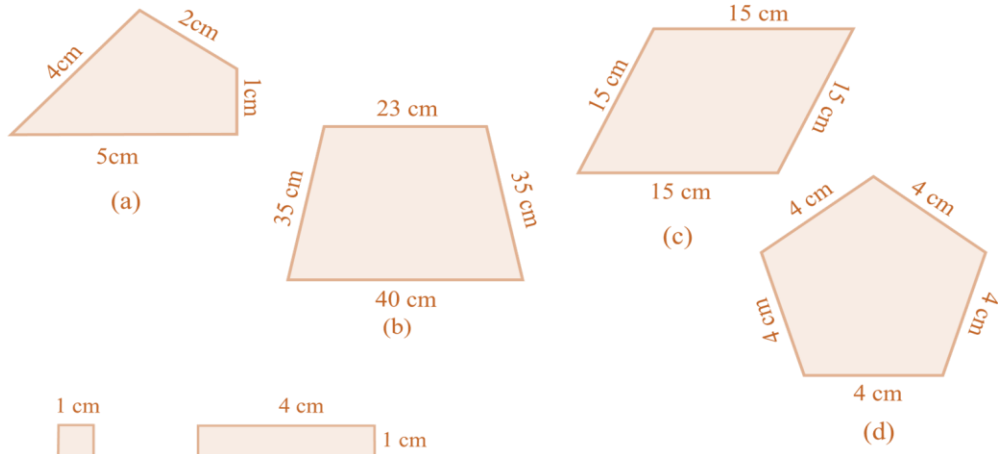
MATHEMATICS

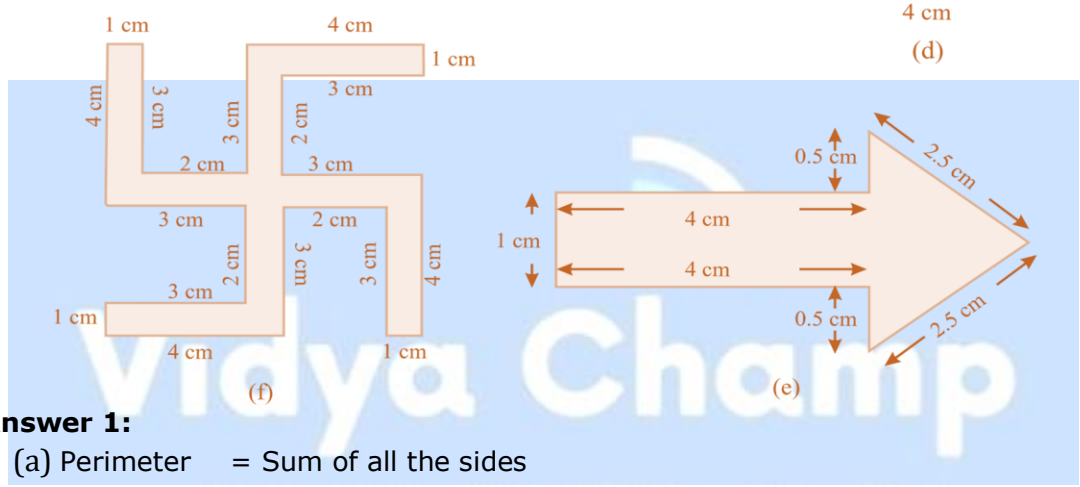
CHAPTER-10 MENSURATION

Exercise 10.1

Question 1:

Find the perimeter of each of the following figures:





Answer 1:

(a) Perimeter = Sum of all the sides
= 4 cm + 2 cm + 1 cm + 5 cm = 12 cm

(b) Perimeter = Sum of all the sides
= 23 cm + 35 cm + 40 cm + 35 cm = 133 cm

(a) Perimeter = Sum of all the sides
= 15 cm + 15 cm + 15 cm + 15 cm = 60 cm

(b) Perimeter = Sum of all the sides
= 4 cm + 4 cm + 4 cm + 4 cm + 4 cm = 20 cm

(c) Perimeter = Sum of all the sides
1 cm + 4 cm + 0.5 cm + 2.5 cm + 2.5 cm + 0.5 cm + 4 cm = 15 cm

(d) Perimeter = Sum of all the sides
= 4 cm + 1 cm + 3 cm + 2 cm + 3 cm + 4 cm + 1 cm + 3 cm + 2 cm + 3
cm + 4 cm + 1 cm + 3 cm + 2 cm + 3 cm + 4 cm + 1 cm + 3 cm + 2 cm
+ 3 cm = 52 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:

Total length of tape required = Perimeter of rectangle
= 2 (length + breadth)
= 2 (40 + 10)
= 2 x 50
= 100 cm
= 1 m

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:

Length of table top = 2 m 25 cm = 2.25 m
Breadth of table top = 1 m 50 cm = 1.50 m
Perimeter of table top = 2 x (length + breadth)
= 2 x (2.25 + 1.50)
= 2 x 3.75
= 7.50 m

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:

Length of wooden strip = Perimeter of photograph
Perimeter of photograph = 2 x (length + breadth)
= 2 (32 + 21)
= 2 x 53 cm
= 106 cm

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.

Perimeter of field = 2 x (length + breadth)
= 2 x (0.7 + 0.5)
= 2 x 1.2
= 2.4 km
= 2.4 x 1000 m
= 2400 m

Thus, the length of wire = 4 x 2400 = 9600 m = 9.6 km

Question 6:

Find the perimeter of each of the following shapes:

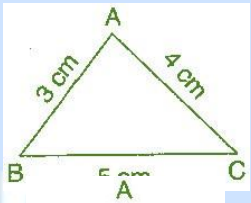
(a) A triangle of sides 3 cm, 4 cm and 5 cm.

(b) An equilateral triangle of side 9 cm.

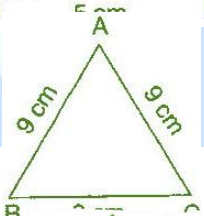
(c) An isosceles triangle with equal sides 8 cm each and third side 6 cm

Answer 6:

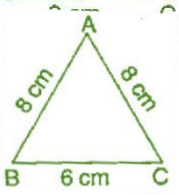
(a) Perimeter of ☐ABC = AB + BC + CA
= 3 cm + 5 cm + 4 cm
= 12 cm



(b) Perimeter of equilateral ABC = 3 x side
= 3 x 9 cm
= 27 cm



(c) Perimeter of ☐ABC = AB + BC + CA
= 8 cm + 6 cm + 8 cm
= 22 cm



Question 7:
Find the perimeter of a triangle with sides measuring 10 cm, 14 cm and 15 cm.

Answer 7:

Perimeter of triangle = Sum of all three sides
= 10 cm + 14 cm + 15 cm
= 39 cm

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:

Perimeter of Hexagon = 6 x length of one side
= 6 x 8 m
= 48 m

Thus, the perimeter of hexagon is 48 m.

Question 9:
Find the side of the square whose perimeter is 20 m.

Answer 9:

Perimeter of square = 4 x side

- 20 = 4 x side
- Side = $\frac{20}{4}$ = 5 cm

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:

Perimeter of regular pentagon = 100 cm

- 5 x side = 100 cm
- Side = $\frac{100}{5}$ = 20 cm

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

- 4 x side = 30 cm
- Side = $\frac{30}{4}$ = 7.5 cm

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

(b) Perimeter of equilateral triangle = 30 cm

- 3 x side = 30 cm
- Side = $\frac{30}{3}$ = 10 cm

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

(c) Perimeter of hexagon = 30 cm

- 6 x side = 30 cm
- Side = $\frac{30}{6}$ = 5 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

- $12 + 14 + x = 36$
- $26 + x = 36$
- $x = 36 - 26$
- $x = 10$ 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:

Side of square = 250 m
Perimeter of square = 4 x side
= 4 x 250
= 1000 m
Since, cost of fencing of per meter = ₹ 20
Therefore, the cost of fencing of 1000 meters = 20 x 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:

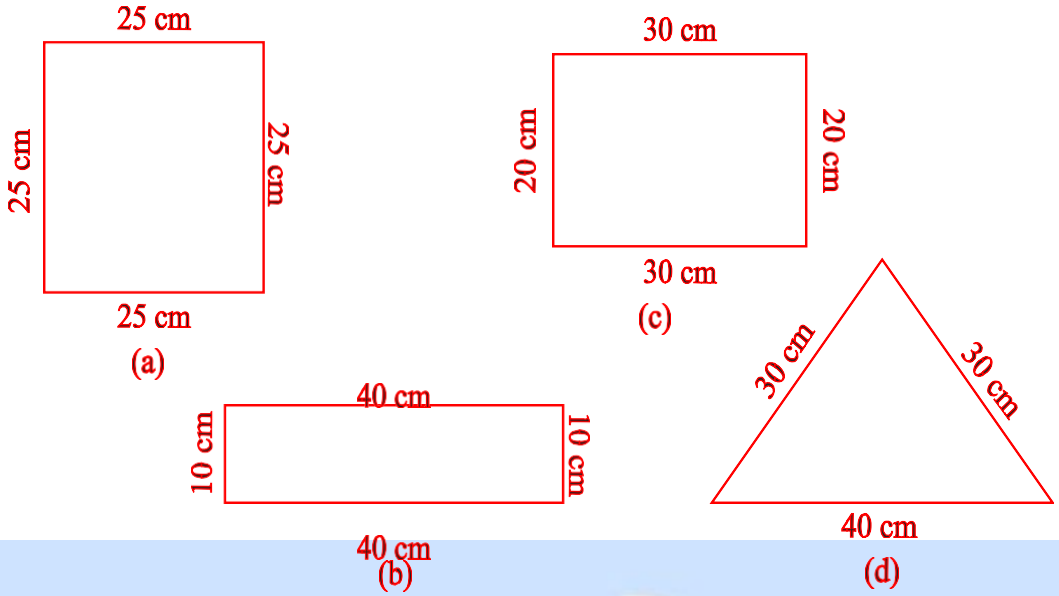
Length of rectangular park = 175 m
Breadth of rectangular park = 125 m
Perimeter of park = 2 x (length + breadth)
= 2 x (175 + 125)
= 2 x 300 = 600 m
Since, the cost of fencing park per meter = ₹ 12
Therefore, the cost of fencing park of 600 m = 12 x 600 = ₹ 7,200

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:

Distance covered by Sweety = Perimeter of square park
Perimeter of square = 4 x side
= 4 x 75 = 300 m
Thus, distance covered by Sweety is 300 m.
Now, distance covered by Bulbul = Perimeter of rectangular park
Perimeter of rectangular park = 2 x (length + breadth)
= 2 x (60 + 45)
= 2 x 105 = 210 m
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 x side
= 4 x 25 = 100 cm

(b) Perimeter of rectangle = 2 x (length + breadth)
= 2 x (40 + 10)
= 2 x 50
= 100 cm

(c) Perimeter of rectangle = 2 x (length + breadth)
= 2 x (30 + 20)
= 2 x 50
= 100 cm

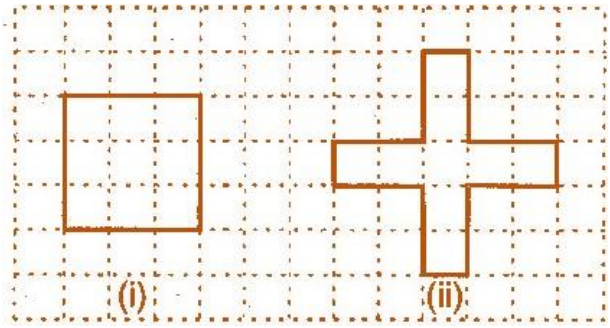
(d) Perimeter of triangle = Sum of all sides
= 30 cm + 30 cm + 40 cm
= 100 cm

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

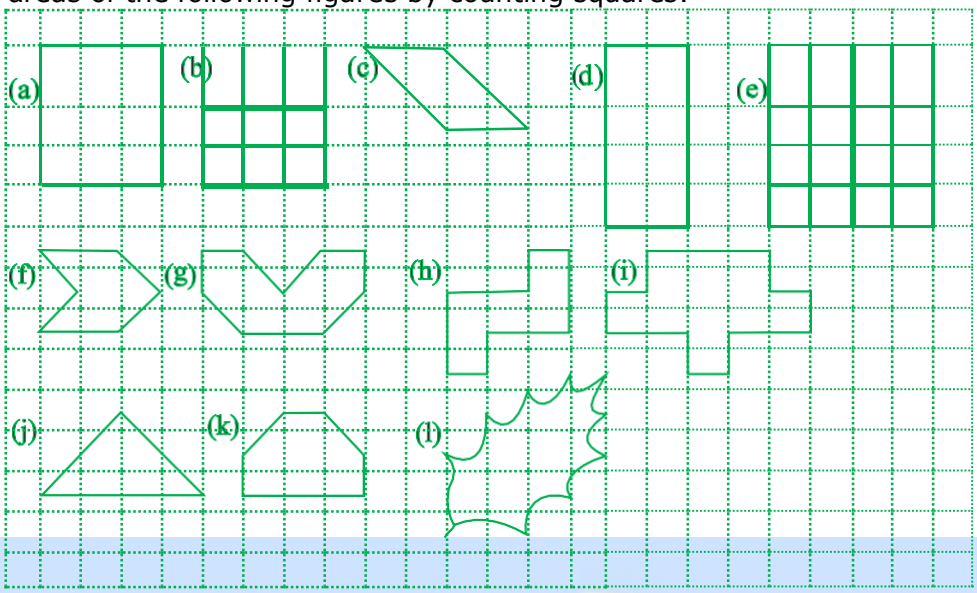
(c) Second arrangement has greater perimeter.

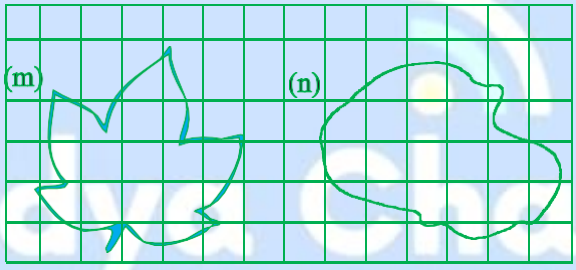
(d) Yes, if all the squares are arranged in row, the perimeter be 10 cm.

Exercise 10.2

Question 1:

Find the areas of the following figures by counting squares:





Answer 1:

(a) Number of filled square = 9

☐Area covered by squares = 9 x 1 = 9 sq. units

(b) Number of filled squares = 5

☐Area covered by filled squares = 5 x 1 = 5 sq. units

(c) Number of full filled squares = 2

Number of half-filled squares = 4

☐Area covered by full filled squares = 2 x 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

(d) Number of filled squares = 8
☐Area covered by filled squares = 8 x 1 = 8 sq. units

(a) Number of filled squares = 10
☐Area covered by filled squares = 10 x 1 = 10 sq. units

(b) Number of full filled squares = 2 Number of half-filled squares = 4
☐Area covered by full filled squares = 2 x 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 x 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 x 1 = 5 sq. units

(e) Number of filled squares = 9
☐Area covered by filled squares = 9 x 1 = 9 sq. units

(f) Number of full filled squares = 2
Number of half-filled squares = 4
☐Area covered by full filled squares = 2 x 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 x 1 = 4 sq. units

And Area covered by half-filled squares = $2 \times \frac{1}{2}$ = 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 = $10 \times \frac{1}{2}$ = 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 = $14 \times \frac{1}{2}$ = 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 = $16 \times \frac{1}{2}$ = 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 cm^2

(b) Area of rectangle = length x breadth

= 12 m x 21 m = 252 m^2

(c) Area of rectangle = length x breadth

= 2 km x 3 km = 6 km^2

(d) Area of rectangle = length x breadth

= 2 m x 70 cm = 2 m x 0.7 m = 1.4 m^2

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 cm^2

(b) Area of square = side x side = 14 cm x 14 cm = 196 cm^2

(c) Area of square = side x side = 5 m x 5 m = 25 m^2

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 m^2

(b) Area of rectangle = length x breadth= 3 m x 17 m = 51 m^2

(c) Area of rectangle = length x breadth= 4 m x 14 m = 56 m^2

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 m^2, find the width of the garden.

Answer 4:

Length of rectangle = 50 m and Area of rectangle = 300 m^2 Since, Area of rectangle = length x breadth

Therefore, Breadth = $\frac{\text{Area of rectangle}}{\text{Length}}$ = $\frac{\cancel{300}}{\cancel{50}}$ = 6 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 m^2 ∵ Cost of tilling 100 sq. m of land = ₹ 8

☐ Cost of tilling 1,00,000 sq. m of land = $\frac{8\times 100\cancel{00}}{\cancel{100}}$ = ₹ 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 m^2

Question 7:

A room us 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 = 14m^2

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 m^2 Now, Side of square carpet = 3 m

Area of square carpet = side x side = 3 x 3 = 9 m^2

Area of floor that is not carpeted = 20 m^2 – 9 m^2 = 11 m^2

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 m^2

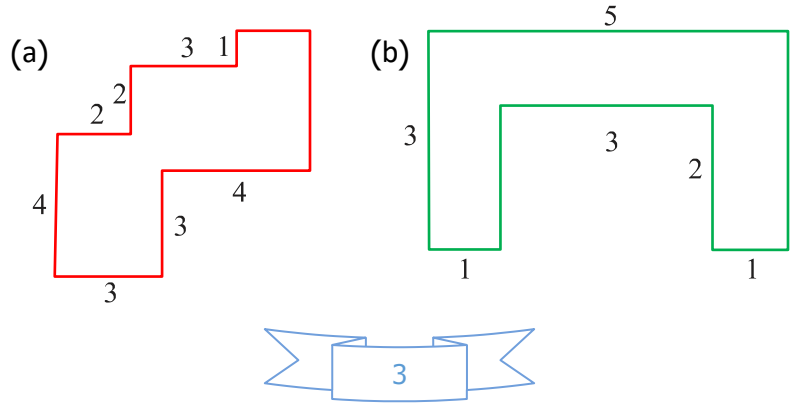
☐ Area of 5 square beds = 1 x 5 = 5 m^2 Now, Length of land = 5 m

Breadth of land = 4 m

☐ Area of land = length x breadth
= 5 m x 4 m = 20 m^2

Area of remaining part = Area of land – Area of 5 flower beds
= 20 m^2 – 5 m^2 = 15 m^2

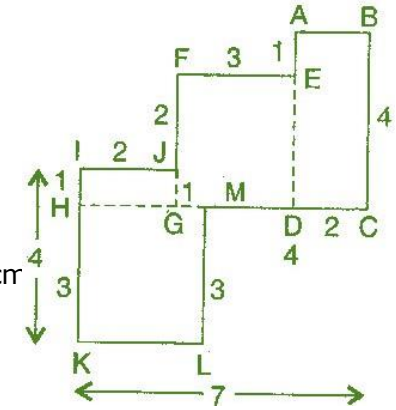
Question 10:
By splitting the following figures into rectangles, find their areas. (The measures are given in centimetres)



Answer 10:

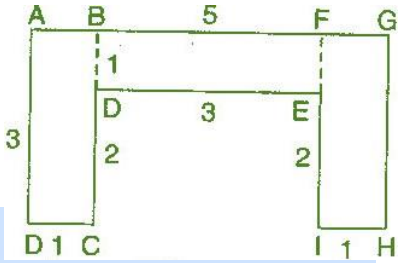
(a) Area of HKLM = 3 x 3 = 9 cm^2 Area of IJGH = 1 x 2 = 2 cm^2 Area of FEDG = 3 x 3 = 9 cm^2 Area of ABCD = 2 x 4 = 8 cm^2

Total area of the figure = 9 + 2 + 9 + 8 = 28 cm



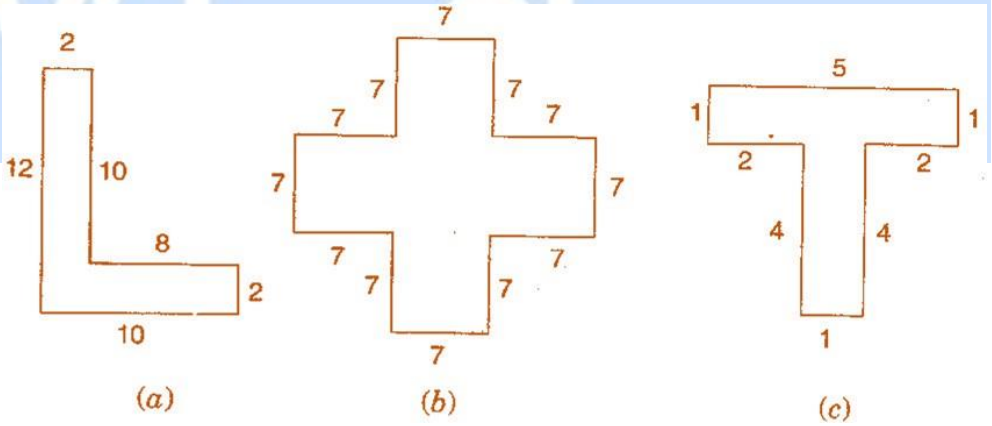
(b) Area of ABCD = 3 x 1 = 3 cm^2 Area of BDEF = 3 x 1 = 3 cm^2 Area of FGHI = 3 x 1 = 3 cm^2

Total area of the figure = 3 + 3 + 3 = 9 cm^2



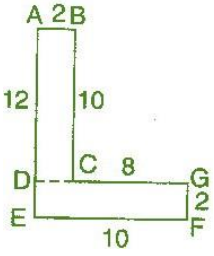
Question 11:

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

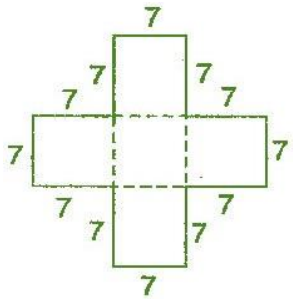


Answer 11:

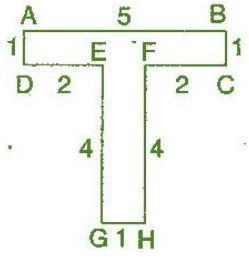
(a) Area of rectangle ABCD = 2 x 10 = 20 cm^2 Area of rectangle DEFG = 10 x 2 = 20 cm^2 Total area of the figure = 20 + 20 = 40 cm^2



(b) There are 5 squares each of side 7 cm. Area of one square = 7 x 7 = 49 cm^2 Area of 5 squares = 49 x 5 = 245 cm^2



(c) Area of rectangle ABCD = 5 x 1 = 5 cm^2 Area of rectangle EFGH = 4 x 1 = 4 cm^2 Total area of the figure = 5 + 4 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 cm x 144 cm = 14400 cm^2 Area of one tile = 5 cm x 12 cm = 60 cm^2

$$\text{Number of tiles} = \frac{\text{Area of region}}{\text{Area of one tile}}$$

$$= \frac{\cancel{14400}}{\cancel{60}} = 240$$

Thus, 240 tiles are required.

(b) Area of region = 70 cm x 36 cm = 2520 cm^2 Area of one tile = 5 cm x 12 cm = 60 cm^2

$$\text{Number of tiles} = \frac{\text{Area of region}}{\text{Area of one tile}}$$

$$= \frac{\cancel{2520}}{\cancel{60}} = 42$$

Thus, 42 tiles are required.