

EXERCISE 20B

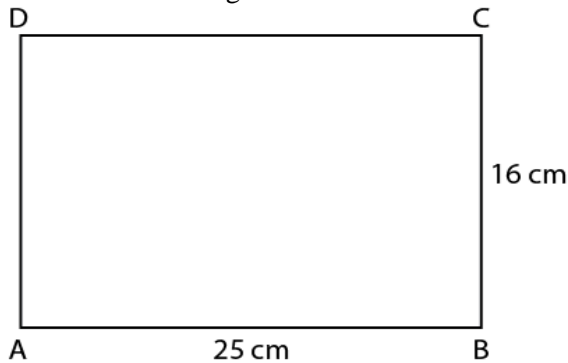
1. Find the area of a rectangle whose length and breadth are 25 cm and 16 cm.

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

$$= 25 \times 16$$

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

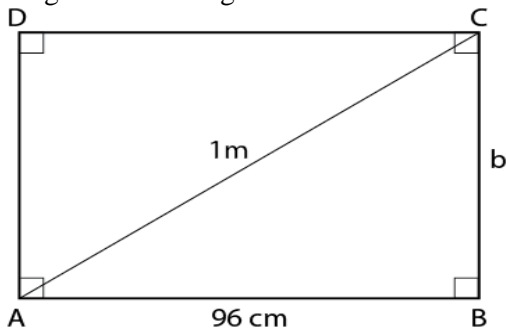
2. The diagonal of a rectangular board is 1 m and its length is 96 cm. Find the area of the board.

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
 $= 96 \times 28$
 $= 2688 \text{ cm}^2$

3. The sides of a rectangular park are in the ratio 4 : 3. If its area is 1728 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 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 = $168 \times 40 = ₹ 6720$

4. 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 = $6/10 \times 5/10 = 30/100 = 3/10$ m²

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

5. 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 m².

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
= 125×75
= 9375 m²

(iii) Cost of levelling at the rate of ₹60 per m² = $60 \times 9375 = ₹ 5,62,500$

6. 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

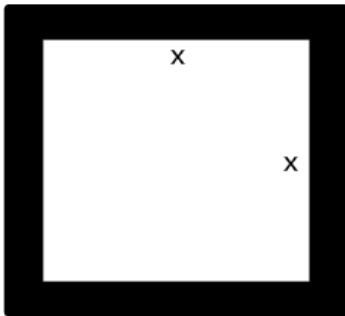
Area of the square = side²

Substituting the values

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

7. A square lawn is surrounded by a path 2.5 m wide. If the area of the path is 165 m², find the area of the lawn.

Solution:



It is given that

Area of the path = 165 m²

Width of the path = 2.5 m

Consider x m as the side of square lawn

So the outer side = x + 2 × 2.5

We get

Outer side = (x + 5) m

Here the area of path = (x + 5)² - x²

Substituting the values

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

By further calculation

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

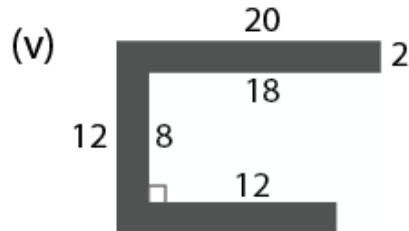
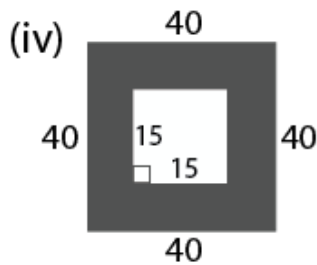
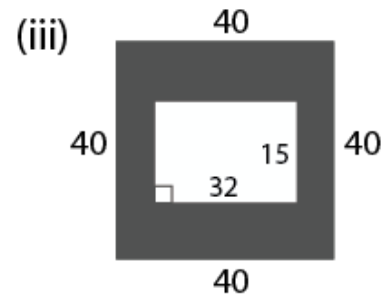
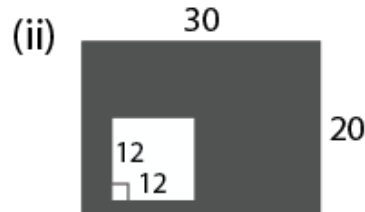
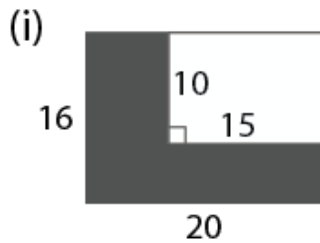
So we get

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

Here the side of lawn = 14 m

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

8. 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
 $= 600 - 144$
 $= 456 \text{ cm}^2$

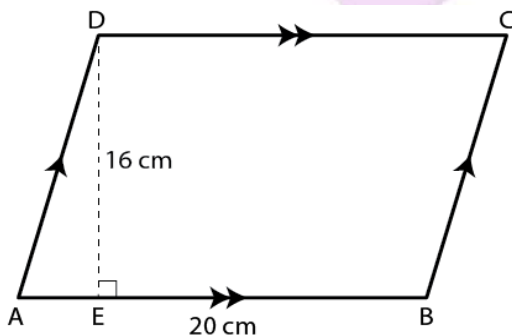
(iii) Here the area shaded portion = area of outer region – area of unshaded region
 Substituting the values
 $= 40 \times 40 - 32 \times 15$
 So we get
 $= 1600 - 480$
 $= 1120 \text{ cm}^2$

(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
 $= 40 + 16 + 28$
 $= 84 \text{ cm}^2$

9. 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

$$= 20 \times 16$$

$$= 320 \text{ cm}^2$$

10. The base of a parallelogram is thrice its height. If its area is 768 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

$$768 = 3x^2$$

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

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

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

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

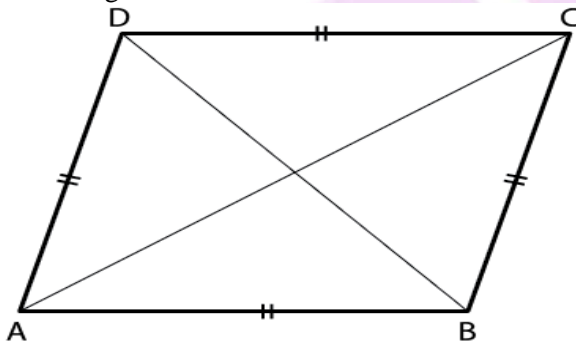
11. Find the area of the rhombus, if its diagonals are 30 cm and 24 cm.

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 cm^2 .

12. If the area of a rhombus is 112 cm^2 and one of its diagonals is 14 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 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 cm.

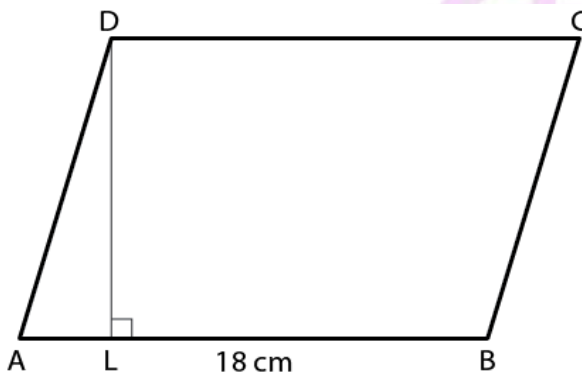
13. One side of a parallelogram is 18 cm and its area is 153 cm^2 . Find the distance of the given side from its opposite side.

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 = area/ base

Substituting the values

$$= 153/18$$

$$= 17/2$$

$$= 8.5 \text{ cm}$$

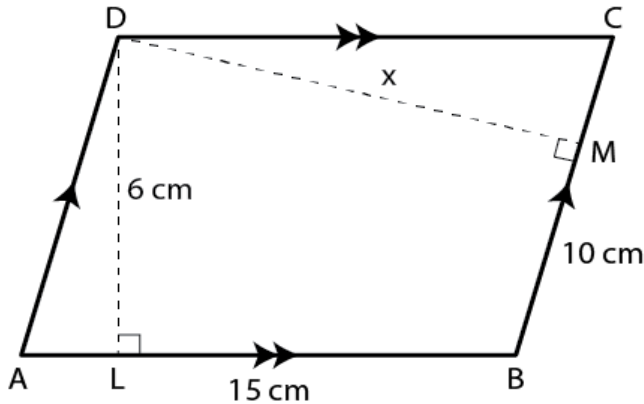
14. The adjacent sides of a parallelogram are 15 cm and 10 cm. If the distance between the longer sides is 6 cm, find the distance between the shorter sides.

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

$$10x = 90$$

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

15. The area of a rhombus is 84 cm^2 and its perimeter is 56 cm. Find its height.

Solution:

It is given that

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

$$\text{Perimeter of a rhombus} = 56 \text{ cm}$$

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

Here the height = area/ base

Substituting the values

$$= 84/14$$

$$= 6 \text{ cm}$$