

CLASS NOTES

Class: VII

Topic: Ch 11 PERIMETER AND AREA

Date: 01/ 11/ 2021

Subject: MATHEMATICS

EXERCISE 11.3

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: 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

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

$$\therefore r^2 = \frac{314}{3.14} = 100 = 10 \times 10$$

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

\therefore Radius of the circular flower garden is 10 m.

Since, the sprinkler can cover an area of radius 12 m

\therefore Yes, the sprinkler will water the entire garden.

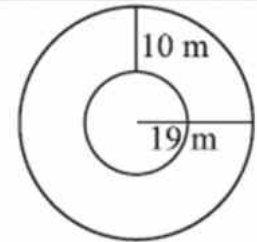
15. Find the circumference of the inner and the outer circles, shown in the adjoining figure? (Take $\pi = 3.14$)

Solution: Radius of inner circle = outer circle radius – 10 = $19 - 10 = 9 \text{ m}$

Circumference of the inner circle = $2\pi r = 2 \times 3.14 \times 9 = 56.52 \text{ m}$

Radius of outer circle = 19 m

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



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

Solution: Circumference of the wheel = $2\pi r$

$$= 2 \times \frac{22}{7} \times 28 = 2 \times 22 \times 4 = 176 \text{ cm}$$

$$\text{The number of rotation of the wheel} = \frac{\text{total distance covered by the wheel}}{\text{circumference of the wheel}} = \frac{35200}{176} \quad (352 \text{ m} = 35200 \text{ cm}) = 200$$

KEY POINTS FOR CONVERSION OF UNITS

- $1 \text{ cm}^2 = 100 \text{ mm}^2$
- $1 \text{ m}^2 = 10000 \text{ cm}^2$
- $1 \text{ hectare} = 10000 \text{ m}^2$
- $1000 \text{ cm}^2 = 100000 \text{ mm}^2$
- $1000 \text{ cm}^2 = 0.1 \text{ m}^2$

EXERCISE 11.4

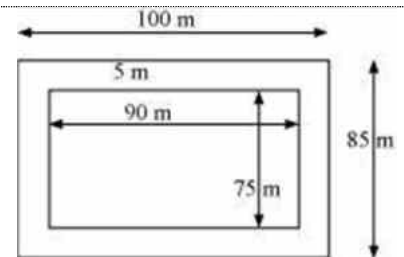
1. A garden is 90 m long and 75 m broad. A path 5 m wide is to be built outside and around it. Find the area of the path. Also find the area of the garden in hectare.

Solution: Length (l) of garden = 90 m

Breadth (b) of garden = 75 m

Area of garden = $l \times b = 90 \times 75 = 6750 \text{ m}^2$

From the figure, the length and breadth of the garden including path are ($5 \text{ m} + 90 \text{ m} + 5 \text{ m} = 100 \text{ m}$) and ($5 \text{ m} + 75 \text{ m} + 5 \text{ m} = 85 \text{ m}$) respectively.



This content is prepared at home.

∴ Area of the garden including the path = $100 \times 85 = 8500 \text{ m}^2$
 ∴ Area of path = Area of the garden including the path – Area of garden
 = $8500 - 6750 = 1750 \text{ m}^2$
 1 hectare = 10000 m^2
 ∴ The area of garden in hectare = $\frac{6750}{10000} = 0.675$ hectare

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

Solution: Length of cardboard = 8 cm

Breadth of cardboard = 5 cm

∴ Area of cardboard including margin = $l \times b = 8 \times 5 = 40 \text{ cm}^2$

The length and breadth of the cardboard, when margin is not included, are

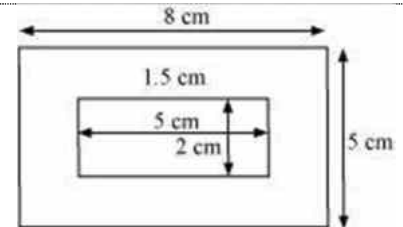
Length = $8 \text{ cm} - 1.5 \text{ cm} - 1.5 \text{ cm} = 5 \text{ cm}$

Breadth = $5 \text{ cm} - 1.5 \text{ cm} - 1.5 \text{ cm} = 2 \text{ cm}$

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

Area of the margin = Area of cardboard including the margin – Area of cardboard not including the margin

= $40 - 10 = 30 \text{ cm}^2$



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 Rs 200 per m^2 .

Solution: Length of room = 5.5 m

Breadth of room = 4 m

∴ Area of room = $l \times b = 5.5 \times 4 = 22 \text{ m}^2$

The length and breadth of the room, when verandah is also included are

Length = $2.25 \text{ m} + 5.5 \text{ m} + 2.25 \text{ m} = 10 \text{ m}$

Breadth = $2.25 \text{ m} + 4 \text{ m} + 2.25 \text{ m} = 8.5 \text{ m}$

∴ Area of the room including the verandah = $10 \times 8.5 = 85 \text{ m}^2$

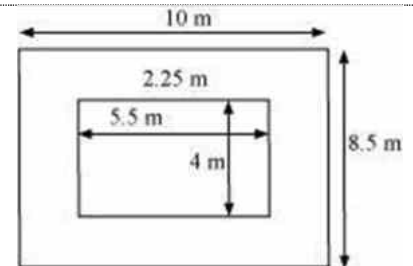
Area of verandah = Area of the room including the verandah – Area of room

= $85 - 22 = 63 \text{ m}^2$

i) Cost of cementing 1 m^2 area of the floor of the verandah = Rs 200

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

= Rs 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 .

This content is prepared at home.

SOLUTION:

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

Area of square garden including the path $= a^2 = (30)^2 = 900 \text{ m}^2$

Side of the square garden, excluding path $= 30 - 1 - 1 = 28$ m.

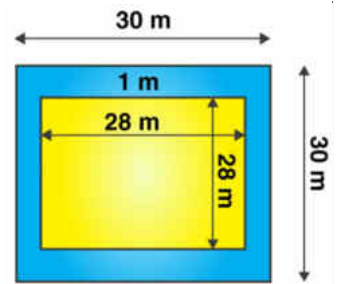
Area of the square garden excluding path $= (28)^2 = 784 \text{ m}^2$

Area of path = Area of the square garden including path – Area of square garden excluding path.

$$= 900 - 784 = 116 \text{ m}^2$$

(ii) Cost of planting grass in an area of 1 m^2 of the garden = Rs 40

Cost of planting grass in an area of 784 m^2 of the garden $= 784 \times 40 = \text{Rs } 31360$



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:

Length of field, $l = 90$ m

Breadth of field, $b = 60$ m

Area of field $= 90 \times 60 = 5400 \text{ m}^2$

Length of road ABDC = 90 m

Length of road EFGH = 60 m

Width of each road = 3 m

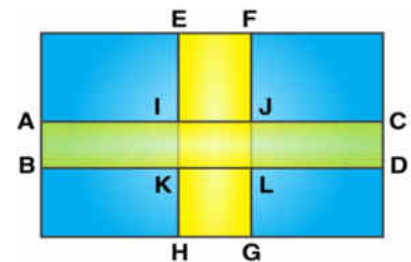
Area of the roads = ar (ABDC) + ar (EFGH) - ar (IJLK)

$$= (90 \times 3) + (60 \times 3) - (3 \times 3)$$

$$= 270 + 180 - 9 = 441 \text{ m}^2$$

Cost for constructing 1 m^2 road = Rs 110

Cost for constructing 441 m^2 road $= 110 \times 441 = \text{Rs } 48510$



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 flowerbed.

SOLUTION:

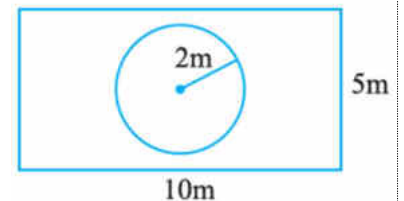
(i) Area of whole land = Length \times Breadth $= 10 \times 5 = 50 \text{ m}^2$

(ii) Area of flower bed $= \pi r^2 = 3.14 \times 2 \times 2 = 12.56 \text{ m}^2$

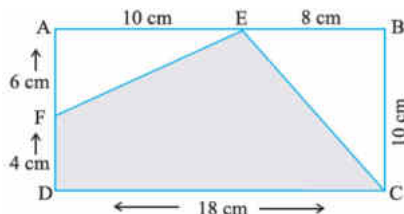
(iii) Area of lawn excluding the flower bed = Area of whole land - Area of flower bed

$$= 50 - 12.56 = 37.44 \text{ m}^2$$

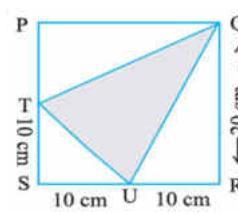
(iv) Circumference of flower bed $= 2\pi r = 2 \times 3.14 \times 2 = 12.56 \text{ m}$



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



(i)



(ii)

SOLUTION:

This content is prepared at home.

$$\begin{aligned}
 \text{(i) Area of EFDC} &= \text{ar (ABCD)} - \text{ar (BCE)} - \text{ar(AFE)} \\
 &= (18 \times 10) - \frac{1}{2}(10 \times 8) - \frac{1}{2}(6 \times 10) \\
 &= 180 - 40 - 30 = 110 \text{ cm}^2
 \end{aligned}$$

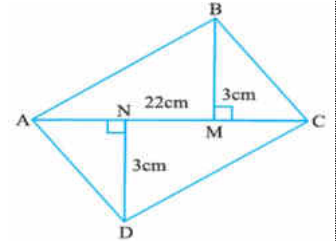
$$\begin{aligned}
 \text{(ii) ar (QTU)} &= \text{ar (PQRS)} - \text{ar (TSU)} - \text{ar (RUQ)} - \text{ar(PQT)} \\
 &= (20 \times 20) - (10 \times 10) - \frac{1}{2}(20 \times 10) - \frac{1}{2}(20 \times 10) \\
 &= 400 - 100 - 100 - 100 = 150 \text{ cm}^2
 \end{aligned}$$

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

$$\begin{aligned}
 &= \frac{1}{2}(3 \times 22) + \frac{1}{2}(3 \times 22) \\
 &= 33 + 33 = 66 \text{ cm}^2
 \end{aligned}$$



Assignment: Q2, Q6 and Q8 of Ex 11.4 and Q17 of Ex 11.3