

## EXERCISE 20B

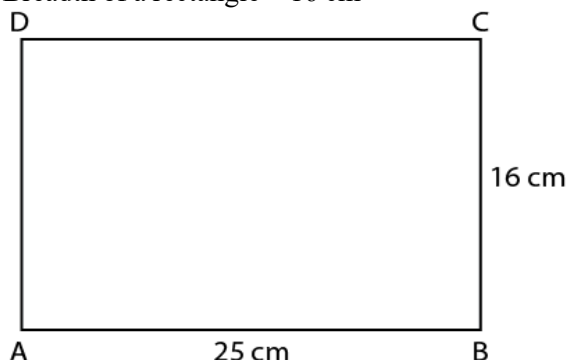
**Find the area of a rectangle whose length and breadth are 25 cm and 16 cm.**

**Solution:**

It is given that

Length of a rectangle = 25 cm

Breadth of a rectangle = 16 cm



We know that

Area of a rectangle =  $l \times b$

Substituting the values

$$= 25 \times 16$$

$$= 400 \text{ cm}^2$$

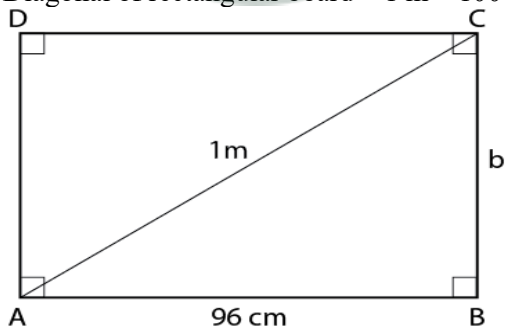
**1. The diagonal of a rectangular board is 1 m and its length is 96 cm. Find the area of the board.**

**Solution:**

It is given that

Length of rectangular board = 96 cm

Diagonal of rectangular board = 1 m = 100 cm



Using the Pythagoras theorem in right angled triangle ABC

$$AC^2 = AB^2 + BC^2$$

Substituting the values

$$100^2 = 96^2 + BC^2$$

By further calculation

$$10000 = 9216 + BC^2$$

So we get

$$BC^2 = 10000 - 9216 = 784$$

$$BC = \sqrt{784} = 28 \text{ cm}$$

Here the area of rectangular board =  $l \times b$   
Substituting the values  
 $= 96 \times 28$   
 $= 2688 \text{ cm}^2$

**2. The sides of a rectangular park are in the ratio 4 : 3. If its area is  $1728 \text{ m}^2$ , find:**

**(i) its perimeter**

**(ii) cost of fencing it at the rate of ₹40 per meter.**

**Solution:**

It is given that

Ratio in the sides of a rectangular park = 4 : 3

Area =  $1728 \text{ m}^2$

Consider  $4x$  as the length and  $3x$  as the breadth

We know that

Area =  $l \times b$

Substituting the values

$1728 = 4x \times 3x$

By further calculation

$12x^2 = 1728$

$x^2 = 1728/12 = 144$

$x = \sqrt{144} = 12$

Here we get

Length =  $4x = 4 \times 12 = 48 \text{ m}$

Breadth =  $3x = 3 \times 12 = 36 \text{ m}$

(i) We know that

Perimeter =  $2(l + b)$

Substituting the values

$= 2(48 + 36)$

So we get

$= 2(84)$

$= 168 \text{ m}$

(ii) It is given that

Rate of fencing = ₹40 per meter

So the total cost of fencing =  $168 \times 40 = ₹ 6720$

**3. A floor is 40 m long and 15 m broad. It is covered with tiles, each measuring 60 cm by 50 cm. Find the number of tiles required to cover the floor.**

**Solution:**

Given below are the dimensions of floor

Length = 40 m

Breadth = 15 m

We know that

Area =  $l \times b = 40 \times 15 = 600 \text{ m}^2$

Here the length of one tile = 60 cm =  $6/10 \text{ m}$

Breadth of one tile = 50 cm =  $5/10$  m  
So the area of one tile =  $6/10 \times 5/10 = 30/100 = 3/10$  m<sup>2</sup>

We know that  
Number of tiles = total area of floor/ area of one tile  
Substituting the values  
=  $600 / 3/10$   
=  $(600 \times 10) / 3$   
= 2000

**4. The length and breadth of a rectangular piece of land are in the ratio 5 : 3. If the total cost of fencing it at the rate of ₹24 per meter is ₹9600, find its:**

**(i) length and breadth**

**(ii) area**

**(iii) cost of levelling at the rate of ₹60 per m<sup>2</sup>.**

**Solution:**

It is given that  
Ratio in length and breadth of a rectangular piece of land = 5 : 3  
Cost of fencing = ₹9600  
Rate = ₹24 per meter

We know that  
Perimeter = total cost of fencing/ rate per meter  
Substituting the values  
=  $9600 / 24$   
= 400 m

Consider  $5x$  as the length and  $3x$  as the breadth  
Here perimeter =  $2(l + b)$   
Substituting the values  
 $400 = 2(5x + 3x)$   
By further calculation  
 $400 = 2(8x)$   
So we get  
 $400 = 16x$   
 $x = 400/16 = 25$

(i) Length of land =  $5x = 5 \times 25 = 125$  m  
Breadth of land =  $3x = 3 \times 25 = 75$  m

(ii) Area =  $l \times b$   
Substituting the values  
=  $125 \times 75$   
=  $9375$  m<sup>2</sup>

(iii) Cost of levelling at the rate of ₹60 per m<sup>2</sup> =  $60 \times 9375 = ₹ 5,62,500$

**5. Find the area of the square whose perimeter is 56 cm.**

**Solution:**

It is given that

Perimeter of the square = 56 cm

We know that

$$4 \times \text{side} = 56 \text{ cm}$$

So we get

$$\text{Side} = 56/4 = 14 \text{ cm}$$

Here

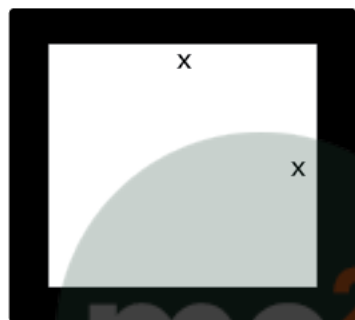
Area of the square = side<sup>2</sup>

Substituting the values

$$\text{Area of the square} = 14^2 = 196 \text{ cm}^2$$

**6. A square lawn is surrounded by a path 2.5 m wide. If the area of the path is 165 m<sup>2</sup>, find the area of the lawn.**

**Solution:**



It is given that

Area of the path = 165 m<sup>2</sup>

Width of the path = 2.5 m

Consider  $x$  m as the side of square lawn

So the outer side =  $x + 2 \times 2.5$

We get

Outer side =  $(x + 5)$  m

Here the area of path =  $(x + 5)^2 - x^2$

Substituting the values

$$x^2 + 10x + 25 - x^2 = 165$$

By further calculation

$$10x = 165 - 25 = 140$$

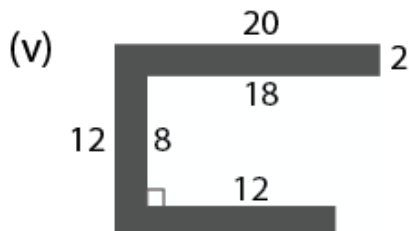
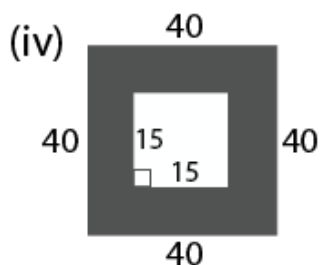
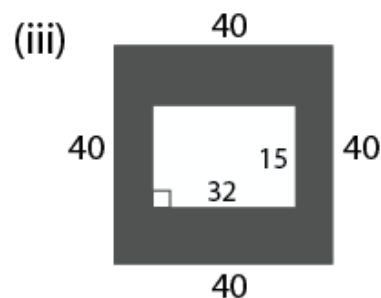
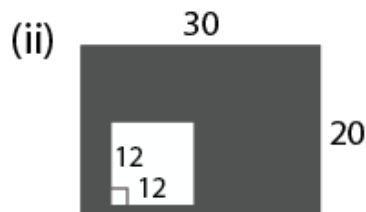
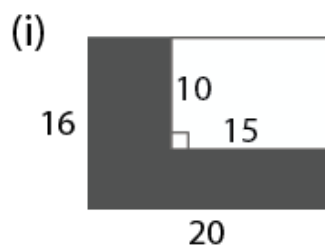
So we get

$$x = 140/10 = 14 \text{ m}$$

Here the side of lawn = 14 m

$$\text{Area of the lawn} = 14^2 = 196 \text{ m}^2$$

**7. For each figure, given below, find the area of shaded region: (All measurements are in cm)**



**Solution:**

(i) It is given that  
Outer length = 20 cm  
Outer breadth = 16 cm  
Outer area =  $l \times b$   
Substituting the values  
 $= 20 \times 16$   
 $= 320 \text{ cm}^2$

Similarly  
Inner length = 15 cm  
Inner breadth = 10 cm  
So the inner area =  $l \times b$   
Substituting the values  
 $= 15 \times 10$   
 $= 150 \text{ cm}^2$

Here the area of shaded region = area of whole region – area of unshaded region  
Substituting the values  
 $= 320 - 150$   
 $= 170 \text{ cm}^2$

(ii) It is given that  
Outer length = 30 cm  
Outer breadth = 20 cm  
Outer area =  $l \times b$   
Substituting the values  
 $= 30 \times 20$   
 $= 600 \text{ cm}^2$

Similarly

Inner length = 12 cm  
Inner breadth = 12 cm  
So the inner area =  $l \times b$   
Substituting the values  
 $= 12 \times 12$   
 $= 144 \text{ cm}^2$

Here the area of shaded region = area of outer figure – area of inner figure  
Substituting the values  
 $= 600 - 144$   
 $= 456 \text{ cm}^2$

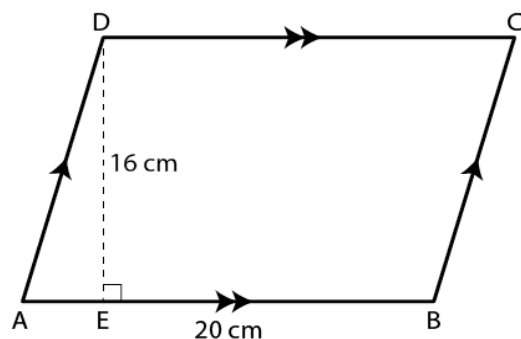
(iii) Here the area shaded portion = area of outer region – area of unshaded region  
Substituting the values  
 $= 40 \times 40 - 32 \times 15$   
So we get  
 $= 1600 - 480$   
 $= 1120 \text{ cm}^2$

(iv) Here the area of shaded region = area of outer region – area of inner region  
Substituting the values  
 $= 40 \times 40 - 15 \times 15$   
So we get  
 $= 1600 - 225$   
 $= 1375 \text{ cm}^2$

(v) Area of shaded portion =  $2 \times 20 + 2 \times 8 + 2 \times (12 + 2)$   
By further calculation  
 $= 40 + 16 + 28$   
 $= 84 \text{ cm}^2$

**8. One side of a parallelogram is 20 cm and its distance from the opposite side is 16 cm. Find the area of the parallelogram.**

**Solution:**



We know that  
Area of parallelogram = base  $\times$  height  
Here  
Area of parallelogram =  $AB \times DE$   
Substituting the values

$$= 20 \times 16$$
$$= 320 \text{ cm}^2$$

9. The base of a parallelogram is thrice its height. If its area is  $768 \text{ cm}^2$ , find the base and the height of the parallelogram.

**Solution:**

It is given that

$$\text{Area of parallelogram} = 768 \text{ cm}^2$$

Consider  $x$  as the height and  $3x$  as the base of parallelogram

So we get

$$\text{Area} = \text{base} \times \text{height}$$

Substituting the values

$$768 = 3x \times x$$

By further calculation

$$768 = 3x^2$$

$$x^2 = 768/3 = 256 \text{ cm}$$

$$x = \sqrt{256} = 16 \text{ cm}$$

$$\text{Height} = x = 16 \text{ cm}$$

$$\text{Base} = 3x = 3 \times 16 = 48 \text{ cm}$$

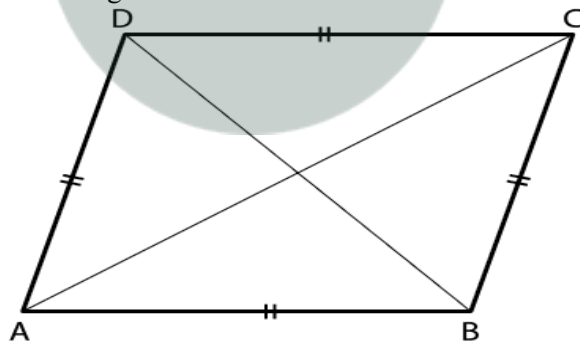
10. Find the area of the rhombus, if its diagonals are 30 cm and 24 cm.

**Solution:**

It is given that

$$\text{Diagonal } d_1 = 30 \text{ cm}$$

$$\text{Other diagonal } d_2 = 24 \text{ cm}$$



Consider AC and BD as the diagonals of rhombus

We know that

$$\text{Area} = \frac{1}{2} \times \text{product of diagonals}$$

So we get

$$= \frac{1}{2} \times AC \times BD$$

$$= \frac{1}{2} \times d_1 \times d_2$$

Substituting the values

$$= \frac{1}{2} \times 30 \times 24$$

$$= 15 \times 24$$

$$= 360 \text{ cm}^2$$

Hence, the area of the rhombus is  $360 \text{ cm}^2$ .

11. If the area of a rhombus is  $112 \text{ cm}^2$  and one of its diagonals is  $14 \text{ cm}$ , find its other diagonal.

**Solution:**

It is given that

$$\text{Area of a rhombus} = 112 \text{ cm}^2$$

$$\text{One diagonal} = 14 \text{ cm}$$

Consider  $x \text{ cm}$  as the second diagonal

We know that

$$\text{Area} = \text{product of diagonal}/2$$

Substituting the values

$$112 = (14 \times x)/2$$

By further calculation

$$x = (112 \times 2)/14$$

So we get

$$x = 224/14 = 16 \text{ cm}$$

Hence, the other diagonal of the rhombus is  $16 \text{ cm}$ .

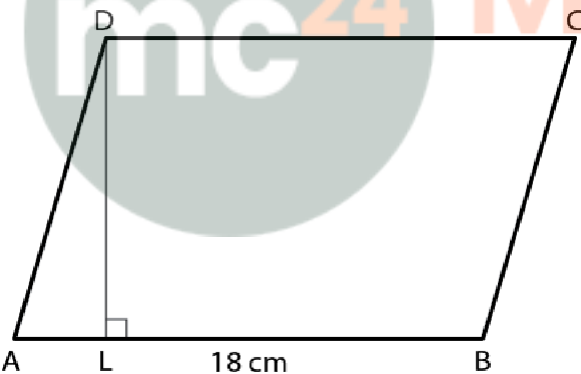
12. One side of a parallelogram is  $18 \text{ cm}$  and its area is  $153 \text{ cm}^2$ . Find the distance of the given side from its opposite side.

**Solution:**

It is given that

$$\text{Area of parallelogram} = 153 \text{ cm}^2$$

$$\text{One side} = 18 \text{ cm}$$



So the distance between AB and DC =  $\text{area}/\text{base}$

Substituting the values

$$= 153/18$$

$$= 17/2$$

$$= 8.5 \text{ cm}$$

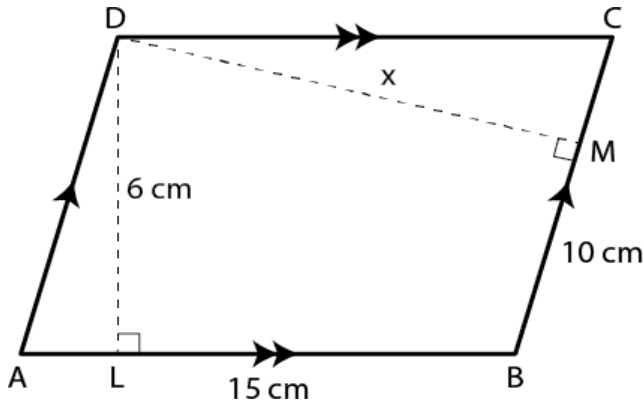
13. The adjacent sides of a parallelogram are  $15 \text{ cm}$  and  $10 \text{ cm}$ . If the distance between the longer sides is  $6 \text{ cm}$ , find the distance between the shorter sides.

**Solution:**

It is given that

$$AB = DC = 15 \text{ cm}$$

$$BC = AD = 10 \text{ cm}$$



Here the distance between longer sides AB and DC = 6 cm  
So perpendicular DL = 6 cm  
DM is perpendicular to BC

We know that

Area of parallelogram = base  $\times$  altitude

So we get

$$= AB \times DL$$

Substituting the values

$$= 15 \times 6$$

$$= 90 \text{ cm}^2$$

Consider DM = x cm

Similarly

Area of parallelogram ABCD = BC  $\times$  DM

Substituting the values

$$= 10 \times x$$

$$= 10x \text{ cm}^2$$

By equating both

$$10x = 90$$

$$x = 90/10 = 9 \text{ cm}$$

**14. The area of a rhombus is  $84 \text{ cm}^2$  and its perimeter is 56 cm. Find its height.**

**Solution:**

It is given that

Area of a rhombus =  $84 \text{ cm}^2$

Perimeter of a rhombus = 56 cm

So the side of a rhombus =  $56/4 = 14 \text{ cm}$

Here the height = area/ base

Substituting the values

$$= 84/14$$

$$= 6 \text{ cm}$$