CHAPTER TWELVE

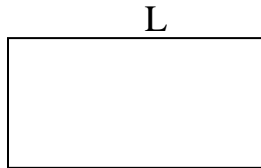## *PERIMETERS AND AREAS*

The Rectangle :

L

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.

$$\text{Soln.}$$

L = 8cm, B = 5cm.
P = 2L + 2B = 2(8) +2(5) = 16 + 10 = 26cm.
$\therefore perimeter = 26cm.$

$$\text{Method 2}$$

P = 2(L+ B) = 2(8 + 5) = 2(13) = 2 x13 = 26cm.

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

$$\text{Soln.}$$

L = 100cm and B = 80cm .
P = 2L + 2B = 2(100) + 2(80) = 2 x100 + 2 x 80 = 200 + 160 = $360cm$.

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

$$\text{Soln.}$$

Width = breadth = 3cm length = 6cm. From p = 2L+2B => $p = 2(6) + 2(3) = 12 + 6 = 18.$

$Perimeter = 18cm.$

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

N/B: The length is given in meters and the breadth in centimeters. Covert the meters into centimeters by multiplying by 100, since 100cm = 1m.

<center>Soln.</center>

L = 0.2cm = 0.2 x 100 = 20cm and B = 10cm. Since P = 2L + 2B , => $p = 2(20) + 2(10) = 40 + 20 = 60$.

$\therefore Perimeter = 60cm.$

Q5. A rectangular plot of land is 0.4m long and 30cm wide. Calculate the distance round it.

L = 0.4m = 0.4 x 100 = 40cm. Width = 30cm => B = 30cm.

Distance around it = the perimeter = 2(L + B) = 2(40 + 30) = 2(70) =140cm.

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

<center>Soln.</center>

P = 520cm, L = 80cm, B = ?

Since P = 2L+ 2B => $p = 2(80) + 2B$, $\therefore 520 = 160 + 2B$ => $520 - 160 = 2B$, => $360 = 2B \rightarrow B = \frac{360}{2} = 180$.

$\therefore The\ breadth\ is\ 180cm.$

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

<center>Soln.</center>

a) The distance covered by the man if he walks round the field once = the perimeter = 2L+2B

    =2(200) + 2(80) = 400 + 160 = 560m.

b) The distance covered if he walks twice round the football field is twice the perimeter = 2 x 560 = 1120m.

The area of a rectangle:
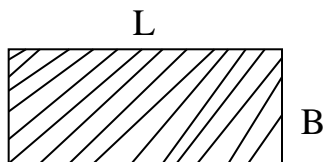
- The region inside a given figure is called its area.
- Therefore the shaded region within the above figure is the area of the rectangle.

- The area of a rectangle = L x B, where L = Length and B = Breadth.

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

<div align="center">Soln.</div>

Area = L x B = 50 x 30 = $1500m^2$

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

<div align="center">Soln</div>

L = 30m, B = 15m.

A = L x B = 30 x 15 = 450 , => $area = 450m^2$

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

<div align="center">Soln.</div>

L = 0.5m = 0.5 x 100 = 50cm, and B = 20cm.

A = L x B = 50 x 20 = 1000, => area = $1000cm^2$

Q4. The area of a rectangularly shaped land is $120m^2$. If its breadth is 40m, determine its length.

<div align="center">Soln.</div>

A = $120m^2$, B = 40m, L = ?

Since A = L x B => $120 = 40 \times L$, => $40L = 120$

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

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

<div align="center">Soln.</div>

A = $340m^2$, L = 30m, B = ?

Since A = L x B => $340 = 30 \times B$, => $340 = 30B \rightarrow 30B = 340$, => $B = \frac{340}{30} = 11.3$. $The\ breadth = 11.3m$

Q6. The Perimeter of a rectangle is 26mm. If its breadth is 10mm, calculate.   a) its length. b) its area.

<div align="center">Soln.</div>

P = 26mm, B = 10mm, L = ?

But since P = 2L + 2B => $26 = 2L + 2(10)$, => $26 = 2L + 20$ => $26 - 20 = 2L$, => $6 = 2L$ => $2L = 6$ => $L = \frac{6}{2} = 3$.

a) Length (L) = 3mm.

b) Area = L x B = 3 x 10 = 30 => $area = 30mm^2$

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

<div align="center">Soln.</div>

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

But since P = 2L + 2B $=> 52 = 2L + 2(10), => 52 - 20 = 2L, => 32 = 2L,$

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