = 22/7 × 5^2
$\qquad\qquad$ = 22/7 × 25
$\qquad\qquad$ = 550/7
$\qquad\qquad$ = 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, Circumference of the circle = 2πr
$\qquad\qquad$ 154 = 2 × (22/7) × r
$\qquad\qquad$ 154 = 44/7 × r
$\qquad\qquad$ r = (154 × 7)/44
$\qquad\qquad$ r = (14 × 7)/4
$\qquad\qquad$ r = (7 × 7)/2
$\qquad\qquad$ r = 49/2
$\qquad\qquad$ r = 24.5 m

Now,
Area of the circle = πr^2

$\qquad$ = 22/7 × (24.5)^2

$\qquad$ = 22/7 × 600.25

$\qquad$ = 22 × 85.75

$\qquad$ = 1886.5 m^2

So, the radius of circle is 24.5 and area of 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 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

$\qquad$ = 21/2

$\qquad$ = 10.5 m

Then,
Circumference of the circle = 2πr

$\qquad$ = 2 × (22/7) × 10.5

$\qquad$ = 462/7

$\qquad$ = 66 m

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

Cost of 1 m rope = ₹ 4 $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ [given]

Cost of 132 m rope = ₹ 4 × 132

$\qquad$ = ₹ 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 give 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 cm².

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 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

$$= 1.5/2$$
$$= 0.75 \text{ m}$$

Then,
Circumference of the circle = $2\pi r$

$$= 2 \times 3.14 \times 0.75$$
$$= 4.71 \text{ m}$$

So, the length of 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.
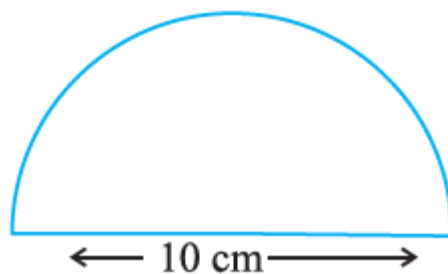
← 10 cm →

Solution:-

From the question it is given that,
Diameter of semi-circle = 10 cm
We know that, radius (r) = d/2

$$= 10/2$$
$$= 5 \text{ cm}$$

Then,
Circumference of the semi-circle = πr

$$= (22/7) × 5$$
$$= 110/7$$
$$= 15.71 \text{ cm}$$

Now,
Perimeter of the given figure = Circumference of the semi-circle + semi-circle diameter

$$= 15.71 + 10$$
$$= 25.71 \text{ cm}$$

8. Find the cost of polishing a circular table-top of diameter 1.6 m, if the rate of polishing is ₹15/m². (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

$$= 1.6/2$$
$$= 0.8 \text{ m}$$

Then,
Area of the circular table-top = πr²

$$= 3.14 × 0.8^2$$
$$= 3.14 × 0.8 × 0.8$$
$$= 2.0096 \text{ m}^2$$

Cost for polishing 1 m² area = ₹ 15   [given]
Cost for polishing 2.0096 m² area = ₹ 15 × 2.0096

$$= ₹ 30.144$$

Hence, the Cost for polishing 2.0096 m² 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, circumference of the circle = 2πr

$$44 = 2 \times (22/7) \times r$$
$$44 = 44/7 \times r$$
$$(44 \times 7)/44 = r$$
$$r = 7 \text{ cm}$$

Area of the circle = πr²

$$= 22/7 \times 7^2$$
$$= 22/7 \times 7 \times 7$$
$$= 22 \times 7$$
$$= 154 \text{ cm}^2$$

Now,

If the wire is bent into a square,

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

$$= 11 \text{ cm}$$

Area of the square = length of the side of square²

$$= 11^2$$
$$= 121 \text{ cm}^2$$

By comparing the two areas of the square and circle,

Clearly, 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 circle = 3.5 cm
Length of the rectangle = 3 cm
Breadth of the rectangle = 1 cm
First we have to find out the area of circular card sheet, two circles and rectangle to find out the remaining area.
Now,

Area of the circular card sheet = πr^2
$$= 22/7 \times 14^2$$
$$= 22/7 \times 14 \times 14$$
$$= 22 \times 2 \times 14$$
$$= 616 \text{ cm}^2$$

Area of the 2 small circles = $2 \times \pi r^2$
$$= 2 \times (22/7 \times 3.5^2)$$
$$= 2 \times (22/7 \times 3.5 \times 3.5)$$
$$= 2 \times ((22/7) \times 12.25)$$
$$= 2 \times 38.5$$
$$= 77 \text{ cm}^2$$

Area of the rectangle = Length × Breadth
$$= 3 \times 1$$
$$= 3 \text{ cm}^2$$

Now,
The area of the remaining part = Card sheet area – (area of two small circles + rectangle area)
$$= 616 – (77 + 3)$$
$$= 616 – 80$$
$$= 536 \text{ cm}^2$$

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 left over 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 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 × 2 × 2

= 3.14 × 4

= 12.56 cm^2

Now,

The area of the remaining part = Area of aluminum square sheet – area of 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:-

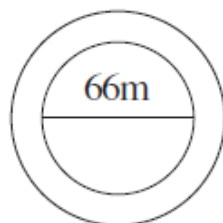From the question it is given that,

Circumference of a circle = 31.4 cm

We know that,

Circumference of a circle = 2πr

31.4 = 2 × 3.14 × r

31.4 = 6.28 × 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)

66m

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 area of the flower bed and path together
So, radius of 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 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
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 × 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.
Since, the sprinkler can cover an area of radius 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)
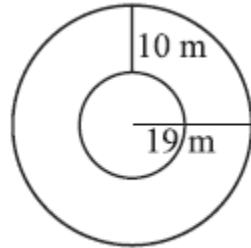
Solution:-
From the figure,
Radius of inner circle = outer circle radius – 10
                                  = 19 – 10
                                  = 9 m
Circumference of the inner circle = 2πr
                                  = 2 × 3.14 × 9
                                  = 56.52 m
Then,
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 rotation of the wheel,
            = Total distance to be covered/ circumference of 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
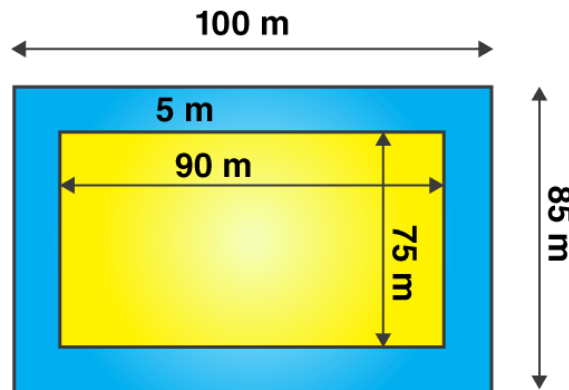
= 2πr

= 2 × 3.14 × 15

= 94.2 cm

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:-

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 m²
From the figure,
The new length and breadth of the garden when path is included is 100 m and 85 m respectively.
New area of the garden = 100 × 85
                        = 8500 m²
The area of path = New area of the garden including path – Area of garden
                = 8500 – 6750
                = 1750 m²
For 1 hectare = 10000 m²
Hence, area of garden in hectare = 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:-
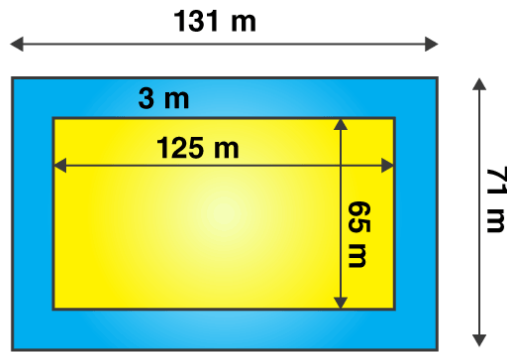
From the question it is given that,
Length of the park (L) = 125 m
Breadth of the park (B) = 65 m
Then,
Area of the park = length × breadth
   = 125 × 65
                 = 8125 m^2
From the figure,
The new length and breadth of the park when path is included is 131 m and 71 m respectively.
New area of the park = 131 × 71
                     = 9301 m^2
The area of path = New area of the park including path – Area of 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:-
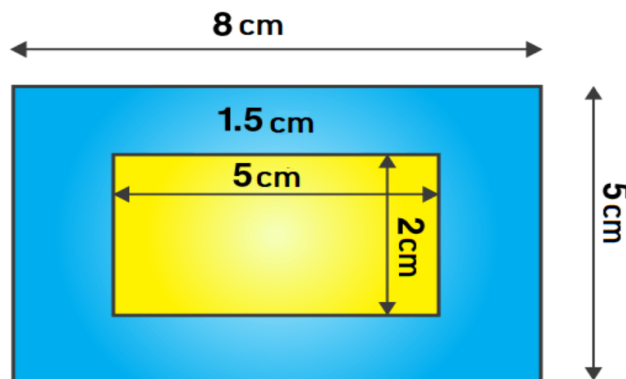
From the question it is given that,
Length of the cardboard (L) = 8 cm
Breadth of the cardboard (B) = 5 cm
Then,
Area of the cardboard = length × breadth
$$= 8 × 5$$
$$= 40 \text{ cm}^2$$
From the figure,
The new length and breadth of the cardboard when margin is not included is 5 cm and 2 cm respectively.
New area of the cardboard = 5 × 2
$$= 10 \text{ cm}^2$$
The area of margin = Area of the cardboard when margin is including – Area of the cardboard when margin is not including
$$= 40 – 10$$
$$= 30 \text{ cm}^2$$

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 m².
Solution:-
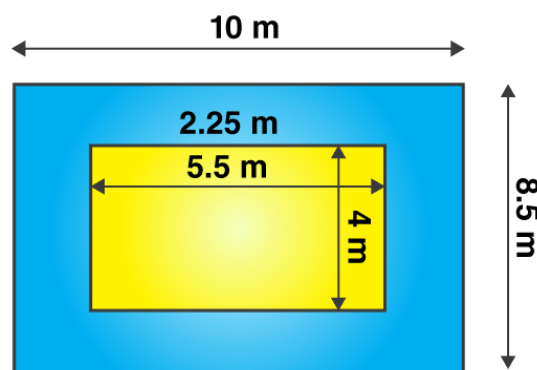
(i)
From the question it is given that,
Length of the room (L) = 5.5 m
Breadth of the room (B) = 4 m
Then,

Area of the room = length × breadth

= 5.5 × 4

= 22 m^2

From the figure,

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

New area of the room when 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)
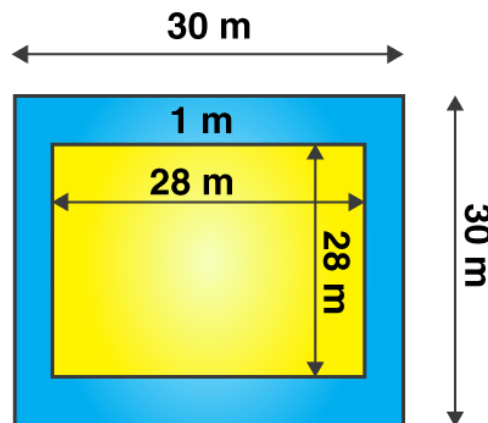
From the question it is given that,

Side of square garden (s) = 30 m

Then,

Area of the square garden = S²
$$= 30^2$$
$$= 30 × 30$$
$$= 900 \text{ m}^2$$

From the figure,

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

New area of the room when verandah is included = 28²
$$= 28 × 28$$
$$= 784 \text{ m}^2$$

The area of path = Area of the square garden when path is included – Area of the square

Garden when 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 m² area of the garden = 784 × 40
$$= ₹ 31360$$

6. Two cross roads, 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 cross roads. Give the answer in hectares.

Solution:-
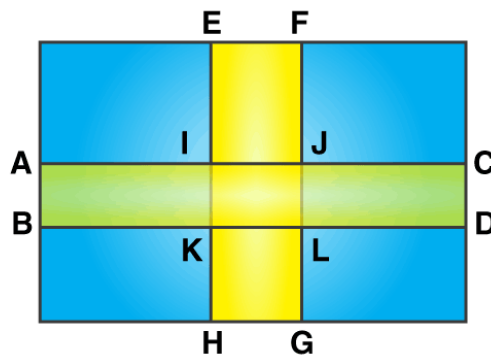
From the question it is given that,

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 cross road and EFGH is another cross road in the park.

The length of ABCD cross road = 700 m

The length of EFGH cross road = 300 m

Both cross road 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 center = 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, area of roads in hectare = 9900/10000

                         = 0.99 hectare

Finally, Area of the park excluding roads = Area of 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:-
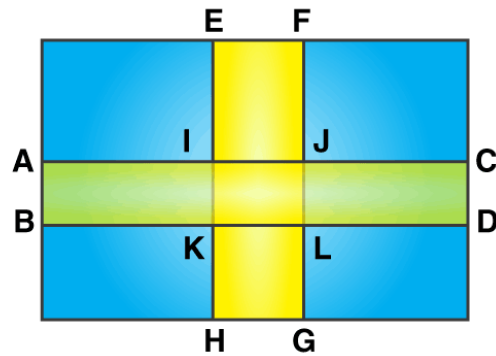
(i)
From the question it is given that,
Length of the field (L) = 90 m
Breadth of the field (B) = 60 m
Then,
Area of the field = length × breadth
= 90 × 60
= 5400 m²
Let us assume that ABCD is the one cross road and EFGH is another cross road in the park.
The length of ABCD cross road = 90 m
The length of EFGH cross road = 60 m
Both cross road have the same width = 3 m
Then,
Area of the ABCD cross road = length × breadth
= 90 × 3
= 270 m²
Area of the EFGH cross road = length × breadth
= 60 × 3
= 180 m²
Area of the IJKL at center = length × breadth
= 3 × 3
= 9 m²
Area of the roads = Area of ABCD + Area of EFGH – Area of IJKL
= 270 + 180 – 9
= 450 – 9
= 441 m²
(ii)

Given, the cost of constructing the roads at the rate of ₹ 110 per m².
Then the cost of constructing the 441 m² 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 cord left? (π = 3.14)
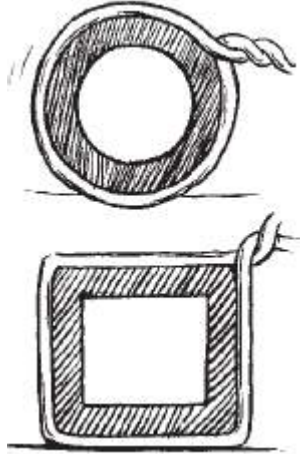
Solution:-
From the question it is given that,
Radius of a circular pipe = 4 cm
Side of a square = 4 cm
Then,
Perimeter of the circular pipe = 2πr
                                = 2 × 3.14 × 4
                                = 25.12 cm
Perimeter of the square = 4 × side of the square
                        = 4 × 4
                        = 16 cm
So, the length of cord left with Pragya = Perimeter of circular pipe - Perimeter of 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.
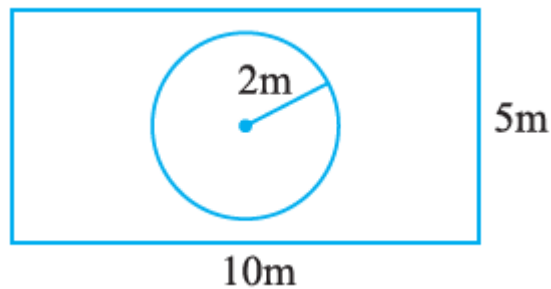
Solution:-

(i)

From the figure,

Length of rectangular lawn = 10 m

Breadth of rectangular lawn = 5 m

Area of the rectangular lawn = Length × Breadth

$$= 10 × 5$$
$$= 50 \text{ m}^2$$

(ii)

From the figure,

Radius of the flower bed = 2 m

Area of the flower bed = πr^2

$$= 3.14 × 2^2$$
$$= 3.14 × 4$$
$$= 12.56 \text{ m}^2$$

(iii)

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

Area of flower bed
$$= 50 – 12.56$$
$$= 37.44 \text{ m}^2$$

(iv)

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

$$= 2 × 3.14 × 2$$
$$= 12.56 \text{ m}$$

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

(i)
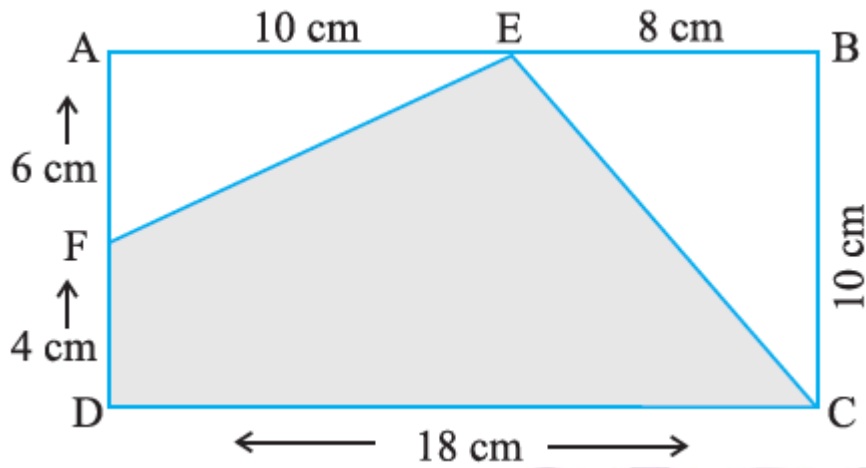
Solution:-

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 cm²

Area of ΔEBC = ½ × Base × Height

= ½ × 8 × 10

= 1 × 4 × 10

= 40 cm²

Area of rectangle ABCD = length × breadth

= 18 × 10

= 180 cm²

Then,

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

= 180 – (30 + 40)

= 180 – 70

= 110 cm²

(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**
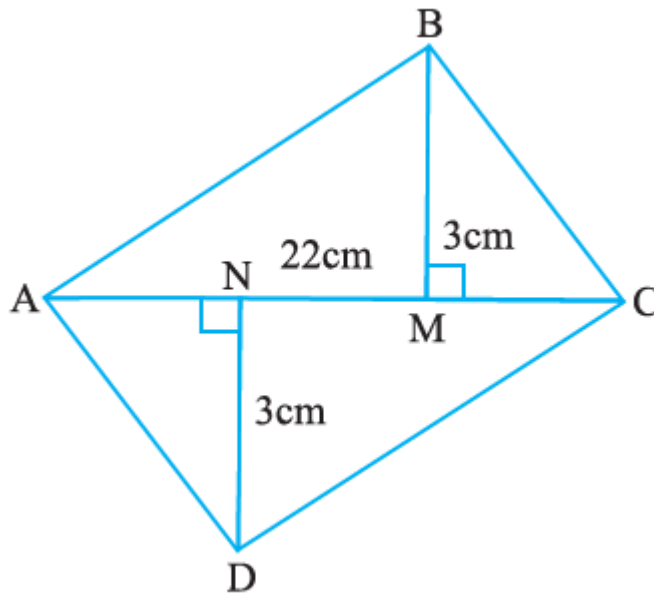
Solution:-
From the it is given that,
AC = 22 cm, BM = 3 cm DN = 3 cm and BM ⊥ AC, DN ⊥ AC
To find the area of quadrilateral ABCD, first we have to find the area of ΔABC, and ΔADC
Area of ΔABC = ½ × Base × Height

$\qquad$ = ½ × 22 × 3

$\qquad$ = 1 × 11 × 3

$\qquad$ = 33 cm²

Area of ΔADC = ½ × Base × Height

$\qquad$ = ½ × 22 × 3

$\qquad$ = 1 × 11 × 3

$\qquad$ = 33 cm²

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

$\qquad$ = 33 + 33

$\qquad$ = 66 cm²