

EXERCISE 20.4

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1. Find the area of a rectangle, whose**(i) Length = 6 cm, breadth = 3 cm****(ii) Length = 8 cm, breadth = 3 cm****(iii) Length = 4.5 cm, breadth = 2 cm.****Solution:**

(i) We know that area of a rectangle = $L \times B$

It is given that Length = 6 cm, breadth = 3 cm

By substituting the values

$$\text{Area of a rectangle} = 6 \times 3 = 18 \text{ cm}^2$$

(ii) We know that area of a rectangle = $L \times B$

It is given that Length = 8 cm, breadth = 3 cm

By substituting the values

$$\text{Area of a rectangle} = 8 \times 3 = 24 \text{ cm}^2$$

(iii) We know that area of a rectangle = $L \times B$

It is given that Length = 4.5 cm, breadth = 2 cm

By substituting the values

$$\text{Area of a rectangle} = 4.5 \times 2 = 9 \text{ cm}^2$$

2. Find the area of a square whose side is:**(i) 5 cm****(ii) 4.1 cm****(iii) 5.5 cm****(iv) 2.6 cm****Solution:**

(i) We know that area of a square = side \times side

It is given that side of a square = 5 cm

$$\text{So the area of the square} = 5 \times 5 = 25 \text{ cm}^2$$

(ii) We know that area of a square = side \times side

It is given that side of a square = 4.1 cm

$$\text{So the area of the square} = 4.1 \times 4.1 = 16.81 \text{ cm}^2$$

(iii) We know that area of a square = side \times side

It is given that side of a square = 5.5 cm

$$\text{So the area of the square} = 5.5 \times 5.5 = 30.25 \text{ cm}^2$$

(iv) We know that area of a square = side \times side

It is given that side of a square = 2.6 cm

$$\text{So the area of the square} = 2.6 \times 2.6 = 6.76 \text{ cm}^2$$

3. The area of a rectangle is 49 cm^2 and its breadth is 2.8 cm. Find the length of the rectangle.**Solution:**

It is given that area of a rectangle = 49 cm^2

Breadth of a rectangle = 2.8 cm

We know that

Area of a rectangle = $L \times B$

It can be written as

$$L = \text{Area}/B = 49/2.8 = 17.5 \text{ cm}$$

Hence, the length of the rectangle is 17.5 cm.

4. The side of a square is 70 cm. Find its area and perimeter.

Solution:

It is given that side of a square = 70 cm

We know that area of a square = side \times side

By substituting the values

$$\text{Area of a square} = 70 \times 70 = 4900 \text{ cm}^2$$

We know that perimeter of a square = $4 \times$ side

By substituting the values

$$\text{Perimeter of a square} = 4 \times 70 = 280 \text{ cm}$$

Hence, the area of square is 4900 cm^2 and the perimeter of square is 280 cm.

5. The area of a rectangle is 225 cm^2 and its one side is 25 cm, find its other side.

Solution:

It is given that

$$\text{Area of a rectangle} = 225 \text{ cm}^2$$

$$\text{Length of one side} = 25 \text{ cm}$$

We know that area of a rectangle = Product of length of two sides

So the other side = area/side

By substituting the values

$$\text{Other side} = 225/25 = 9 \text{ cm}$$

Hence, the other side of the rectangle is 9 cm.

6. What will happen to the area of rectangle if its

(i) Length and breadth are trebled

(ii) Length is doubled and breadth is same

(iii) Length is doubled and breadth is halved.

Solution:

(i) Length and breadth are trebled

Consider l as the initial length and b as the initial breadth

So the original area = $l \times b$

If the length and breadth are trebled it becomes three times more than the original value

$$\text{New length} = 3l$$

$$\text{New breadth} = 3b$$

$$\text{New area of the rectangle} = 3l \times 3b = 9lb$$

Hence, the area of the rectangle becomes 9 times more than its original area.

(ii) Length is doubled and breadth is same
Consider l as the initial length and b as the initial breadth
So the original area = $l \times b$
If the length is doubled and breadth is same we get
New length = $2l$
New breadth = b
New area of the rectangle = $2l \times b = 2lb$

Hence, the area of the rectangle becomes 2 times more than the original area.

(iii) Length is doubled and breadth is halved
Consider l as the initial length and b as the initial breadth
So the original area = $l \times b$
If the length is doubled and breadth is halved we get
New length = $2l$
New breadth = $b/2$
New area of the rectangle = $2l \times b/2 = lb$

Hence, the area of the rectangle does not change.

7. What will happen to the area of a square if its side is:

(i) Tripled

(ii) Increased by half of it.

Solution:

(i) Tripled

Consider s as the original side of the square
We know that original area = $s \times s = s^2$
If the side of the square is tripled we get
New side = $3s$
So the new area of the square = $3s \times 3s = 9s^2$

Hence, the area becomes 9 times more than that of the original area.

(ii) Increased by half of it

Consider s as the original side of the square
We know that original area = $s \times s = s^2$
If the side of the square is increased by half of it we get
New side = $s + s/2 = 3s/2$
So the new area of the square = $3s/2 \times 3s/2 = 9s^2/4$

Hence, the area becomes $9/4$ times more than that of the original area.

8. Find the perimeter of a rectangle whose area is 500 cm^2 and breadth is 20 cm.

Solution:

It is given that

Area of the rectangle = 500 cm^2
Breadth of the rectangle = 20 cm
We know that area = $L \times B$

It can be written as

$$L = \text{Area}/B$$

By substituting the values

$$L = 500/20 = 25 \text{ cm}$$

We know that perimeter = $2(L + B)$

By substituting the values

$$\text{Perimeter} = 2(25 + 20) = 2 \times 45 = 90 \text{ cm}$$

Hence, the perimeter of the rectangle is 90 cm.

9. A rectangle has the area equal to that of a square of side 80 cm. If the breadth of the rectangle is 20 cm, find its length.

Solution:

It is given that

$$\text{Side of a square} = 80 \text{ cm}$$

So the area of the square = side \times side

By substituting the values

$$\text{Area of square} = 80 \times 80 = 6400 \text{ cm}^2$$

We know that area of rectangle = area of square = 6400 cm^2

$$\text{Breadth} = 20 \text{ cm}$$

$$\text{Area of rectangle} = L \times B$$

It can be written as

$$L = \text{Area}/B = 6400/20 = 320 \text{ cm}$$

Hence, the length of the rectangle is 320 cm.

10. Area of a rectangle of breadth 17 cm is 340 cm^2 . Find the perimeter of the rectangle.

Solution:

The dimensions of rectangle are

$$\text{Breadth} = 17 \text{ cm}$$

$$\text{Area} = 340 \text{ cm}^2$$

We know that

$$\text{Area of rectangle} = L \times B$$

It can be written as

$$L = \text{Area}/B = 340/17 = 20 \text{ cm}$$

So the perimeter = $2(L + B)$

By substituting the values

$$\text{Perimeter} = 2(20 + 17) = 2 \times 37 = 74 \text{ cm}$$

Hence, the perimeter of the rectangle is 74 cm.

11. A marble tile measures $15 \text{ cm} \times 20 \text{ cm}$. How many tiles will be required to cover a wall of size $4 \text{ m} \times 6 \text{ m}$?

Solution:

Measure of marble tile = $15 \text{ cm} \times 20 \text{ cm}$
Size of wall = $4 \text{ m} \times 6 \text{ m} = 400 \text{ cm} \times 600 \text{ cm}$
So we get area of tile = $15 \text{ cm} \times 20 \text{ cm} = 300 \text{ cm}^2$
Area of wall = $400 \text{ cm} \times 600 \text{ cm} = 240000 \text{ cm}^2$

No. of tiles required to cover the wall = Area of wall / Area of one tile
Substituting the values
No. of tiles required to cover the wall = $240000/300 = 800$ tiles

Hence, 800 tiles are required to cover a wall of size $4 \text{ m} \times 6 \text{ m}$.

12. A marble tile measures $10 \text{ cm} \times 12 \text{ cm}$. How many tiles will be required to cover a wall of size $3 \text{ m} \times 4 \text{ m}$? Also, find the total cost of the tiles at the rate of Rs 2 per tile.

Solution:

Measure of marble tile = $10 \text{ cm} \times 12 \text{ cm}$
Size of the wall = $3 \text{ m} \times 4 \text{ m} = 300 \text{ cm} \times 400 \text{ cm}$
So the area of marble tile = $10 \text{ cm} \times 12 \text{ cm} = 120 \text{ cm}^2$
Area of wall = $300 \text{ cm} \times 400 \text{ cm} = 120000 \text{ cm}^2$

No. of tiles required to cover the wall = Area of wall / Area of one tile
Substituting the values
No. of tiles required to cover the wall = $120000/120 = 1000$ tiles

It is given that
Cost of one tile = Rs 2
So the cost of 1000 tiles = $1000 \times 2 = \text{Rs } 2000$

Hence, 1000 number of tiles are required to cover the wall and the cost is Rs 2000.

13. One side of a square plot is 250 m, find the cost of levelling it at the rate of Rs 2 per square metre.

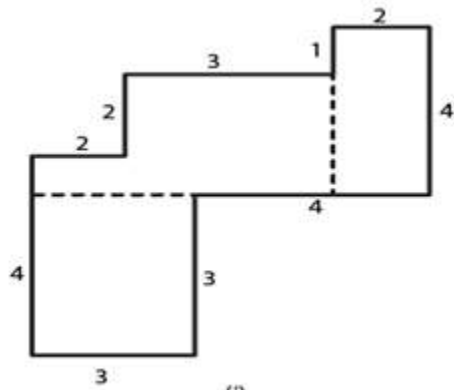
Solution:

It is given that
Side of one tile of a square plot = 250 m
So the area = side \times side = $250 \times 250 = 62500 \text{ m}^2$

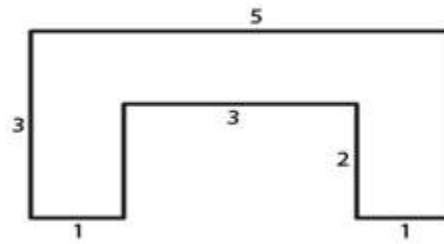
Cost of levelling = Rs 2 per square meter
So the cost of levelling $62500 \text{ m}^2 = 62500 \times 2 = \text{Rs } 125000$

Hence, the cost of levelling is Rs 125000.

14. The following figures have been split into rectangles. Find their areas. (The measures are given in centimetres)



(i)



(ii)

Solution:

(i) The given figure has two rectangles II and IV and two squares I and III.

So the area of square I = side \times side = $3 \times 3 = 9 \text{ cm}^2$

The same way area of rectangle II = $L \times B = 2 \times 1 = 2 \text{ cm}^2$

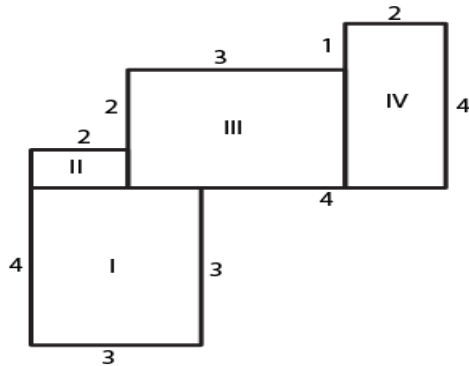
Area of square III = side \times side = $3 \times 3 = 9 \text{ cm}^2$

Similarly area of rectangle IV = $L \times B = 2 \times 4 = 8 \text{ cm}^2$

So the total area of the figure = Area of square I + Area of rectangle II + Area of square III + Area of rectangle IV

By substituting the values

Total area of the figure = $9 + 2 + 9 + 8 = 28 \text{ cm}^2$



(ii) The given figure has three rectangles I, II and III.

So the area of rectangle I = $L \times B = 3 \times 1 = 3 \text{ cm}^2$

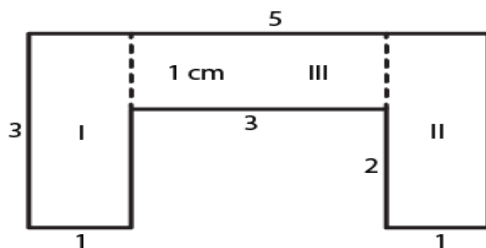
Area of rectangle II = $L \times B = 3 \times 1 = 3 \text{ cm}^2$

Area of rectangle III = $L \times B = 3 \times 1 = 3 \text{ cm}^2$

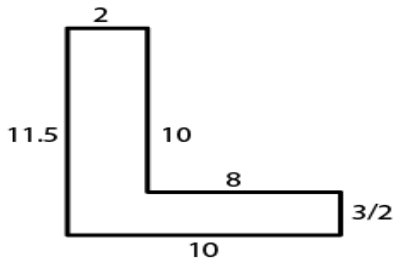
So the total area of the figure = Area of rectangle I + Area of rectangle II + Area of rectangle III

By substituting the values

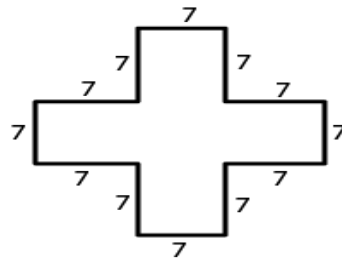
Total area of the figure = $3 + 3 + 3 = 9 \text{ cm}^2$



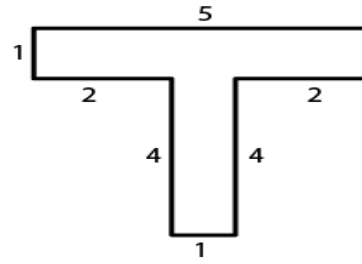
15. Split the following shapes into rectangles and find the area of each. (The measures are given in centimetres)



(i)



(ii)



(iii)

Solution:

(i) The given figure has two rectangles I and II.

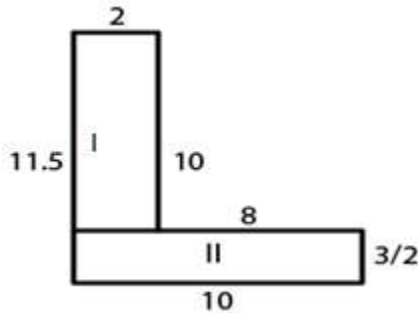
So the area of rectangle I = $L \times B = 10 \times 2 = 20 \text{ cm}^2$

In the same way area of rectangle II = $L \times B = 10 \times 3/2 = 15 \text{ cm}^2$

So the total area of the figure = Area of rectangle I + Area of rectangle II

By substituting the values

Total area of the figure = $20 + 15 = 35 \text{ cm}^2$



(ii) The given figure has two squares I and III and one rectangle II.

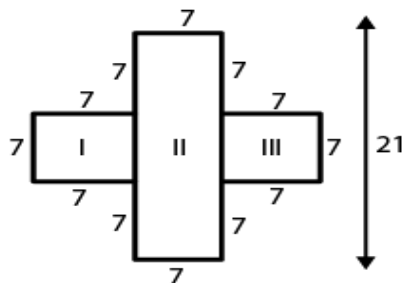
So the area of square I = Area of square III = $\text{side} \times \text{side} = 7 \times 7 = 49 \text{ cm}^2$

The area of rectangle II = $21 \times 7 = 147 \text{ cm}^2$

So the total area of the figure = Area of square I + Area of rectangle II + Area of square III

By substituting the values

Total area of the figure = $49 + 49 + 147 = 245 \text{ cm}^2$



(iii) The given figure has two rectangles I and II.

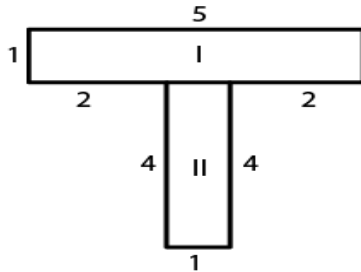
So the area of rectangle I = $L \times B = 5 \times 1 = 5 \text{ cm}^2$

The same way, area of rectangle II = $L \times B = 4 \times 1 = 4 \text{ cm}^2$

So the total area of the figure = Area of rectangle I + Area of rectangle II

By substituting the values

Total area of the figure = $5 + 4 = 9 \text{ cm}^2$



16. How many tiles with dimensions 5 cm and 12 cm will be needed to fit a region whose length and breadth are respectively:

(i) 100 cm and 144 cm

(ii) 70 cm and 36 cm

Solution:

(i) Tile dimensions = $5 \text{ cm} \times 12 \text{ cm}$

Region dimensions = $100 \text{ cm} \times 144 \text{ cm}$

So the area of tile = $5 \text{ cm} \times 12 \text{ cm} = 60 \text{ cm}^2$

Similarly area of region = $100 \text{ cm} \times 144 \text{ cm} = 14400 \text{ cm}^2$

No. of tiles which is required to cover the region = Area of region/ Area of one tile

By substituting the values

No. of tiles which is required to cover the region = $14400/60 = 240$ tiles

(ii) Tile dimensions = $5 \text{ cm} \times 12 \text{ cm}$

Region dimensions = $70 \text{ cm} \times 36 \text{ cm}$

So the area of tile = $5 \text{ cm} \times 12 \text{ cm} = 60 \text{ cm}^2$

Similarly area of region = $70 \text{ cm} \times 36 \text{ cm} = 2520 \text{ cm}^2$

No. of tiles which is required to cover the region = Area of region/ Area of one tile

By substituting the values

No. of tiles which is required to cover the region = $2520/60 = 42$ tiles