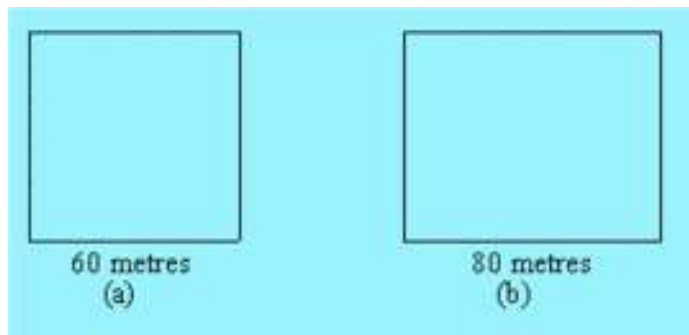


NCERT SOLUTIONS OF Mensuration

Exercise 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:

Perimeter of Square is given by

$$= 4 \times \text{side} = 4 \times 60 = 240 \text{ m}$$

$$\text{Area of Square} = \text{Side}^2 = 60^2 = 3600 \text{ m}^2$$

Now Perimeter of Rectangle is given by

$$= 2(\text{length} + \text{breadth})$$

$$\text{Or, } = 2(80 + \text{breadth})$$

Now both the square and rectangle has the same perimeter

So

$$240 = 2(80 + \text{breadth})$$

$$80 + \text{breadth} = 120$$

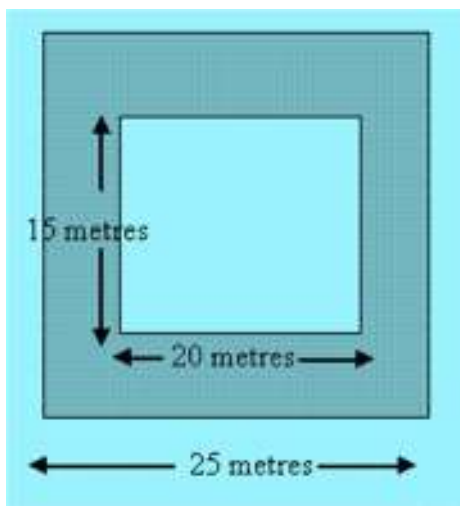
$$\text{Breadth} = 120 - 80 = 40 \text{ m}$$

Area of rectangle = length x breadth = $80 \times 40 = 3200 \text{ m}^2$

Now it is clear that the area of the square field is greater than the area of the rectangular field.

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 Rs 55 per m^2 .



Answer:

Area of the square plot = Side² = $25^2 = 625 \text{ m}^2$

Area of the house construction part = length x breadth

= $20 \times 15 = 300 \text{ m}^2$

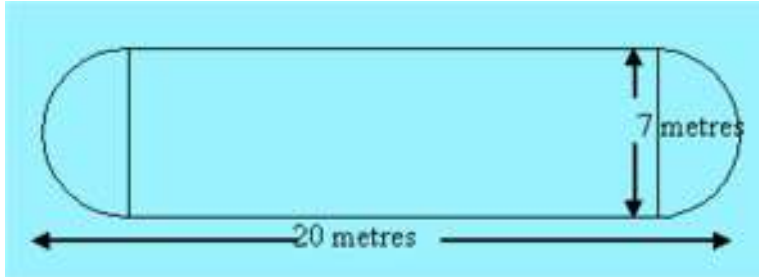
So, area of the garden = Area of square plot – area of house in construction = $625 - 300 = 325 \text{ m}^2$

Cost of developing the garden = Area of Garden x Rate

= $300 \times 55 = 16500$ rupees

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 $20 - (3.5 + 3.5)$ m].



Answer: Area of the rectangular part = length x breadth

$$= 20 \times 7 = 140 \text{ sq m}$$

Area of Semicircular portions: $= \pi \times r^2$

Here $\pi = 22/7$ and radius $= 7/2 = 3.5$ m

So area of two Semicircular portions: = Area of circle = $\pi \times r^2$

$$= (22/7) \times 3.5 \times 3.5 = 37.5$$

So Total area of the garden =

Area of rectangular portion + Area of circle

$$= 140 + 37.5 = 177.5 \text{ m}^2$$

Now the perimeter of shape = Perimeter of semicircular portion + Length + Perimeter of semicircular portion + length

= Perimeter of Circle + 2 Length

$$= 2 \pi r + 40$$

$$= 22 + 40 = 62 \text{ m}$$

Question 4

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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 the Parallelogram = base x height

$$= 24 \times 10 = 240 \text{ cm}^2$$

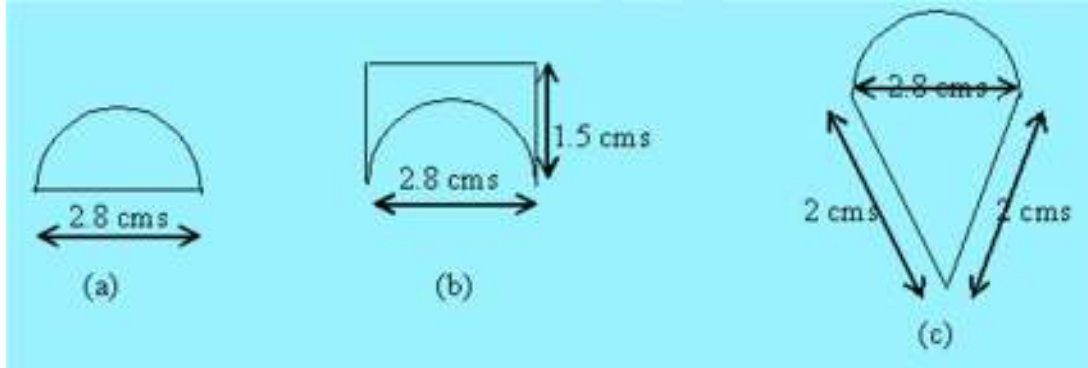
So required Number of tiles = Area of the Floor/Area of the Tiles

$$= 1080 \times 100 \times 100 / 240 = 45000$$

(area of floor is converted into square cm)

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

- a) In the first case, Perimeter of the shape
 = Perimeter of Semicircular part + Diameter of the part
 = $\pi r + 2r$
 = $(22/7) \times (1.4) + 2.8$
 = 7.2 cm
- b) In the second case, Perimeter of the shape
 = Perimeter of Semicircular part + 2Length + Breadth
 = $\pi r + 2L + B$
 = $4.4 + 3 + 2.8$
 = 10.2 cm

- c) In the third case, Perimeter of the shape
= Perimeter of Semicircular part + 2(slant height)
= $4.4 + 4 = 8.4$ cm

So, the food shape in (a) requires the ant to cover the least distance.

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