Mathematics

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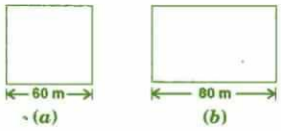
(Chapter – 11) (Mensuration)
(Class – VIII)

Exercise 11.1

Question 1:

A square and a rectangular field with measurements as given in the figure have the same perimeter. Which field has a larger area?



Answer 1:

Given: The side of a square = 60 m
And the length of rectangular field = 80 m

According to question,

Perimeter of rectangular field = Perimeter of square field

$\Rightarrow \quad 2(l+b) = 4 \text{ x side} \quad \Rightarrow \quad 2(80+b) = 4\times 60$

$\Rightarrow \quad 160+2b = 240 \quad \Rightarrow \quad 2b = 240-160$

$\Rightarrow \quad 2b = 80 \quad \Rightarrow \quad b = 40 \text{ m}$

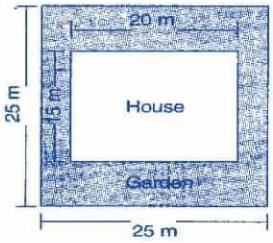
Now Area of Square field = $(\text{Side})^2 = (60)^2 = 3600 \text{ m}^2$

And Area of Rectangular field = length x breadth = 80 x 40 = 3200 m^2

Hence, area of square field is larger.

Question 2:

Mrs. Kaushik has a square plot with the measurement as shown in the figure. She wants to construct a house in the middle of the plot. A garden is developed around the house. Find the total cost of developing a garden around the house at the rate of ₹ 55 per m^2.



Answer 2:

Side of a square plot = 25 m

$\therefore$ Area of square plot = $(\text{Side})^2 = (25)^2 = 625 \text{ m}^2$

Length of the house = 20 m and
Breadth of the house = 15 m

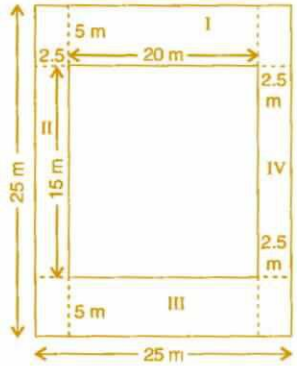
$\therefore$ Area of the house = length x breadth = 20 x 15 = 300 m^2

Area of garden = Area of square plot – Area of house
= 625 – 300 = 325 m^2

$\because$ Cost of developing the garden per sq. m = ₹ 55

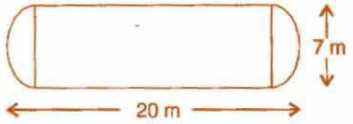
$\therefore$ Cost of developing the garden 325 sq. m = ₹ 55 x 325
= ₹ 17,875

Hence total cost of developing a garden around is ₹ 17,875.



Question 3:

The shape of a garden is rectangular in the middle and semi-circular at the ends as shown in the diagram. Find the area and the perimeter of this garden [Length of rectangle is 20 – (3.5 + 3.5 meters]



Answer 3:

Given: Total length = 20 m
Diameter of semi circle = 7 m

$\therefore$ Radius of semi circle = $\frac{7}{2}$ = 3.5 m

Length of rectangular field = 20 – (3.5 + 3.5) = 20 – 7 = 13 m

Breadth of the rectangular field = 7 m

$\therefore$ Area of rectangular field = $l \times b$ = 13 x 7 = 91 m^2

Area of two semi circles = $2 \times \frac{1}{2} \pi r^2$ = $2 \times \frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5$ = 38.5 m^2

Area of garden = 91 + 38.5 = 129.5 m^2

Now Perimeter of two semi circles = $2 \times \pi r = 2 \times \frac{22}{7} \times 3.5$ = 22 m

And Perimeter of garden = 22 + 13 + 13 = 48 m

Question 4:

A flooring tile has the shape of a parallelogram whose base is 24 cm and the corresponding height is 10 cm. How many such tiles are required to cover a floor of area 1080 m^2? [If required you can split the tiles in whatever way you want to fill up the corners]

Answer 4:

Given: Base of flooring tile = 24 cm = 0.24 m

Corresponding height of a flooring tile = 10 cm = 0.10 m

Now Area of flooring tile = Base x Altitude = 0.24 x 0.10 = 0.024 m^2

$\therefore$ Number of tiles required to cover the floor = $\frac{\text{Area of floor}}{\text{Area of one tile}}$

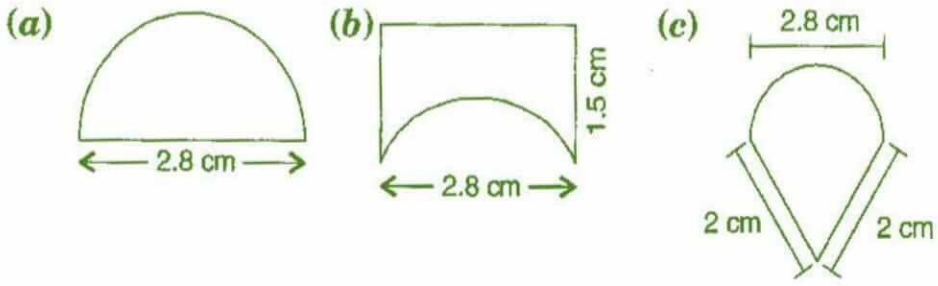
$= \frac{1080}{0.024}$

= 45000 tiles

Hence 45000 tiles are required to cover the floor.

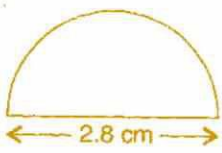
Question 5:

An ant is moving around a few food pieces of different shapes scattered on the floor. For which food-piece would the ant have to take a longer round? Remember, circumference of a circle can be obtained by using the expression $c = 2\pi r$, where r is the radius of the circle.



Answer 5:

(a) Radius = $\frac{\text{Diameter}}{2} = \frac{2.8}{2}$ = 1.4 cm

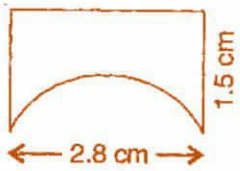


Circumference of semi circle = πr = $\frac{22}{7} \times 1.4$ = 4.4 cm

Total distance covered by the ant = Circumference of semi circle + Diameter

= 4.4 + 2.8 = 7.2 cm

(b) Diameter of semi circle = 2.8 cm

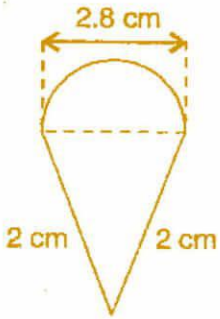


$\therefore$ Radius = $\frac{\text{Diameter}}{2} = \frac{2.8}{2}$ = 1.4 cm

Circumference of semi circle = $\pi r = \frac{22}{7} \times 1.4$ = 4.4 cm

Total distance covered by the ant = 1.5 + 2.8 + 1.5 + 4.4 = 10.2 cm

(c) Diameter of semi circle = 2.8 cm



$\therefore$ Radius = $\frac{\text{Diameter}}{2} = \frac{2.8}{2}$ = 1.4 cm

Circumference of semi circle = $\pi r = \frac{22}{7} \times 1.4$ = 4.4 cm

Total distance covered by the ant = 2 + 2 + 4.4 = 8.4 cm

Hence for figure (b) food piece, the ant would take a longer round.