

Perimeter and Area of Plane Figures

IMPORTANT POINTS

1. Perimeter: It is the length of the boundry of the given figure.

(i) Perimeter of a triangle = Sum of its three sides.

(ii) Perimeter of rectangle = 2 (length + breadth)

(iii) Perimeter of square = 4 x side.

2. Area: Area is the measure of surface of the plane covered by a closed plane figure. In other words, we can say that area of a closed plane figure is the measure of its interior region.

(i) Area of rectangle = length x breadth

(ii) Area of square = (side)².

3. Units of measurement of perimeter and area :

(i) Perimeter is measured in centimetre (cm) metre (m) or millimeter (mm).

(ii) Area is measured in square mm, square cm or square metre.

EXERCISE 32 (A)

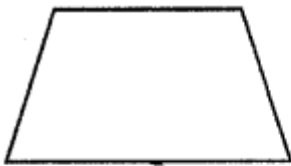
Question 1.

What do you understand by a plane closed figure?

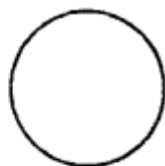
Solution:

Any geometrical plane figure bounded by lines (straight or curved) in a plane is called a plane closed figure.

Each of the following figures is a plane closed figure.



(i)



(ii)



(iii)



(iv)

Question 2.

The interior of a figure is called region of the figure. Is this statement true ?

Solution:

Yes. The interior of the figure alongwith its boundary is called region of the figure

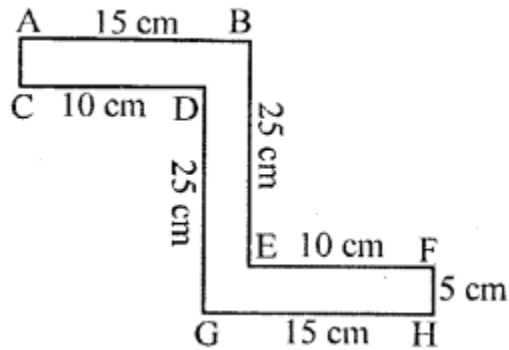
Question 3.

Find the perimeter of each of the following closed figures :

Solution:

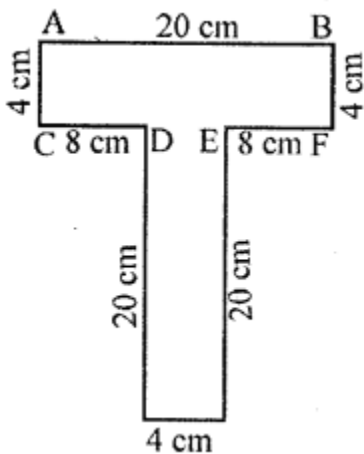
(i) Required perimeter

$$\begin{aligned} &= AB + AC + BE + EF + FH + HG + HD \\ &= 15 + 5 + 25 + 10 + 5 + 15 + 25 = 110 \text{ cm} \end{aligned}$$



(ii) Required perimeter

$$\begin{aligned} &= AB + AC + CD + DG + BF + EF + EH + GH \\ &= 20 + 4 + 8 + 20 + 4 + 8 + 20 + 4 = 88 \text{ cm} \end{aligned}$$



Question 4.

Find the perimeter of a rectangle whose:

(i) length = 40 cm and breadth = 35 cm

(ii) length = 10 m and breadth = 8 m

(iii) length = 8 m and breadth = 80 cm

(iv) length = 3.6 m and breadth = 2.4 m

Solution:

(i) length = 40 cm and breadth = 35 cm

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

$$= 2 (40 \text{ cm} + 35 \text{ cm})$$

$$= 2 \times 75 \text{ cm}$$

$$= 150 \text{ cm} = \frac{150}{100}$$

$$= 1.5 \text{ m}$$

(ii) length = 10 m and breadth = 8 m

$$\begin{aligned}\therefore \text{Perimeter} &= 2 (\text{length} + \text{breadth}) \\ &= 2 (10 \text{ m} + 8 \text{ m}) \\ &= 2 \times 18 \text{ m} = 54 \text{ m}\end{aligned}$$

(iii) length = 8 m and

breadth = 80 cm

Length = 8 m

Breadth = 80 cm = $\frac{80}{100}$ m = 0.8 m

$$\begin{aligned}\therefore \text{Perimeter} &= 2 (\text{length} + \text{breadth}) \\ &= 2 (8 \text{ m} + 0.8 \text{ m}) \\ &= 2 \times 8.8 \text{ m} = 17.6 \text{ m}\end{aligned}$$

(iv) length = 3.6 m and breadth = 2.4 m

$$\begin{aligned}\therefore \text{Perimeter} &= 2 (\text{length} + \text{breadth}) \\ &= 2 (3.6 \text{ m} + 2.4 \text{ m}) \\ &= 2 \times 6 \text{ m} = 12 \text{ m}\end{aligned}$$

Question 5.

If P denotes perimeter of a rectangle, l denotes its length and b denotes its breadth, find :

(i) l, if P = 38cm and b = 7cm

(ii) b, if P = 3.2m and l = 100 cm

(iii) P, if l = 2 m and b = 75cm

Solution:

(i) l , if $P = 38\text{cm}$ and $b = 7\text{cm}$

$$\text{Length, } (l) = \frac{P}{2} - b$$

$$= \frac{38}{2} - 7\text{cm}$$

$$= 19\text{ cm} - 7\text{cm} = 10\text{ cm Ans.}$$

(ii) b , if $P = 3.2\text{m}$ and $l = 100\text{ cm}$

$$\left[\because 100\text{cm} = \frac{100}{100}\text{m} = 1\text{m} \right]$$

$$\text{Breadth, } (b) = \frac{P}{2} - l$$

$$= \frac{3.2}{2}\text{ m} - 1\text{m}$$

$$= 1.6\text{ m} - 1\text{m} = 0.6\text{ Ans.}$$

(iii) P , if $l = 2\text{ m}$ and $b = 75\text{cm}$

$$\left[\because b = 75\text{cm} = \frac{75}{100}\text{m} = 0.75 \right]$$

$$\therefore \text{ Perimeter} = 2(l + b)$$

$$= 2(2 + 0.75)$$

$$= 2(2.75)$$

$$= 5.5\text{ cm Ans.}$$

Question 6.

Find the perimeter of a square whose each side is 1.6 m.

Solution:

$$\because \text{Side of the square} = 1.6\text{ m}$$

$$\therefore \text{its perimeter} = 4 \times \text{side}$$

$$= 4 \times 1.6\text{ m}$$

$$= 6.4\text{ m}$$

Question 7.

Find the side of the square whose pe-rimeter is 5 m.

Solution:

Perimeter of the square = 5 m

$$\therefore \text{Its side} = \frac{\text{Perimeter}}{4}$$

$$= \frac{5}{4} \text{ m} = 1.25 \text{ m Ans.}$$

Question 8.

A square field has each side 70 m whereas a rectangular field has length = 50 m and breadth = 40 m. Which of the two fields has greater perimeter and by how much?

Solution:

Perimeter of the square field = 4 x side = 4 x 70m = 280m

Perimeter of rectangular field = 2 (length + breadth)

$$= 2 (50 \text{ m} + 40 \text{ m})$$

$$= 2 \times 90 \text{ m}$$

$$= 180 \text{ m}$$

\therefore Square field has greater perimeter by $280 \text{ m} - 180 \text{ m} = 100 \text{ m}$

Question 9.

A rectangular field has length = 160m and breadth = 120 m. Find :

(i) the perimeter of the field.

(ii) the length of fence required to enclose the field.

(iii) the cost of fencing the field at the rate of ₹ 80 per metre.

Solution:

Given = length = 160 m, breadth = 120m

(i) The Perimeter of the field = 2 (l + b)

$$= 2 (160 \text{ m} + 120 \text{ m})$$

$$= 2 \times 280$$

$$= 560 \text{ m}$$

(ii) The length of fence required to enclose the field = The perimeter of the rectangular field

$$= 560 \text{ m}$$

(iii) The cost of fencing the field = Length of fence x Rate of fence

$$= 560 \text{ m} \times ₹80 \text{ per metre}$$

$$= ₹44,800$$

Question 10.

Each side of a square plot of land is 55 m. Find the cost of fencing the plot at the rate of ₹32 per metre.

Solution:

\therefore Perimeter of square field = 4 x its side = 4 x 55 m

\therefore Length of required fencing = 220 m Now, the cost of fencing = its length x its rate

$$= 220 \text{ m} \times ₹32 \text{ per metre?}$$

$$= ₹7040$$

Question 11.

Each side of a square field is 70 cm. How much distance will a boy walk in order to make ?

(i) one complete round of this field ?

(ii) 8 complete rounds of this field ?

Solution:

(i) Distance covered by the boy to make one complete round of the field.

Perimeter of the field : $4 \times \text{its side} = 4 \times 70 = 280 \text{ m}$

(ii) Distance covered by the boy to make 8 complete rounds of this field.

$$= 280 \text{ m} \times 8 \text{ m} = 2240 \text{ m}$$

Question 12.

A school playground is rectangular in shape with length = 120 m and breadth = 90 m. Some school boys run along the boundary of the play-ground and make 15 complete rounds in 45 minutes. How much distance they run during this period.

Solution:

Length of the rectangular playground = 120 m
Breadth of the rectangular playground = 90 m

\therefore Perimeter of the rectangular ground = $2(l + b)$

$$= 2(120 + 90) \text{ m} = 420 \text{ m}$$

Thus, in one complete round, boys covers a distance of = 420 m

$$\therefore \text{Distance covered in 15 complete rounds} = 420 \text{ m} \times 15 = 6300 \text{ m}$$

Question 13.

Mohit makes 8 full rounds of a rect-angular field with length = 120 m and breadth = 75 m.

John makes 10 full rounds of a square field with each side 100 in. Find who covers larger distance and by how much?

Solution:

Mohit

Length of the rectangular field = 120

Breadth of the rectangular field = 75 m

\therefore Distance covered in one round (perim-eter) = $2(l + b)$

$$= 2(120 + 75) = 390 \text{ m} \text{ Hence, distance covered in 8 rounds} = 390 \times 8 \text{ m} = 3120 \text{ m}$$

John

Side of the field = 100 m

\therefore Distance covered in one round = $4 \times a = 4 \times 100 = 400 \text{ m}$

Hence, Distance covered in 10 rounds = $400 \times 10 \text{ m} = 4000 \text{ m}$

$$\text{John a covers greater distance then Mohit by} = (4000 - 3120) \text{ m} = 880 \text{ m}$$

Question 14.

The length of a rectangle is twice of its breadth. If its perimeter is 60 cm, find its

length.

Solution:

Let the breadth of the field = x cm

\therefore its length = $2x$

and, its perimeter = $2 \times (\text{length} + \text{breadth})$

$= 2 \times (2x + x)$

$= 2(3x)$

$= 6x$ cm

Perimeter = 60 cm

$\Rightarrow 60 \text{ cm} = 6x \text{ cm}$

$\Rightarrow x = \frac{60}{6} = 10 \text{ cm}$

\therefore Breadth = $x = 10 \text{ cm}$

Length = $2x = 2 \times 10 = 20 \text{ cm}$

Question 15.

Find the perimeter of :

(i) an equilateral triangle of side 9.8 cm.

(ii) an isosceles triangle with each equal side = 13 cm and the third side = 10 cm.

(iii) a regular pentagon of side 8.2 cm.

(iv) a regular hexagon of side 6.5 cm.

Solution:

(i) The perimeter of equilateral triangle = $3 \times \text{side}$

$= 3 \times 9.8 \text{ cm}$

$= 29.4 \text{ cm}$

(ii) Required perimeter = $13 \text{ cm} + 13 \text{ cm} + 10 \text{ cm}$

$= 36 \text{ cm}$

(iii) Perimeter of given pentagon = $5 \times \text{side} = 5 \times 8.2 \text{ cm}$

$= 41 \text{ cm}$

(iv) Perimeter of given hexagon = $6 \times \text{side} = 6 \times 6.5 \text{ cm}$

$= 39 \text{ cm}$

Question 16.

An equilateral triangle and a square has equal perimeter. If side of the triangle is 9.6 cm ; what is the length of the side of the square ?

Solution:

Perimeter of equilateral triangle = Perimeter of square Side of triangle = 9.6 cm

\therefore Perimeter of triangle = $3 \times \text{side}$

$= 3 \times 9.6 \text{ cm} = 28.8 \text{ cm}$

> Perimeter of the square = 28.8 cm

$4 \times \text{the side of square} = 28.8 \text{ cm}$

\Rightarrow The side of the square = $\frac{28.8}{4} \text{ cm}$

$= 7.2 \text{ cm}$ Ans.

Question 17.

A rectangle with length = 18 cm and breadth = 12 cm has same perimeter as that

of a regular pentagon. Find the side of the pentagon.

Solution:

Length of rectangle = 18 cm

Breadth of rectangle = 12 cm

∴ Perimeter of rectangle = $2 \times (l + b)$

= $2 \times (18 + 12)$

= $2 \times 30 = 60$ cm

∴ Perimeter of rectangle = Perimeter of pentagon

60 cm = $5 \times \text{side}$

side = $\frac{60}{5}$ cm = 12 cm

∴ Side of the pentagon = 12 cm Ans.

Question 18.

A regular pentagon of each side 12 cm has same perimeter as that of a regular hexagon. Find the length of each side of the hexagon.

Solution:

Perimeter of regular pentagon = $5 \times \text{length of the side}$

= 5×12 cm = 60 cm

Clearly, perimeter of the given pentagon = 60 cm

⇒ $6 \times \text{side of hexagon} = 60$ cm

⇒ side of hexagon = $\frac{60}{6}$ cm = 10 cm

Question 19.

Each side of a square is 45 cm and a rectangle has length 50 cm. If the perimeters of both (square and rectangle) are same, find the breadth of the rectangle.

Solution:

Side of a square = 45 cm

∴ Perimeter = $4a = 4 \times 45$ cm = 180 cm

or Perimeter of rectangle = 180 cm

Length of rectangle = 50 cm

$$\therefore \text{Breadth} = \frac{P}{2} - l = \frac{180}{2} - 50$$

$$= 90 - 50 = 40 \text{ Ans.}$$

Question 20.

A wire is bent in the form of an equilateral triangle of each side 20 cm. If the same wire is bent in the form of a square, find the side of the square.

Solution:

∴ Each side of the given equilateral triangle = 20 cm

∴ Perimeter of the triangle = $3 \times \text{side} = 3 \times 20$ cm = 60 cm ,

∴ Perimeter of the square = Perimeter of equilateral triangle

$\Rightarrow 4 \times \text{side of square} = 60 \text{ cm}$
 $\Rightarrow \text{The side of the square} = \frac{60}{4}$
 $= 15 \text{ cm}$

EXERCISE 32 (B)

Question 1.

Find the area of a rectangle whose :

- (i) length = 15 cm breadth = 6.4 cm
- (ii) Length = 8.5 m breadth = 5 m
- (iii) Length = 3.6 m breadth = 90 cm
- (iv) Length = 24 cm breadth = 180 mm

Solution:

(i) length = 15 cm and breadth = 6.4 cm
 $\Rightarrow \text{Area of the rectangle} = \text{length} \times \text{breadth}$
 $= 15 \text{ cm} \times 6.4 \text{ cm}$
 $= 96 \text{ cm}^2$

(ii) Length = 8.5 m and breadth = 5 m
 $\Rightarrow \text{Area of the rectangle} = \text{length} \times \text{breadth}$
 $= 8.5 \text{ m} \times 5 \text{ m}$
 $= 42.5 \text{ m}^2$

(iii) Length = 3.6 m and breadth = 90 cm
 $\Rightarrow \text{Area of the rectangle} = \text{length} \times \text{breadth}$
 $= 3.6 \text{ m} \times 0.9 \text{ m}$

$$[\because 90 \text{ cm} = \frac{90}{100} \text{ m} = 0.9 \text{ m}]$$

$$= 3.24 \text{ m}^2$$

(iv) Length = 24 cm and breadth = 180 mm
 $\Rightarrow \text{length} = 24 \text{ cm}$

$$\text{breadth} = 180 \text{ mm} = \frac{180}{10} \text{ cm} = 18 \text{ cm}$$

$\Rightarrow \text{Area of the rectangle} = \text{length} \times \text{breadth}$
 $= 24 \text{ cm} \times 18 \text{ cm}$
 $= 432 \text{ cm}^2$

Question 2.

Find the area of a square, whose each side is :

- (i) 7.2 cm
- (ii) 4.5 m
- (iii) 4.1 cm

Solution:

(i) 7.2 cm

Area of the square = (side)² = (7.2 cm)² = 7.2 cm x 7.2 cm = 51.84 cm²

(ii) 4.5 m

Area of the square = (side)² = (4.5 m)² = 4.5 m x 4.5 m = 20.25 m²

(iii) 4.1 cm

Area of the square = (side)² = (4.1 cm)² = 4.1 cm x 4.1 cm = 16.81 cm²

Question 3.

If A denotes area of a rectangle, l represents its length and b represents its breadth, find :

(i) l, if A = 48 cm² and b = 6 cm

(ii) b, if A = 88 m² and l = 8m

Solution:

(i) l, if A = 48 cm² and b = 6 cm

$$l = \frac{A}{b} \quad [\because A = l \times b \Rightarrow l = \frac{A}{b}]$$

$$\Rightarrow l = \frac{48\text{cm}^2}{6\text{cm}} = 8 \text{ cm}$$

(ii) b, if A = 88 m² and l = 8m

$$b = \frac{A}{l} \quad [\because A = l \times b \Rightarrow b = \frac{A}{l}]$$

$$\Rightarrow b = \frac{88\text{cm}^2}{8\text{cm}} = 11 \text{ m}$$

Question 4.

Each side of a square is 3.6 cm; find its

(i) perimeter

(ii) area.

Solution:

(i) Perimeter = 4 x side

= 4 x 3.6 cm = 14.4 cm

(ii) Area = (side)²

= (3.6 cm)²

= 12.96 cm²

Question 5.

The perimeter of a square is 60 m, find :

(i) its each side its area

(ii) its new area obtained on increasing

(iii) each of its sides by 2 m.

Solution:

Perimeter of a square = 60 m

(i) Perimeter of a square = 4 x side

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

$$\frac{60}{4} = \text{side}$$

$$\therefore \text{side} = 15 \text{ m}$$

(ii) Area of square = (side)² = (15 m)²

$$= 15 \text{ m} \times 15 \text{ m}$$

$$= 225 \text{ m}^2$$

(iii) Increased each side = 2 m

Side of square = 15 m

New length of side = (2m + 15m)

$$= 17 \text{ m}$$

$$\therefore \text{New Area of square} = (17 \text{ m})^2 = 17 \text{ m} \times 17 \text{ m} = 289 \text{ m}^2$$

Question 6.

Each side of a square is 7 m. If its each side be increased by 3 m, what will be the increase in its area.

Solution:

Each side of square = 7 m

$$\therefore \text{Area of square} = (\text{side})^2 = (7 \text{ m})^2$$

$$= 7 \text{ m} \times 7 \text{ m} = 49 \text{ m}^2$$

\therefore Side increased by 3 m

$$\therefore \text{Total length of side will be} = 3 \text{ m} + 7 \text{ m} = 10 \text{ m}$$

$$\therefore \text{Area of square} = (10 \text{ m})^2 = 10 \text{ m} \times 10 \text{ m} = 100 \text{ m}^2$$

$$\therefore \text{Increase in area} = 100 \text{ m}^2 - 49 \text{ m}^2 = 51 \text{ m}^2$$

Question 7.

The perimeter of a square field is numerically equal to its area. Find each side of the square.

Solution:

$$\text{Perimeter of square} = \text{Area of square}$$

$$\therefore 4a = a^2$$

$$\Rightarrow \frac{a^2}{a} = 4$$

$$\Rightarrow a = 4$$

$$\therefore \text{each side of square} = 4$$

Question 8.

A rectangular piece of paper has area = 24 cm² and length = 5 cm. Find its perimeter.

Solution:

$$\therefore \text{Area of rectangle} = \text{length} \times \text{breadth}$$

$$\Rightarrow 24 \text{ cm}^2 = 5 \text{ cm} \times \text{breadth}$$

$$\Rightarrow \text{breadth} = \frac{24 \text{ cm}^2}{5 \text{ cm}} = 4.8 \text{ cm}$$

$$\text{and, perimeter} = 2 \times (l + b)$$

$$= 2 \times (5 \text{ cm} + 4.8 \text{ cm})$$

$$= 2 \times 9.8 \text{ cm}$$

$$= 19.6 \text{ cm Ans.}$$

Question 9.

Find the perimeter of a rectangle whose area = 2600 m² and breadth = 50 m.

Solution:

$$\therefore \text{Area of rectangle} = 2600 \text{ m}^2$$

$$\text{and breadth} = 50 \text{ m}$$

$$\therefore \text{its length} = \frac{\text{Area}}{\text{Breadth}}$$

$$= \frac{2600 \text{ cm}^2}{50 \text{ cm}} = 52 \text{ cm}$$

$$\Rightarrow \text{Perimeter of the rectangle}$$

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

$$= 2 \times (52 \text{ cm} + 50 \text{ cm})$$

$$= 2 \times 102 = 204 \text{ cm}$$

Question 10.

What will happen to the area of a rectangle, if its length and breadth both are trebled?

Solution:

Let the original length of the rectangle = l and its original breadth = b

\therefore its original area = length \times breadth i.e $A = l \times b$ i. e.

Since,

Increased length = $3l$

and, increased breadth = $3b$

\therefore New area = $3l \times 3b = 9 \times l \times b$ [$\because A = l \times b$]

\Rightarrow Area of the new rectangle = 9 times than area of original rectangle

Question 11.

Length of a rectangle is 30 m and its breadth is 20 m. Find the increase in its area if its length is increased by 10 m and its breadth is doubled.

Solution:

Length of a rectangle (l) = 30 m,

Breadth of the rectangle (b) = 20 m

Area of rectangle = $l \times b$

$$= 30 \times 20 = 600 \text{ m}^2$$

Since, the length is increased by 10 m and breadth is doubled

$$\therefore \text{New length } (l) = (30 + 10) \text{ m} = 40 \text{ m}$$

$$\text{and new breadth} = (20 \times 2) \text{ m} = 40 \text{ m}$$

$$\therefore \text{New area} = l \times b = 40 \times 40 \text{ m}^2 = 1600 \text{ m}^2$$

$$\text{Hence, the increase in the area} = (1600 - 600) \text{ m}^2$$

$$= 1000 \text{ m}^2$$

Question 12.

The side of a square field is 16 m. What will be increase in its area, if:

(i) each of its sides is increased by 4 m

(ii) each of its sides is doubled.

Solution:

Side of the square field (a) = 16 m

$$\therefore \text{Area of the square field} = (a)^2$$

$$= 16 \times 16 \text{ m}^2 = 256 \text{ m}^2$$

(i) Each of its sides increased by 4 m

$$\therefore \text{New side} = (16 + 4) \text{ m} = 20 \text{ m}$$

$$\therefore \text{New area of the square field} = (a)^2$$

$$= 20 \times 20 \text{ m}^2 = 400 \text{ m}^2$$

(ii) Each of its side is doubled

$$\therefore \text{New side} = 16 \times 2 = 32 \text{ m}$$

$$\therefore \text{New area of the square field} = (a)^2$$

$$= 32 \times 32 \text{ m}^2 = 1024 \text{ m}^2$$

Question 13.

Each rectangular tile is 40 cm long and 30 cm wide. How many tiles will be required to cover the floor of a room with length = 4.8 m and breadth = 2.4 m.

Solution:

Area of each rectangular tiles

$$= 40 \text{ cm} \times 30 \text{ cm}$$

$$= 0.4 \text{ m} \times 0.3 \text{ m tiles} = 0.12 \text{ m}^2$$

$$\Rightarrow \text{Area to be covered by the tiles} = 4.8 \text{ m} \times 2.4 \text{ m} = 15.36 \text{ m}^2$$

\therefore Required number of tiles

$$= \frac{\text{Area to be covered by tiles}}{\text{Area of each tile}}$$

$$= \frac{15.36 \text{ m}^2}{0.12} = 128$$

Question 14.

Each side of a square tile is 60 cm. How many tiles will be required to cover the floor of a hall with length = 50 m and breadth = 36 m.

Solution:

Area of each square tile = (side)²

$$= (60 \text{ cm})^2 = (0.6 \text{ m})^2$$

$$= 0.6 \text{ m} \times 0.6 \text{ m} = 0.36 \text{ m}^2$$

And, area to be covered by the tiles =
length \times breadth

$$= 50 \text{ m} \times 36 \text{ m}$$

$$= 1800 \text{ m}^2$$

\therefore Required no. of tiles

$$= \frac{\text{Area to be covered by tiles}}{\text{Area of each tile}}$$

$$= \frac{1800 \text{ m}^2}{0.36 \text{ m}^2} = 5000$$

Question 15.

The perimeter of a square plot = 360 m. Find :

(i) its area.

(ii) cost of fencing its boundary at the rate of ₹ 40 per metre.

(iii) cost of levelling the plot at ₹60 per square metre.

Solution:

Given, perimeter of square plot = 360 m

\therefore Perimeter of the square = 4 \times its side

$\therefore 4 \times \text{side of square} = 360 \text{ m}$

$\Rightarrow \text{side of the square} = \frac{360\text{m}}{4} = 90 \text{ m}$

(i) The area of the square field = (side)²

= (90 m)²

= 90 m x 90 m

= 8100 m²

Cost of fencing at ₹ 40 per metre

= 8100 m² x ₹ 40 per metre

= ₹ 324000

Cost of levelling at ₹ 60 per m²

= 8100 m² x ₹60 per m²

= ₹ 486000

Question 16.

The perimeter of a rectangular field is 500 m and its length = 150 m. Find:

(i) its breadth,

(ii) its area.

(iii) cost of ploughing the field at the rate of ₹1.20 per square metre.

Solution:

(i) Perimeter of a rectangle = 2 x (length + breadth)

$\Rightarrow 500 \text{ m} = 2 \times (150 \text{ m} + \text{breadth})$

$\Rightarrow 250 \text{ m} - 150 \text{ m} = \text{breadth}$

$\therefore \text{breadth} = 100 \text{ m}$

(ii) Area of rectangular field = length x breadth

= 150 m x 100 m = 15000 m²

(iii) Cost of ploughing the field at the rate of

= ₹1.20 per square m² = area of the field x rate of ploughing = 15000 m² x ₹1.20 per square metre = ₹15000 x 1.20 = ₹18000

Question 17.

The cost of flooring a hall of ₹64 per square metre is ₹2,048. If the breadth of the hall is 5m, find :

(i) its length.

(ii) its perimeter.

(iii) cost of fixing a border of very small width along its boundary at the rate of ₹60 per square metre.

Solution:

\therefore Total cost of flooring the room = ₹2,048

and, cost of flooring per square metre = ₹64

\therefore Area of the room =

$$\frac{\text{Total cost of flooring}}{\text{cost of flooring per square metre}}$$

$$= \frac{2048}{64} \text{ m}^2 = 32 \text{ m}^2$$

(i) \therefore length \times breadth = area

$$\Rightarrow \text{length} \times 5 \text{ m} = 32 \text{ m}^2$$

$$\Rightarrow \text{length} = \frac{32 \text{ m}^2}{5 \text{ m}} = 6.4 \text{ m}$$

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

$$= 2 \times (6.4 \text{ m} + 5 \text{ m})$$

$$= 2 \times 11.4 \text{ m}$$

$$= 22.8 \text{ m}$$

(iii) Cost of fixing a border at the rate of ₹60 per m^2 = area of hall \times rate of fixing

$$= 32 \text{ m}^2 \times ₹60 \text{ per m}^2$$

$$= ₹1920$$

Question 18.

The length of a rectangle is three times its breadth. If the area of the rectangle is 1875 sq. cm, find its perimeter.

Solution:

Let the breadth of a rectangle = x

and the length of a rectangle = $3x$

\therefore Area of the rectangle = $l \times b$

$$\Rightarrow 1875 \text{ cm}^2 = x \times 3x \quad \Rightarrow \quad 3x^2 = 1875$$

$$\Rightarrow x^2 = \frac{1875}{3} \quad \Rightarrow \quad x = \sqrt{625}$$

$$\Rightarrow x = 25 \text{ cm}$$

\therefore Breadth of a rectangle = 25 cm

and length of a rectangle = $3 \times 25 \text{ cm} = 75 \text{ cm}$

Now, perimeter of a rectangle = $2(l + b)$

$$= 2 (75 + 25) \text{ cm}$$

$$= 2 \times 100 \text{ cm} = 200 \text{ cm}$$