

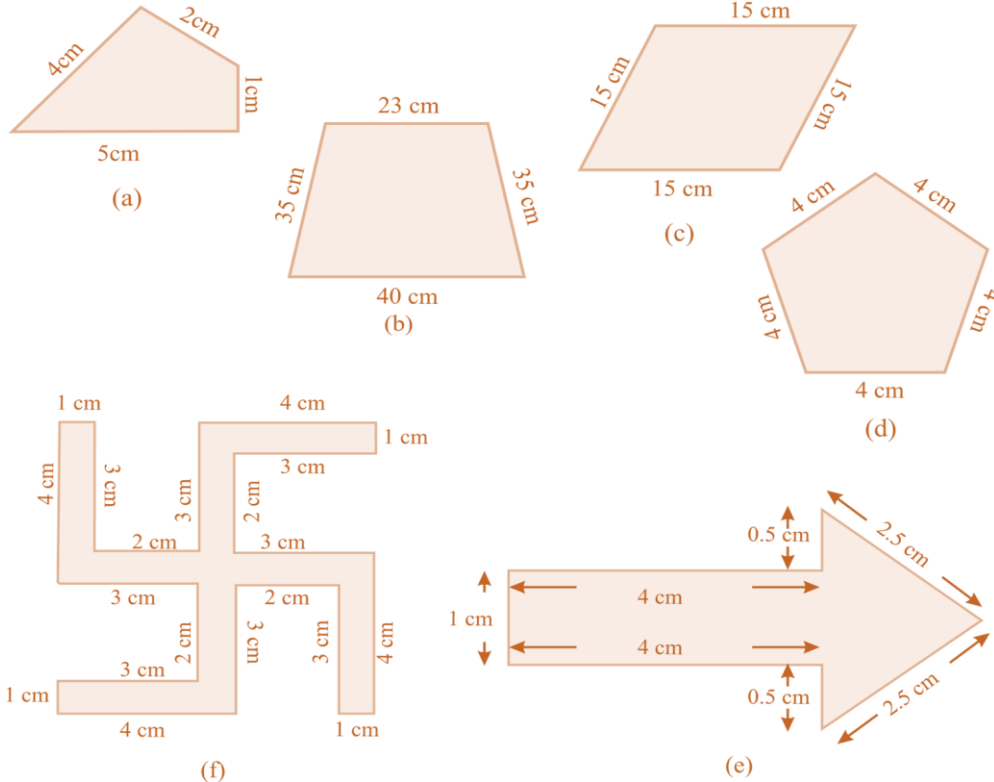
Mathematics

(Chapter – 10) (Mensuration)
(Class – VI)

Exercise 10.1

Question 1:

Find the perimeter of each of the following figures:



Answer 1:

- (a) Perimeter = Sum of all the sides
 $= 4 \text{ cm} + 2 \text{ cm} + 1 \text{ cm} + 5 \text{ cm} = 12 \text{ cm}$
- (b) Perimeter = Sum of all the sides
 $= 23 \text{ cm} + 35 \text{ cm} + 40 \text{ cm} + 35 \text{ cm} = 133 \text{ cm}$
- (c) Perimeter = Sum of all the sides
 $= 15 \text{ cm} + 15 \text{ cm} + 15 \text{ cm} + 15 \text{ cm} = 60 \text{ cm}$
- (d) Perimeter = Sum of all the sides
 $= 4 \text{ cm} + 4 \text{ cm} + 4 \text{ cm} + 4 \text{ cm} + 4 \text{ cm} = 20 \text{ cm}$
- (e) Perimeter = Sum of all the sides
 $1 \text{ cm} + 4 \text{ cm} + 0.5 \text{ cm} + 2.5 \text{ cm} + 2.5 \text{ cm} + 0.5 \text{ cm} + 4 \text{ cm} = 15 \text{ cm}$
- (f) Perimeter = Sum of all the sides
 $= 4 \text{ cm} + 1 \text{ cm} + 3 \text{ cm} + 2 \text{ cm} + 3 \text{ cm} + 4 \text{ cm} + 1 \text{ cm} + 3 \text{ cm} + 2 \text{ cm} + 3 \text{ cm} + 4 \text{ cm} + 1 \text{ cm} + 3 \text{ cm} + 2 \text{ cm} + 3 \text{ cm} = 52 \text{ cm}$

Question 2:

The lid of a rectangular box of sides 40 cm by 10 cm is sealed all round with tape. What is the length of the tape required?

Answer 2:

$$\begin{aligned}\text{Total length of tape required} &= \text{Perimeter of rectangle} \\ &= 2 (\text{length} + \text{breadth}) \\ &= 2 (40 + 10) \\ &= 2 \times 50 \\ &= 100 \text{ cm} \\ &= 1 \text{ m}\end{aligned}$$

Thus, the total length of tape required is 100 cm or 1 m.

Question 3:

A table-top measures 2 m 25 cm by 1 m 50 cm. What is the perimeter of the table-top?

Answer 3:

$$\begin{aligned}\text{Length of table top} &= 2 \text{ m } 25 \text{ cm} = 2.25 \text{ m} \\ \text{Breadth of table top} &= 1 \text{ m } 50 \text{ cm} = 1.50 \text{ m} \\ \text{Perimeter of table top} &= 2 \times (\text{length} + \text{breadth}) \\ &= 2 \times (2.25 + 1.50) \\ &= 2 \times 3.75 \\ &= 7.50 \text{ m}\end{aligned}$$

Thus, the perimeter of table top is 7.5 m.

Question 4:

What is the length of the wooden strip required to frame a photograph of length and breadth 32 cm and 21 cm respectively?

Answer 4:

$$\begin{aligned}\text{Length of wooden strip} &= \text{Perimeter of photograph} \\ \text{Perimeter of photograph} &= 2 \times (\text{length} + \text{breadth}) \\ &= 2 (32 + 21) \\ &= 2 \times 53 \text{ cm} \\ &= 106 \text{ cm}\end{aligned}$$

Thus, the length of the wooden strip required is equal to 106 cm.



Question 5:

A rectangular piece of land measures 0.7 km by 0.5 km. Each side is to be fenced with 4 rows of wires. What is the length of the wire needed?

Answer 5:

Since the 4 rows of wires are needed.

Therefore the total length of wires is equal to 4 times the perimeter of rectangle.

$$\begin{aligned}\text{Perimeter of field} &= 2 \times (\text{length} + \text{breadth}) \\ &= 2 \times (0.7 + 0.5) \\ &= 2 \times 1.2 \\ &= 2.4 \text{ km} \\ &= 2.4 \times 1000 \text{ m} \\ &= 2400 \text{ m}\end{aligned}$$

Thus, the length of wire = $4 \times 2400 = 9600 \text{ m} = 9.6 \text{ km}$

Question 6:

Find the perimeter of each of the following shapes:

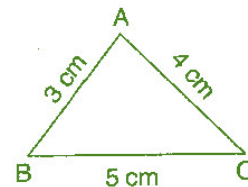
(a) A triangle of sides 3 cm, 4 cm and 5 cm.

(b) An equilateral triangle of side 9 cm.

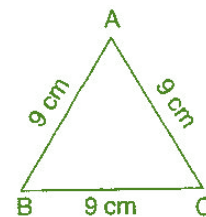
(c) An isosceles triangle with equal sides 8 cm each and third side 6 cm

Answer 6:

$$\begin{aligned}\text{(a) Perimeter of } \triangle ABC &= AB + BC + CA \\ &= 3 \text{ cm} + 5 \text{ cm} + 4 \text{ cm} \\ &= 12 \text{ cm}\end{aligned}$$



$$\begin{aligned}\text{(b) Perimeter of equilateral ABC} &= 3 \times \text{side} \\ &= 3 \times 9 \text{ cm} \\ &= 27 \text{ cm}\end{aligned}$$



$$\begin{aligned}\text{(c) Perimeter of } \triangle ABC &= AB + BC + CA \\ &= 8 \text{ cm} + 6 \text{ cm} + 8 \text{ cm} \\ &= 22 \text{ cm}\end{aligned}$$



Question 7:

Find the perimeter of a triangle with sides measuring 10 cm, 14 cm and 15 cm.

 Answer 7:

$$\begin{aligned}\text{Perimeter of triangle} &= \text{Sum of all three sides} \\ &= 10 \text{ cm} + 14 \text{ cm} + 15 \text{ cm} \\ &= 39 \text{ cm}\end{aligned}$$

Thus, the perimeter of triangle is 39 cm.

Question 8:

Find the perimeter of a regular hexagon with each side measuring 8 cm.

 Answer 8:

$$\begin{aligned}\text{Perimeter of Hexagon} &= 6 \times \text{length of one side} \\ &= 6 \times 8 \text{ m} \\ &= 48 \text{ m}\end{aligned}$$

Thus, the perimeter of hexagon is 48 m.

Question 9:

Find the side of the square whose perimeter is 20 m.

 Answer 9:

$$\begin{aligned}\text{Perimeter of square} &= 4 \times \text{side} \\ \Rightarrow 20 &= 4 \times \text{side} \\ \Rightarrow \text{Side} &= \frac{20}{4} = 5 \text{ cm}\end{aligned}$$

Thus, the side of square is 5 cm.

Question 10:

The perimeter of a regular pentagon is 100 cm. How long is its each side?

 Answer 10:

$$\begin{aligned}\text{Perimeter of regular pentagon} &= 100 \text{ cm} \\ \Rightarrow 5 \times \text{side} &= 100 \text{ cm} \\ \Rightarrow \text{Side} &= \frac{100}{5} = 20 \text{ cm}\end{aligned}$$

Thus, the side of regular pentagon is 20 cm.



Question 11:

A piece of string is 30 cm long. What will be the length of each side if the string is used to form:

- (a) a square (b) an equilateral triangle (c) a regular hexagon?

 Answer 11:

Length of string = Perimeter of each figure

- (a) Perimeter of square = 30 cm

$$\Rightarrow 4 \times \text{side} = 30 \text{ cm}$$

$$\Rightarrow \text{Side} = \frac{30}{4} = 7.5 \text{ cm}$$

Thus, the length of each side of square is 7.5 cm.

- (b) Perimeter of equilateral triangle = 30 cm

$$\Rightarrow 3 \times \text{side} = 30 \text{ cm}$$

$$\Rightarrow \text{Side} = \frac{30}{3} = 10 \text{ cm}$$

Thus, the length of each side of equilateral triangle is 10 cm.

- (c) Perimeter of hexagon = 30 cm

$$\Rightarrow 6 \times \text{side} = 30 \text{ cm}$$

$$\Rightarrow \text{Side} = \frac{30}{6} = 5 \text{ cm}$$

Thus, the side of each side of hexagon is 5 cm.

Question 12:

Two sides of a triangle are 12 cm and 14 cm. The perimeter of the triangle is 36 cm. What is the third side?

 Answer 12:

Let the length of third side be x cm.

Length of other two side are 12 cm and 14 cm.

Now, Perimeter of triangle = 36 cm

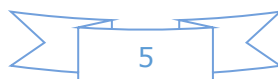
$$\Rightarrow 12 + 14 + x = 36$$

$$\Rightarrow 26 + x = 36$$

$$\Rightarrow x = 36 - 26$$

$$\Rightarrow x = 10 \text{ cm}$$

Thus, the length of third side is 10 cm.



Question 13:

Find the cost of fencing a square park of side 250 m at the rate of ₹20 per meter.

 Answer 13:

$$\begin{aligned}\text{Side of square} &= 250 \text{ m} \\ \text{Perimeter of square} &= 4 \times \text{side} \\ &= 4 \times 250 \\ &= 1000 \text{ m}\end{aligned}$$

$$\text{Since, cost of fencing of per meter} = ₹ 20$$

$$\text{Therefore, the cost of fencing of 1000 meters} = 20 \times 1000 = ₹20,000$$

Question 14:

Find the cost of fencing a rectangular park of length 175 m and breadth 125 m at the rate of ₹12 per meter.

 Answer 14:

$$\begin{aligned}\text{Length of rectangular park} &= 175 \text{ m} \\ \text{Breadth of rectangular park} &= 125 \text{ m} \\ \text{Perimeter of park} &= 2 \times (\text{length} + \text{breadth}) \\ &= 2 \times (175 + 125) \\ &= 2 \times 300 = 600 \text{ m}\end{aligned}$$

$$\text{Since, the cost of fencing park per meter} = ₹ 12$$

$$\text{Therefore, the cost of fencing park of 600 m} = 12 \times 600 = ₹ 7,200$$

Question 15:

Sweety runs around a square park of side 75 m. Bulbul runs around a rectangular park with length of 60 m and breadth 45 m. Who covers less distance?

 Answer 15:

$$\begin{aligned}\text{Distance covered by Sweety} &= \text{Perimeter of square park} \\ \text{Perimeter of square} &= 4 \times \text{side} \\ &= 4 \times 75 = 300 \text{ m}\end{aligned}$$

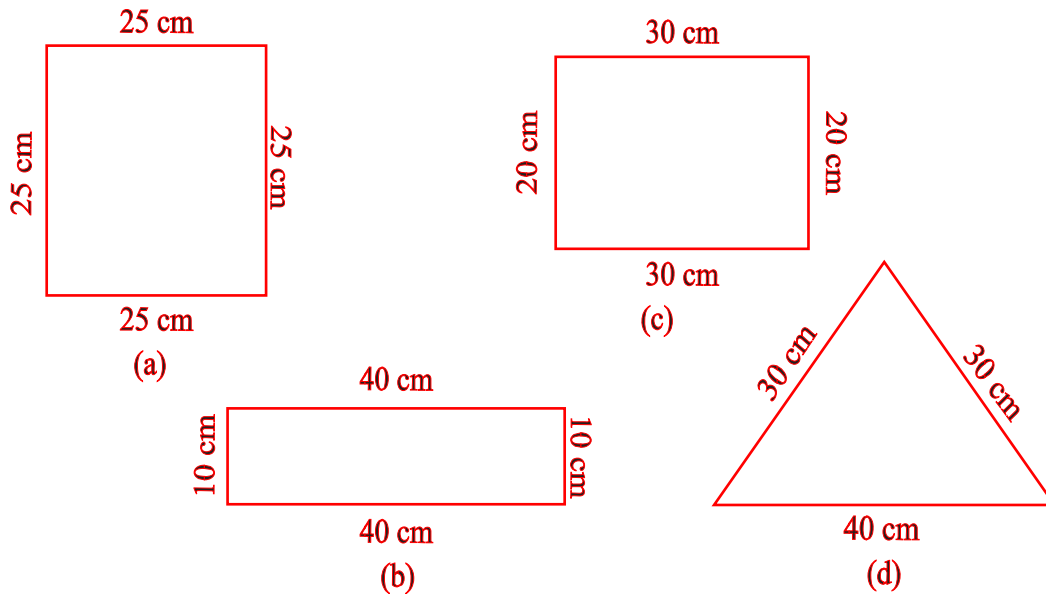
Thus, distance covered by Sweety is 300 m.

$$\begin{aligned}\text{Now, distance covered by Bulbul} &= \text{Perimeter of rectangular park} \\ \text{Perimeter of rectangular park} &= 2 \times (\text{length} + \text{breadth}) \\ &= 2 \times (60 + 45) \\ &= 2 \times 105 = 210 \text{ m}\end{aligned}$$

Thus, Bulbul covers the distance of 210 m and Bulbul covers less distance.

Question 16:

What is the perimeter of each of the following figures? What do you infer from the answer?

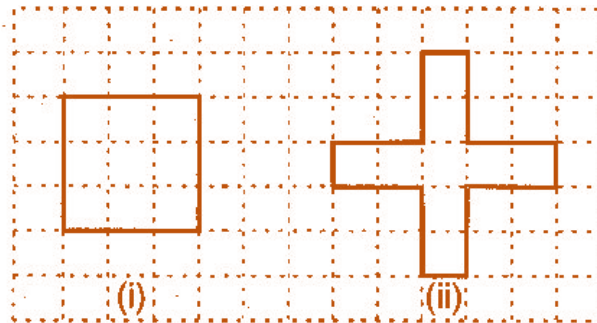
**Answer 16:**

- (a) Perimeter of square = $4 \times \text{side}$
= $4 \times 25 = 100 \text{ cm}$
- (b) Perimeter of rectangle = $2 \times (\text{length} + \text{breadth})$
= $2 \times (40 + 10)$
= 2×50
= 100 cm
- (c) Perimeter of rectangle = $2 \times (\text{length} + \text{breadth})$
= $2 \times (30 + 20)$
= 2×50
= 100 cm
- (d) Perimeter of triangle = Sum of all sides
= $30 \text{ cm} + 30 \text{ cm} + 40 \text{ cm}$
= 100 cm

Thus, all the figures have same perimeter.

Question 17:

Avneet buys 9 square paving slabs, each with a side $\frac{1}{2}$ m. He lays them in the form of a square



- (a) What is the perimeter of his arrangement?
- (b) Shari does not like his arrangement. She gets him to lay them out like a cross. What is the perimeter of her arrangement?
- (c) Which has greater perimeter?
- (d) Avneet wonders, if there is a way of getting an even greater perimeter. Can you find a way of doing this? (The paving slabs must meet along complete edges, i.e., they cannot be broken.)

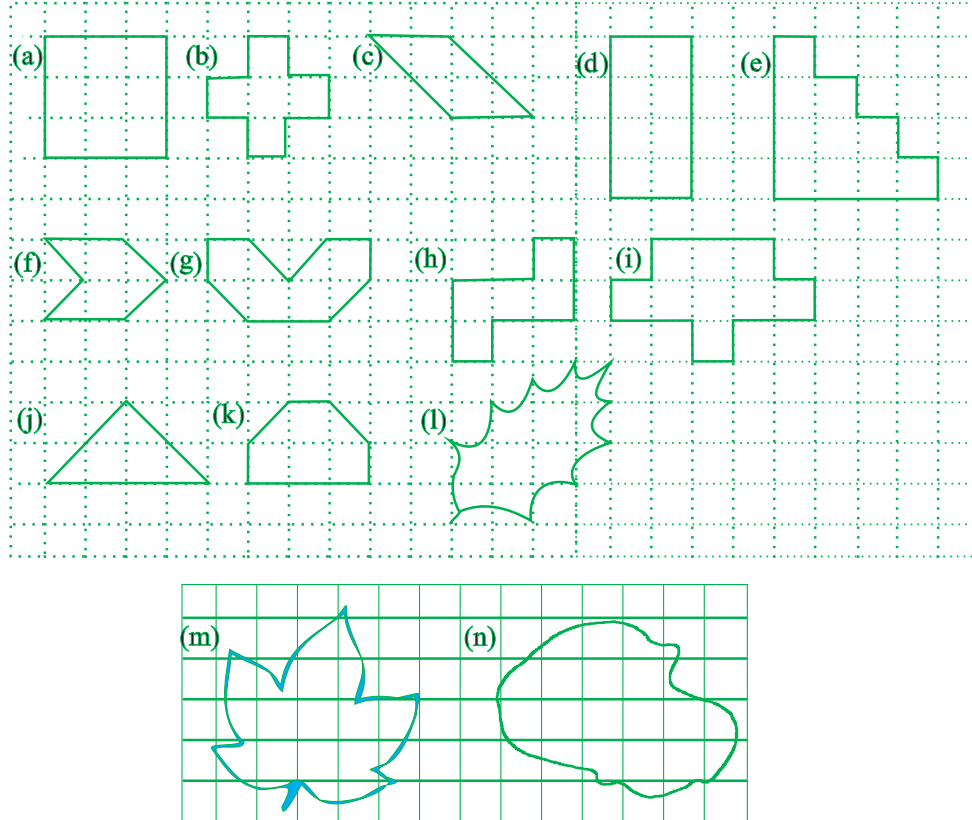
 Answer 17:

- (a) 6 m
- (b) 10 m
- (c) Second arrangement has greater perimeter.
- (d) Yes, if all the squares are arranged in row, the perimeter be 10 cm.

Exercise 10.2

Question 1:

Find the areas of the following figures by counting squares:



Answer 1:

(a) Number of filled square = 9

$\therefore$ Area covered by squares = $9 \times 1 = 9$ sq. units

(b) Number of filled squares = 5

$\therefore$ Area covered by filled squares = $5 \times 1 = 5$ sq. units

(c) Number of full filled squares = 2

Number of half-filled squares = 4

$\therefore$ Area covered by full filled squares = $2 \times 1 = 2$ sq. units

And Area covered by half-filled squares = $4 \times \frac{1}{2} = 2$ sq. units

$\therefore$ Total area = $2 + 2 = 4$ sq. units

(d) Number of filled squares = 8
∴ Area covered by filled squares = $8 \times 1 = 8$ sq. units

(a) Number of filled squares = 10
∴ Area covered by filled squares = $10 \times 1 = 10$ sq. units

(b) Number of full filled squares = 2
Number of half-filled squares = 4
∴ Area covered by full filled squares = $2 \times 1 = 2$ sq. units
And Area covered by half-filled squares = $4 \times \frac{1}{2} = 2$ sq. units
∴ Total area = $2 + 2 = 4$ sq. units

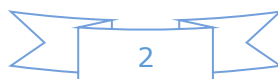
(c) Number of full filled squares = 4
Number of half-filled squares = 4
∴ Area covered by full filled squares = $4 \times 1 = 4$ sq. units
And Area covered by half-filled squares = $4 \times \frac{1}{2} = 2$ sq. units
∴ Total area = $4 + 2 = 6$ sq. units

(d) Number of filled squares = 5
∴ Area covered by filled squares = $5 \times 1 = 5$ sq. units

(e) Number of filled squares = 9
∴ Area covered by filled squares = $9 \times 1 = 9$ sq. units

(f) Number of full filled squares = 2
Number of half-filled squares = 4
∴ Area covered by full filled squares = $2 \times 1 = 2$ sq. units
And Area covered by half-filled squares = $4 \times \frac{1}{2} = 2$ sq. units
∴ Total area = $2 + 2 = 4$ sq. units

(g) Number of full filled squares = 4
Number of half-filled squares = 2
∴ Area covered by full filled squares = $4 \times 1 = 4$ sq. units



And Area covered by half-filled squares = ~~2~~ x $\frac{1}{2}$ = 1 sq. units

∴ Total area = 4 + 1 = 5 sq. units

(h) Number of full filled squares = 3

Number of half-filled squares = 10

∴ Area covered by full filled squares = 3 x 1 = 3 sq. units

And Area covered by half-filled squares = ~~10~~ x $\frac{1}{2}$ = 5 sq. units

∴ Total area = 3 + 5 = 8 sq. units

(i) Number of full filled squares = 7

Number of half-filled squares = 14

∴ Area covered by full filled squares = 7 x 1 = 7 sq. units

And Area covered by half-filled squares = ~~14~~ x $\frac{1}{2}$ = 7 sq. units

∴ Total area = 7 + 7 = 14 sq. units

(j) Number of full filled squares = 10

Number of half-filled squares = 16

∴ Area covered by full filled squares = 10 x 1 = 10 sq. units

And Area covered by half-filled squares = ~~16~~ x $\frac{1}{2}$ = 8 sq. units

∴ Total area = 10 + 8 = 18 sq. units

Exercise 10.3

Question 1:

Find the areas of the rectangles whose sides are:

(a) 3 cm and 4 cm

(b) 12 m and 21 m

(c) 2 km and 3 km

(d) 2 m and 70 cm

Answer 1:

(a) Area of rectangle = length x breadth
= 3 cm x 4 cm = 12 cm²

(b) Area of rectangle = length x breadth
= 12 m x 21 m = 252 m²

(c) Area of rectangle = length x breadth
= 2 km x 3 km = 6 km²

(d) Area of rectangle = length x breadth
= 2 m x 70 cm = 2 m x 0.7 m = 1.4 m²

Question 2:

Find the areas of the squares whose sides are:

(a) 10 cm

(b) 14 cm

(c) 5 cm

Answer 2:

(a) Area of square = side x side = 10 cm x 10 cm = 100 cm²

(b) Area of square = side x side = 14 cm x 14 cm = 196 cm²

(c) Area of square = side x side = 5 m x 5 m = 25 m²

Question 3:

The length and the breadth of three rectangles are as given below:

(a) 9 m and 6 m

(b) 17 m and 3 m

(c) 4 m and 14 m

Which one has the largest area and which one has the smallest?

Answer 3:

(a) Area of rectangle = length x breadth = 9 m x 6 m = 54 m²

(b) Area of rectangle = length x breadth = 3 m x 17 m = 51 m²

(c) Area of rectangle = length x breadth = 4 m x 14 m = 56 m²

Thus, the rectangle (c) has largest area, and rectangle (b) has smallest area.

Question 4:

The area of a rectangle garden 50 m long is 300 m², find the width of the garden.

 Answer 4:

Length of rectangle = 50 m and Area of rectangle = 300 m²

Since, Area of rectangle = length x breadth

$$\text{Therefore, Breadth} = \frac{\text{Area of rectangle}}{\text{Length}} = \frac{300}{50} = 6 \text{ m}$$

Thus, the breadth of the garden is 6 m.

Question 5:

What is the cost of tilling a rectangular plot of land 500 m long and 200 m wide at the rate of ₹8 per hundred sq. m?

 Answer 5:

Length of land = 500 m and Breadth of land = 200 m

Area of land = length x breadth = 500 m x 200 m = 1,00,000 m²

∴ Cost of tilling 100 sq. m of land = ₹ 8

$$\therefore \text{Cost of tilling 1,00,000 sq. m of land} = \frac{8 \times 100000}{100} = ₹ 8000$$

Question 6:

A table-top measures 2 m by 1 m 50 cm. What is its area in square meters?

 Answer 6:

Length of table = 2 m

Breadth of table = 1 m 50 cm = 1.50 m

Area of table = length x breadth
= 2 m x 1.50 m = 3 m²

Question 7:

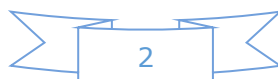
A room is 4 m long and 3 m 50 cm wide. How many square meters of carpet is needed to cover the floor of the room?

 Answer 7:

Length of room = 4 m

Breadth of room = 3 m 50 cm = 3.50 m

Area of carpet = length x breadth
= 4 x 3.50 = 14m²



Question 8:

A floor is 5 m long and 4 m wide. A square carpet of sides 3 m is laid on the floor. Find the area of the floor that is not carpeted.



Answer 8:

Length of floor = 5 m and breadth of floor = 4 m

Area of floor = length x breadth
= 5 m x 4 m = 20 m²

Now, Side of square carpet = 3 m

Area of square carpet = side x side = 3 x 3 = 9 m²

Area of floor that is not carpeted = 20 m² - 9 m² = 11 m²

Question 9:

Five square flower beds each of sides 1 m are dug on a piece of land 5 m long and 4 m wide. What is the area of the remaining part of the land?



Answer 9:

Side of square bed = 1 m

Area of square bed = side x side = 1 m x 1 m = 1 m²

∴ Area of 5 square beds = 1 x 5 = 5 m²

Now, Length of land = 5 m

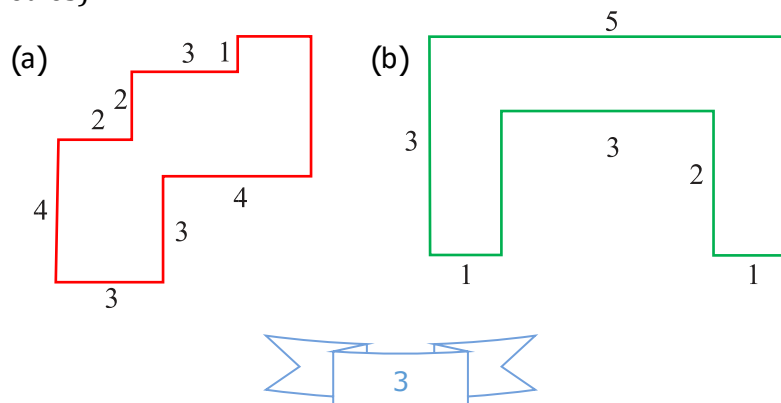
Breadth of land = 4 m

∴ Area of land = length x breadth
= 5 m x 4 m = 20 m²

Area of remaining part = Area of land - Area of 5 flower beds
= 20 m² - 5 m² = 15 m²

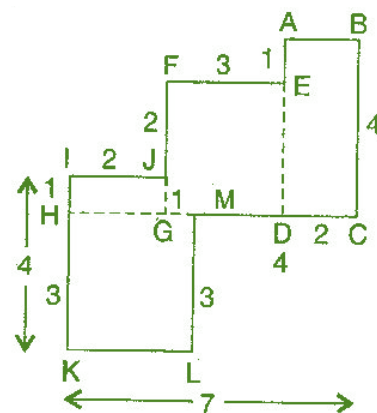
Question 10:

By splitting the following figures into rectangles, find their areas. (The measures are given in centimetres)

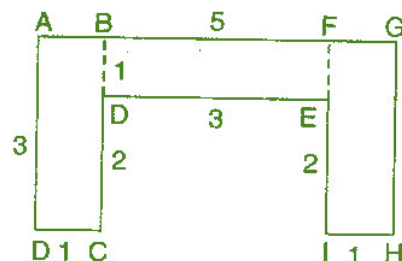


Answer 10:

- (a) Area of HKLM = $3 \times 3 = 9 \text{ cm}^2$
 Area of IJGH = $1 \times 2 = 2 \text{ cm}^2$
 Area of FEDG = $3 \times 3 = 9 \text{ cm}^2$
 Area of ABCD = $2 \times 4 = 8 \text{ cm}^2$
 Total area of the figure = $9 + 2 + 9 + 8 = 28 \text{ cm}^2$

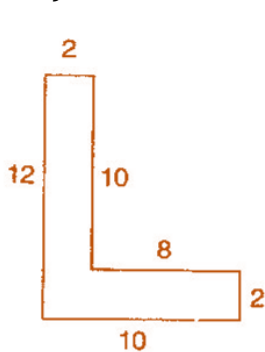


- (b) Area of ABCD = $3 \times 1 = 3 \text{ cm}^2$
 Area of BDEF = $3 \times 1 = 3 \text{ cm}^2$
 Area of FGHI = $3 \times 1 = 3 \text{ cm}^2$
 Total area of the figure = $3 + 3 + 3 = 9 \text{ cm}^2$

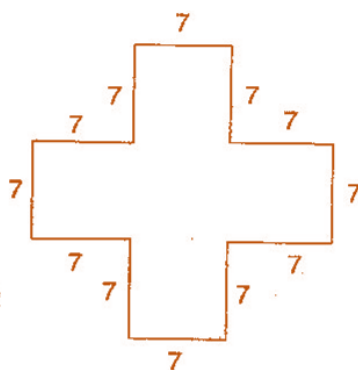


Question 11:

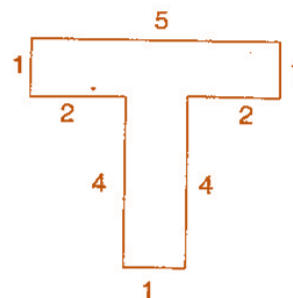
Split the following shapes into rectangles and find their areas. (The measures are given in centimetres)



(a)



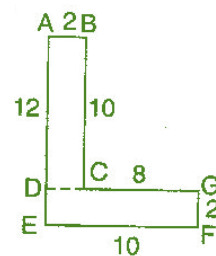
(b)



(c)

Answer 11:

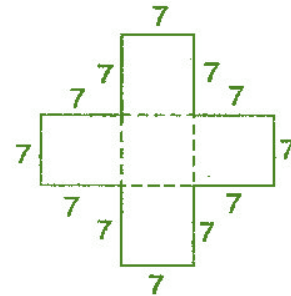
- (a) Area of rectangle ABCD = $2 \times 10 = 20 \text{ cm}^2$
 Area of rectangle DEFG = $10 \times 2 = 20 \text{ cm}^2$
 Total area of the figure = $20 + 20 = 40 \text{ cm}^2$



(b) There are 5 squares each of side 7 cm.

$$\text{Area of one square} = 7 \times 7 = 49 \text{ cm}^2$$

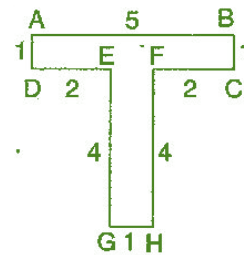
$$\text{Area of 5 squares} = 49 \times 5 = 245 \text{ cm}^2$$



(c) Area of rectangle ABCD = $5 \times 1 = 5 \text{ cm}^2$

$$\text{Area of rectangle EFGH} = 4 \times 1 = 4 \text{ cm}^2$$

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



Question 12:

How many tiles whose length and breadth are 12 cm and 5 cm respectively will be needed to fit in a rectangular region whose length and breadth are respectively?

(a) 100 cm and 144 cm

(b) 70 cm and 36 cm

Answer 12:

(a) Area of region = $100 \text{ cm} \times 144 \text{ cm} = 14400 \text{ cm}^2$

$$\text{Area of one tile} = 5 \text{ cm} \times 12 \text{ cm} = 60 \text{ cm}^2$$

$$\begin{aligned} \text{Number of tiles} &= \frac{\text{Area of region}}{\text{Area of one tile}} \\ &= \frac{14400}{60} = 240 \end{aligned}$$

Thus, 240 tiles are required.

(b) Area of region = $70 \text{ cm} \times 36 \text{ cm} = 2520 \text{ cm}^2$

$$\text{Area of one tile} = 5 \text{ cm} \times 12 \text{ cm} = 60 \text{ cm}^2$$

$$\begin{aligned} \text{Number of tiles} &= \frac{\text{Area of region}}{\text{Area of one tile}} \\ &= \frac{2520}{60} = 42 \end{aligned}$$

Thus, 42 tiles are required.