

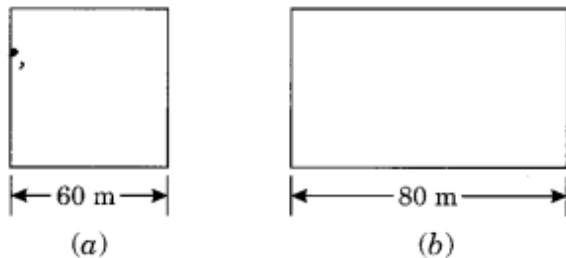
NCERT Solutions for Class 8 Maths Chapter 11 Mensuration

Ex 11.1 Class 8 Maths 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?

Solution:

Perimeter of figure (a) = $4 \times \text{side} = 4 \times 60 = 240 \text{ m}$



Perimeter of figure (b) = $2[l + b]$

Perimeter of figure (b) = Perimeter of figure (a)

$$2[l + b] = 240$$

$$\Rightarrow 2[80 + b] = 240$$

$$\Rightarrow 80 + b = 120$$

$$\Rightarrow b = 120 - 80 = 40 \text{ m}$$

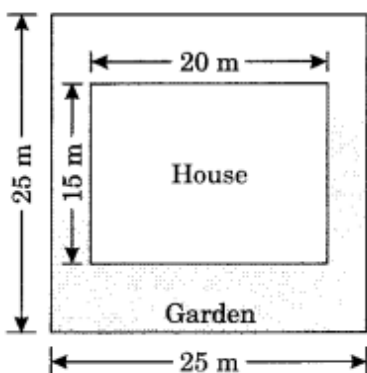
$$\text{Area of figure (a)} = (\text{side})^2 = 60 \times 60 = 3600 \text{ m}^2$$

$$\text{Area of figure (b)} = l \times b = 80 \times 40 = 3200 \text{ m}^2$$

So, area of figure (a) is longer than the area of figure (b).

Ex 11.1 Class 8 Maths 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 .



Solution:

$$\text{Area of the plot} = \text{side} \times \text{side} = 25 \text{ m} \times 25 \text{ m} = 625 \text{ m}^2$$

$$\text{Area of the house} = l \times b = 20 \text{ m} \times 15 \text{ m} = 300 \text{ m}^2$$

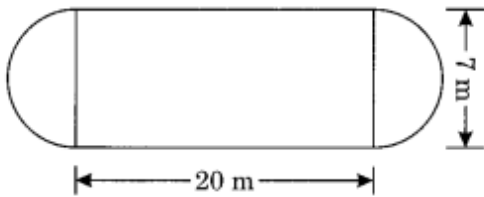
$$\text{Area of the garden to be developed} = \text{Area of the plot} - \text{Area of the house} = 625 \text{ m}^2 - 300 \text{ m}^2 = 325 \text{ m}^2$$

$$\text{Cost of developing the garden} = ₹ 325 \times 55 = ₹ 17875$$

Ex 11.1 Class 8 Maths Question 3.

The shape of a garden is rectangular in the middle and semicircular at the ends as shown in the diagram.

Find the area and the perimeter of this garden. [Length of rectangle is $20 - (3.5 + 3.5)$ metres]



Solution:

$$\text{Length of the rectangle} = 20 - (3.5 + 3.5) = 20 - 7 = 13 \text{ m}$$

$$\text{Area of the rectangle} = l \times b = 13 \times 7 = 91 \text{ m}^2$$

$$\begin{aligned} \text{Area of two circular ends} &= 2\left(\frac{1}{2} \pi r^2\right) \\ &= \pi r^2 \\ &= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \\ &= \frac{77}{2} \text{ m}^2 \\ &= 38.5 \text{ m}^2 \end{aligned}$$

$$\text{Total area} = \text{Area of the rectangle} + \text{Area of two ends} = 91 \text{ m}^2 + 38.5 \text{ m}^2 = 129.5 \text{ m}^2$$

$$\text{Total perimeter} = \text{Perimeter of the rectangle} + \text{Perimeter of two ends}$$

$$\begin{aligned} &= 2(l + b) + 2 \times (\pi r) - 2(2r) \\ &= 2(13 + 7) + 2\left(\frac{22}{7} \times \frac{7}{2}\right) - 4 \times \frac{7}{2} \\ &= 2 \times 20 + 22 - 14 \\ &= 40 + 22 - 14 \\ &= 48 \text{ m} \end{aligned}$$

Ex 11.1 Class 8 Maths 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).

Solution:

$$\text{Area of the floor} = 1080 \text{ m}^2 = 1080 \times 10000 \text{ cm}^2 = 10800000 \text{ cm}^2 [\because 1 \text{ m}^2 = 10000 \text{ cm}^2]$$

$$\text{Area of 1 tile} = 1 \times \text{base} \times \text{height} = 1 \times 24 \times 10 = 240 \text{ cm}^2$$

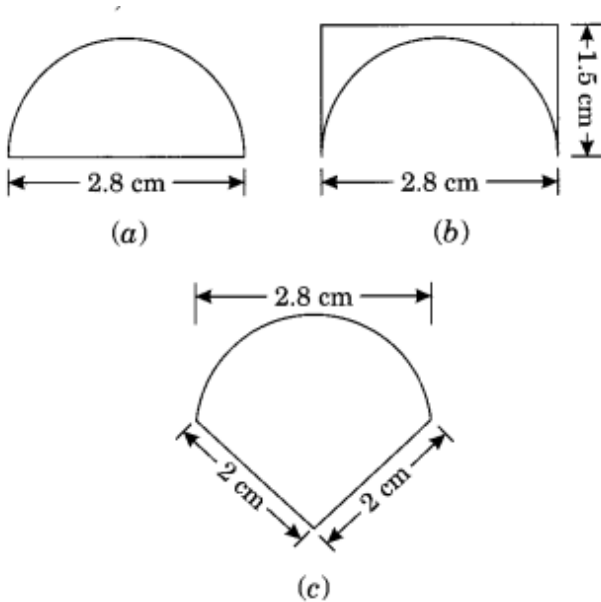
Number of tiles required

$$\begin{aligned} &= \frac{\text{Area of the floor}}{\text{Area of 1 tile}} \\ &= \frac{10800000}{240} \end{aligned}$$

$$= 45000 \text{ tiles}$$

Ex 11.1 Class 8 Maths 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, the circumference of a circle can be obtained by using the expression $C = 2\pi r$, where r is the radius of the circle.



Solution:

(a) Distance covered to take a round by the ant

$$\begin{aligned} &= \frac{1}{2} \times 2\pi r + 2r \\ &= \pi r + 2r \\ &= \frac{22}{7} \times 1.4 + 2 \times 1.4 \\ &= 22 \times 0.2 + 2.8 \\ &= 4.4 + 2.8 = 7.2 \text{ cm} \end{aligned}$$

(b) Distance travelled to take a round by the ant

$$\begin{aligned} &= 1.5 + 1.5 + 2.8 + \frac{1}{2} \times 2\pi r \\ &= 5.8 + \pi r \\ &= 5.8 + \frac{22}{7} \times 1.4 \\ &= 5.8 + 22 \times 0.2 \\ &= 5.8 + 4.4 \\ &= 10.2 \text{ cm} \end{aligned}$$

(c) Distance travelled to take a round by the ant

$$\begin{aligned} &= \frac{1}{2} \times 2\pi r + 2 + 2 \\ &= \pi r + 4 \\ &= \frac{22}{7} \times 1.4 + 4 \\ &= 22 \times 0.2 + 4 \\ &= 4.4 + 4 = 8.4 \text{ cm} \end{aligned}$$

Hence, the ant has to take longer round for the food-piece, i.e., 10.2 cm (b).

Q1 : A square and a rectangular field with measurements as given in the figure have the same perimeter. Which field has a larger area?

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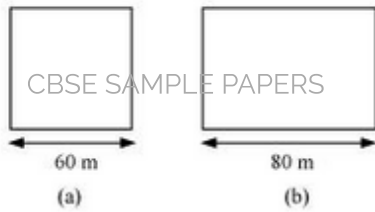
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Answer :

Perimeter of square = $4 \times (\text{Side of the square}) = 4 \times (60 \text{ m}) = 240 \text{ m}$

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

$= 2 \times (80 \text{ m} + \text{Breadth})$

$= 160 \text{ m} + 2 \times \text{Breadth}$

It is given that the perimeter of the square and the rectangle are the same.

$160 \text{ m} + 2 \times \text{Breadth} = 240 \text{ m}$

Breadth of the rectangle = $\left(\frac{80}{2}\right) \text{ m} = 40 \text{ m}$

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

Area of rectangle = $\text{Length} \times \text{Breadth} = (80 \times 40) \text{ m}^2 = 3200 \text{ m}^2$

Thus, the area of the square field is larger than the area of the rectangular field.

Q2 : Mrs. Kaushik has a square plot with the measurement as shown in the following 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 Rs 55 per m^2 .



25 m

Answer :

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

$$\text{Area of the house} = (15 \text{ m}) \times (20 \text{ m}) = 300 \text{ m}^2$$

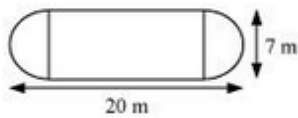
$$\begin{aligned} \text{Area of the remaining portion} &= \text{Area of square plot} - \text{Area of the house} \\ &= 625 \text{ m}^2 - 300 \text{ m}^2 = 325 \text{ m}^2 \end{aligned}$$

The cost of developing the garden around the house is Rs 55 per m^2 .

$$\text{Total cost of developing the garden of area } 325 \text{ m}^2 = \text{Rs } (55 \times 325)$$

$$= \text{Rs } 17,875$$

Q3 : 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 the garden [Length of rectangle is $20 - (3.5 + 3.5)$ metres]

**Answer :**

$$\text{Length of the rectangle} = [20 - (3.5 + 3.5)] \text{ metres} = 13 \text{ m}$$

$$\text{Circumference of 1 semi-circular part} = \pi r = \left(\frac{22}{7} \times 3.5 \right) \text{ m} = 11 \text{ m}$$

$$\text{Circumference of both semi-circular parts} = (2 \times 11) \text{ m} = 22 \text{ m}$$



Perimeter of the garden = AB + Length of both semi-circular regions BC and

DA + CD

$$= 13 \text{ m} + 22 \text{ m} + 13 \text{ m} = 48 \text{ m}$$

Area of the garden = Area of rectangle + 2 × Area of two semi-circular regions

$$= \left[(13 \times 7) + 2 \times \frac{1}{2} \times \frac{22}{7} \times (3.5)^2 \right] \text{ m}^2$$

$$= (91 + 38.5) \text{ m}^2$$

$$= 129.5 \text{ m}^2$$

Q4 : 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 m²? (If required you can split the tiles in whatever way you want to fill up the corners).

Answer :

Area of parallelogram = Base × Height

$$\text{Hence, area of one tile} = 24 \text{ cm} \times 10 \text{ cm} = 240 \text{ cm}^2$$

$$\text{Required number of tiles} = \frac{\text{Area of the floor}}{\text{Area of each tile}}$$

$$= \frac{1080 \text{ m}^2}{240 \text{ cm}^2} = \frac{(1080 \times 10000) \text{ cm}^2}{240 \text{ cm}^2} \quad (\because 1 \text{ m} = 100 \text{ cm}) = 45000 \text{ tiles}$$

Thus, 45000 tiles are required to cover a floor of area 1080 m².

Q5 : 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 :

$$(a) \text{Radius } (r) \text{ of semi-circular part} = \left(\frac{2.8}{2}\right) \text{ cm} = 1.4 \text{ cm}$$

$$\text{Perimeter of the given figure} = 2.8 \text{ cm} + \pi r$$

$$= 2.8 \text{ cm} + \left(\frac{22}{7} \times 1.4\right) \text{ cm}$$

$$= 2.8 \text{ cm} + 4.4 \text{ cm}$$

$$= 7.2 \text{ cm}$$

$$(b) \text{Radius } (r) \text{ of semi-circular part} = \left(\frac{2.8}{2}\right) \text{ cm} = 1.4 \text{ cm}$$

$$\text{Perimeter of the given figure} = 1.5 \text{ cm} + 2.8 \text{ cm} + 1.5 \text{ cm} + \pi (1.4 \text{ cm})$$

$$= 5.8 \text{ cm} + \frac{22}{7} (1.4 \text{ cm})$$

$$= 5.8 \text{ cm} + 4.4 \text{ cm}$$

$$= 10.2 \text{ cm}$$

$$(c) \text{Radius } (r) \text{ of semi-circular part} = \left(\frac{2.8}{2}\right) \text{ cm} = 1.4 \text{ cm}$$

$$\text{Perimeter of the figure(c)} = 2 \text{ cm} + \pi r + 2 \text{ cm}$$

$$= 4 \text{ cm} + \frac{22}{7} \times (1.4 \text{ cm})$$

$$= 4 \text{ cm} + 4.4 \text{ cm}$$

$$= 8.4 \text{ cm}$$

Thus, the ant will have to take a longer round for the food-piece (b), because the perimeter of the figure given in alternative (b) is the greatest among all.

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