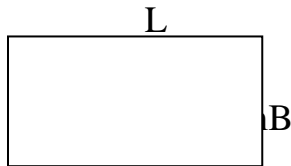


## CHAPTER SEVEN

### The Perimeter, Area And Volume Of Geometrical Figures

#### The Rectangle :



L = the length.

B = the breadth or the width.

The Perimeter:

- The perimeter of a given figure is the distance around it, and as such the perimeter of a rectangle is the distance around it.

- The perimeter of a rectangle is given by

$P = 2L + 2B$ , or  $P = 2(L+B)$ , where P = perimeter, L = length and B = breadth.

Q1. The length of a rectangle is 8cm and its breadth is 5cm. Find its perimeter.

Soln.

L = 8cm, B = 5cm.

$P = 2L + 2B = 2(8) + 2(5) = 16 + 10 = 26\text{cm}$

$\therefore \text{perimeter} = 26\text{cm}.$

Method 2

$P = 2(L+B) = 2(8+5) = 2(13) = 2 \times 13 = 26\text{cm}.$

Q2. A rectangle is of length 100cm and breadth 80cm. Find the distance around it.

Soln.

L = 100cm and B = 80cm.

$P = 2L + 2B = 2(100) + 2(80), \Rightarrow P = 2 \times 100 + 2 \times 80 = 200 + 160 = 360\text{cm}.$

Q3. A rectangle has a length of 6cm and a width of 3cm. Calculate its perimeter.

Soln.

Width = breadth = 3cm and L = 6cm. Since  $P = 2L + 2B, \Rightarrow p = 2(6) + 2(3) = 12 + 6 = 18, \Rightarrow \text{perimeter} = 18\text{cm}.$

Q4. A rectangle has a length of 0.2m and a breadth of 10cm. Find its perimeter.

N/B: The length is given in metres and the breadth in centimetres. Covert the metres into centimeters by multiplying by 100, since  $100\text{cm} = 1\text{m}.$

Soln.

$L = 0.2\text{m} = 0.2 \times 100 = 20\text{cm}$ ,  $B = 10\text{cm}$ .  $P = 2L + 2B \Rightarrow p = 2(20) + 2(10) \Rightarrow p = 40 + 20 = 60$ ,  $\therefore \text{perimeter} = 60\text{cm}$ .

Q5. A rectangular plot of land is 0.4m long and 30cm wide.

Calculate the distance round it.

$L = 0.4\text{m} = 0.4 \times 100 = 40\text{cm}$ . Width = 30cm  $\Rightarrow B = 30\text{cm}$ .

Distance around it = the perimeter =  $2(L+B) = 2(40+30) = 2(70) = 140\text{cm}$ .

Q6. The distance around a rectangular plot of land is 520cm. If the field is 80m long, find its breadth.

Soln.

$P = 520\text{cm}$ ,  $L = 80\text{cm}$ ,  $B = ?$

From  $P = 2L + 2B \Rightarrow p = 2(80) + 2B$ ,  $\Rightarrow 520 = 160 + 2B$ ,  $\Rightarrow 520 - 160 = 2B$ ,  $\Rightarrow 360 = 2B$ ,  $\Rightarrow B = \frac{360}{2} = 180$ .

$\therefore \text{the breadth is } 180\text{cm}$ .

Q7. A football field is in the shape of a rectangle, and is 200m long and 80m wide.

Find the distance covered by a man, if he walks round the field. a) Once b) Twice

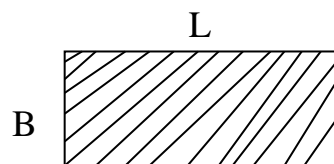
Soln.

a) The distance covered by the man if he walks round the field once = the perimeter

$= 2(200) + 2(80) = 400 + 160 = 560\text{m}$ .

b) The distance covered if he walks twice round the football field is twice the perimeter =  $2 \times 560 = 1120\text{m}$ .

The area of a rectangle:



- The region inside a given figure is called its area.
- Therefore the shaded region within the above figure is the area of the rectangle.
- The area of a rectangle =  $L \times B$ , where  $L$  = the length and  $B$  = the breadth.

Q1. A rectangle has a length of 50m and a breadth of 30m. Find its area.

Soln.

$$\text{Area} = L \times B = 50 \times 30 = 1500\text{m}^2$$

Q2. A rectangular plot of land is 30m long and 15m wide. Find its area.

Soln

$$L = 30\text{m}, B = 15\text{m}.$$

$$A = L \times B = 30 \times 15 = 450, \Rightarrow \text{area} = 450\text{m}^2$$

Q3. The length of a rectangle is 0.5m and its breadth is 20cm. Calculate its area.

Soln.

$$L = 0.5\text{m} = 0.5 \times 100 = 50\text{cm}, B = 20\text{cm}$$

$$A = L \times B = 50 \times 20 = 1000 \Rightarrow \text{area} = 1000\text{cm}^2$$

Q4. The area of a rectangular shaped land is  $120\text{m}^2$ . If its breadth is 40m, determine its length.

Soln.

$$A = 120\text{m}^2, B = 40\text{m}, L = ?$$

$$\text{From } A = L \times B \Rightarrow 120 = 40L, \Rightarrow 40L = 120,$$

$$\therefore L = \frac{120}{40} = 3, \Rightarrow \text{the length} = 3\text{m}.$$

Q5. A rectangle has an area of  $340\text{m}^2$ . If its length is 30m, find its breadth.

Soln.

$$A = 340\text{m}^2, L = 30\text{m}, B = ?$$

$$\text{Since } A = L \times B \Rightarrow 340 = 30 \times B, \Rightarrow 340 = 30B \Rightarrow 30B = 340, \Rightarrow B = \frac{340}{30} =$$

$$11.3, \Rightarrow \text{the breadth} = 11.3\text{m}.$$

Q6. The perimeter of a rectangle is 26mm and its breadth is 10mm. Calculate. a) its length b) its area.

Soln.

$$P = 26\text{mm}, B = 10\text{mm}, L = ?$$

$$\text{Since } P = 2L + 2B \Rightarrow 26 = 2L + 2(10), \Rightarrow 26 = 2L + 20, \Rightarrow 26 - 20 = 2L, \Rightarrow$$

$$6 = 2L \Rightarrow 2L = 6, \Rightarrow L = \frac{6}{2} = 3.$$

$$\text{a) Length (L) = 3mm,}$$

$$\text{b) Area} = L \times B = 3 \times 10 = 30, \Rightarrow \text{area} = 30\text{mm}^2$$

Q7. The perimeter of a rectangle is given as 52m. If the breadth is 10m, calculate its area.

Soln.

$$P = 52m, B = 10m, L = ?$$

$$\text{Since } P = 2L + 2B \Rightarrow 52 = 2L + 2(10), \Rightarrow 52 - 20 = 2L, \Rightarrow 32 = 2L.$$

$$\therefore 2L = 32 \Rightarrow L = \frac{32}{2} = 16m \Rightarrow A = L \times B = 16 \times 10 = 160m^2$$

Q8. The area of a rectangle is  $200cm^2$ . If its length is 40cm, calculate its perimeter.

N/B: You must first determine the breadth.

Soln.

$$A = 200cm^2, L = 40cm, B = ?$$

$$\text{From } A = L \times B \Rightarrow 200 = 40 \times B, \Rightarrow 200 = 40B, \Rightarrow 40B = 200, \therefore B = \frac{200}{40} = 5, \Rightarrow B = 5cm.$$

$$\text{Since } P = 2L + 2B \Rightarrow P = 2(40) + 2(5), \Rightarrow p = 80 + 10 \Rightarrow p = 90cm.$$

Q9. A rectangular plot of land has an area of  $250m^2$  and a length of 25m.

Determine the distance around it.

Soln.

$$A = 250m^2, L = 25m, B = ?$$

$$\text{From } A = L \times B \Rightarrow 250 = 25 \times B, \Rightarrow 250 = 25B, \Rightarrow 25B = 250, \Rightarrow B = \frac{250}{25} = 10, \Rightarrow B = 10m.$$

$$P = 2L + 2B = 2(25) + 2(10) = 50 + 20 = 70 \Rightarrow p = 70m.$$

Q10. A rectangle has a breadth of 15m and an area of  $450m^2$ . Calculate its perimeter.

Soln.

$$B = 15m, A = 450m^2, L = ?$$

$$\text{Since } A = L \times B \Rightarrow 450 = L \times 15, \Rightarrow 450 = 15L, \Rightarrow 15L = 450, \Rightarrow L = \frac{450}{15} = 30, \Rightarrow L = 30m.$$

$$P = 2L + 2B = 2(30) + 2(15), \Rightarrow P = 60 + 30 = 90m.$$

Q11. A rectangle has a length of  $xcm$  and a breadth of  $ycm$ . Calculate

a) its area. b) its perimeter.

Soln.

$$a) L = x \text{ cm}, B = y \text{ cm}.$$

$$A = L \times B = x \times y = xycm^2$$

$$b) P = 2L + 2B = 2(x) + 2(y) = 2x + 2y = (2x + 2y)cm.$$