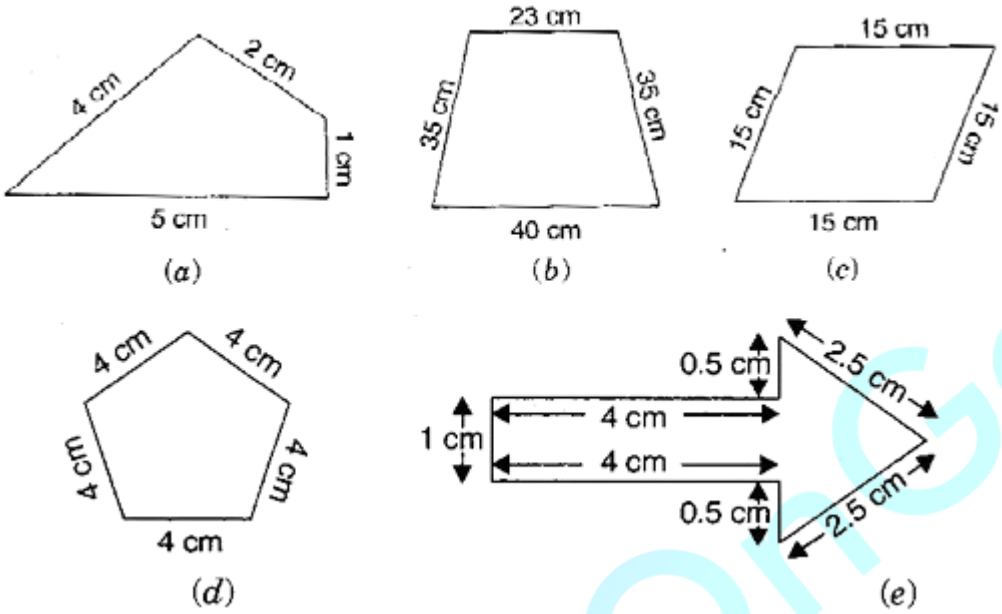
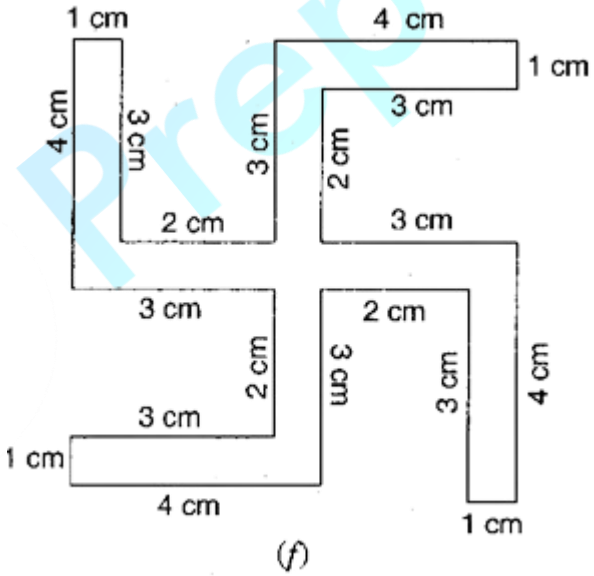
Class VI Mathematics
Chapter-10 MENSURATION

Exercise 10.1

1. Find the perimeter of each of the following figures:





Sol:

(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

(c) Perimeter = Sum of all the sides

= 15 cm + 15 cm + 15 cm + 15 cm = 60 cm

(d) Perimeter = Sum of all the sides

= 4 cm + 4 cm + 4 cm + 4 cm + 4 cm = 20 cm

(e) 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

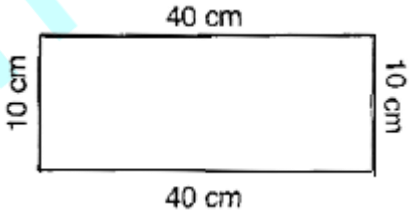
(f) Perimeter = Sum of all the sides

= 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

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?



Sol: Total length of tape required = Perimeter of rectangle

$= 2\,(\,length\, +\, breadth)$

$= 2\,(\,40\, +\, 10)$

$= 2\, \times\, 50$

$= 100\, cm\, =\, 1\, m$

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

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

Sol: 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 $=\, 2\, \times\, (length\, +\, breadth)$

$= 2\, \times\, (2.25\, +\, 1.50)$

$= 2\, \times\, 3.75\, =\, 7.50\, m$

Thus, perimeter of table top is 7.5 m.

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

Sol: Length of wooden strip = Perimeter of photograph

Perimeter of photograph $= 2 \times (length + breadth)$

$= 2\,(32 + 21)$

$= 2 \times 53\,cm = 106\,cm$

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

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?

Sol: 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 $= 2 \times (length + breadth)$

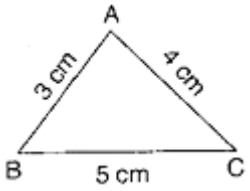
$= 2 \times (0.7 + 0.5) = 2 \times 1.2 = 2.4\,km$

$= 2.4 \times 1000\,m = 2400\,m$

Thus, the length of wire $= 4 \times 2400 = 9600\,m = 9.6\,m$

6. Find the perimeter of each of the following shapes:

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

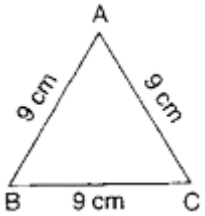


Sol: Perimeter of $\Delta ABC = AB + BC + CA$

$= 3\,cm + 5\,cm + 4\,cm$

$= 12\,cm$

(b) An equilateral triangle of side 9 cm.

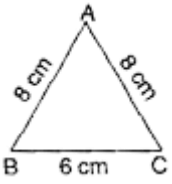


Sol: Perimeter of equilateral $\Delta ABC = 3 \times side$

$= 3 \times 9\,cm$

$= 27\,cm$

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



Sol: Perimeter of $\Delta ABC = AB + BC + CA$

$= 8\,cm + 6\,cm + 8\,cm$

$= 22\,cm$

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

Sol: Perimeter of triangle $= \ Sum\ of\ all\ three\ sides$

$= 10\ cm\ + 14\ cm\ + 15\ cm$

$= 39\ cm$

Thus, perimeter of triangle is 39 cm.

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

Sol: Perimeter of Hexagon $= 6 \times length\ of\ one\ side$

$= 6 \times 8\ m$

$= 48\ m$

Thus, the perimeter of hexagon is 48 m.

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

Sol: Perimeter of square $= 4 \times side$

$\Rightarrow 20 = 4 \times side \qquad \Rightarrow side = \frac{\cancel{20}}{\cancel{4}} = 5\ cm$

Thus, the side of square is 5 cm.

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

Sol: Perimeter of regular pentagon = 100 cm

$\Rightarrow 5 \times side = 100\ cm \qquad \Rightarrow side = \frac{\cancel{100}}{\cancel{5}} = 20\ cm$

Thus, the side of regular pentagon is 20 cm.

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

Ans: Length of string = Perimeter of each figure

(a) A square

Sol: Perimeter of square = 30 cm

$\Rightarrow 4 \times side = 30\ cm \qquad \Rightarrow side = \frac{\cancel{30}}{\cancel{4}} = 7.5\ cm$

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

(b) An equilateral triangle

Sol: Perimeter of equilateral triangle = 30 cm

$$\Rightarrow 3 \times side = 30\ cm \quad \Rightarrow side = \frac{30}{3} = 10\ cm$$

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

(c) A regular hexagon?

Sol: Perimeter of hexagon = 30 cm

$$\Rightarrow 6 \times side = 30\ cm \qquad \Rightarrow side = \frac{30}{6} = 5\ cm$$

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

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?

Sol: Let the length of third side be $x\ cm$.

Length of other two sides is 12 cm and 14 cm.

Now, Perimeter of triangle = 36 cm

$$\Rightarrow 12 + 14 + x = 36 \qquad \Rightarrow 26 + x = 36$$

$$\Rightarrow x = 36 - 26 \qquad \Rightarrow x = 10\ cm$$

Thus, the length of third side is 10 cm.

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

Sol: Side of square = 250 m

Perimeter of square $= 4 \times side$

$$= 4 \times 250 = 1000\ m$$

Since, cost of fencing of per meter = ₹ 20

Therefore, cost of fencing of 1000 meters $= 20 \times 1000 =$ ₹ 20,000

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

Sol: Length of rectangular park = 175 m

Breadth of rectangular park = 125 m

Perimeter of park $= 2 \times (length + breadth)$

$= 2 \times (175 + 125)$

$= 2 \times 300 = 600\, m$

Since, cost of fencing park per meter = ₹12

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

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?

Sol: Distance covered by Sweety = Perimeter of square park

Perimeter of square $= 4 \times side$

$= 4 \times 75 = 300\, m$

Thus, distance covered by Sweety is 300 m.

Now, distance covered by Bulbul = Perimeter of rectangular park

Perimeter of rectangular park $= 2 \times (length + breadth)$

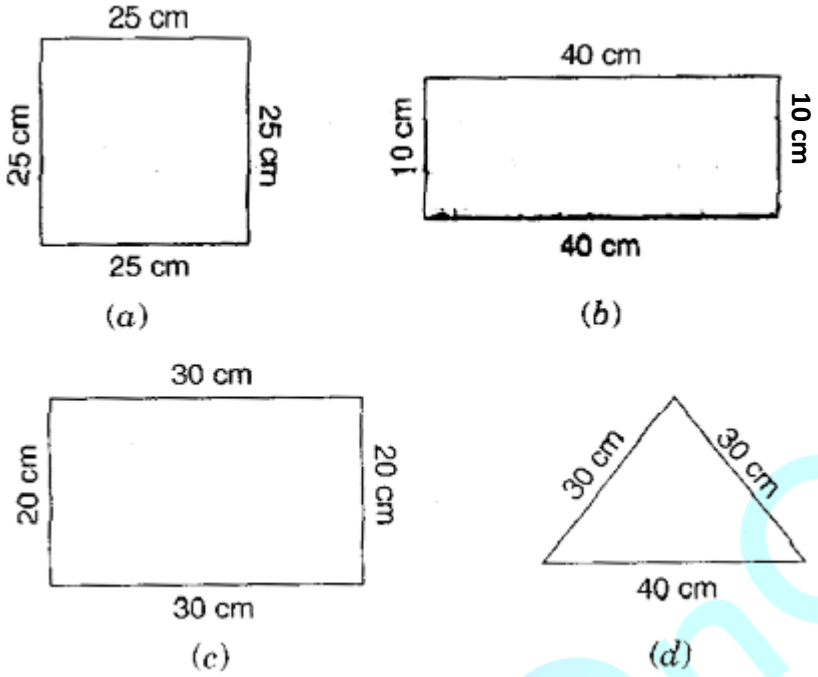
$= 2 \times (60 + 45)$

$= 2 \times 105 = 210\, m$

Thus, Bulbul covers the distance of 210 m.

And Bulbul covers less distance.

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



Sol: (a) $Perimeter\ of\ square\ =\ 4\ \times\ side$

$$=\ 4\ \times\ 25\ =\ 100\ cm$$

(b) $Perimeter\ of\ rectangle\ =\ 2\ \times\ (length\ +\ breadth)$

$$=\ 2\ \times\ (40\ +\ 10)$$

$$=\ 2\ \times\ 50\ =\ 100\ cm$$

(c) $Perimeter\ of\ rectangle\ =\ 2\ \times\ (length\ +\ breadth)$

$$=\ 2\ \times\ (30\ +\ 20)$$

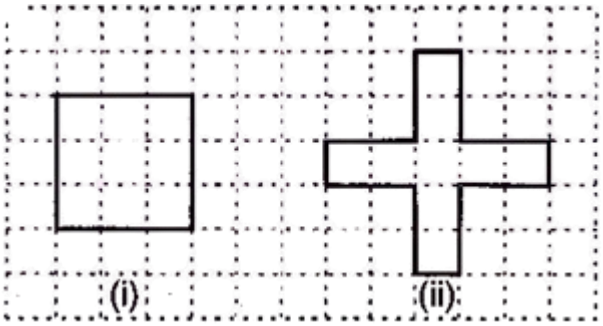
$$=\ 2\ \times\ 50\ =\ 100\ cm$$

(d) $Perimeter\ of\ triangle\ =\ Sum\ of\ all\ sides$

$$=\ 30\ cm\ +\ 30\ cm\ +\ 40\ cm\ =\ 100\ cm$$

Thus, all the figures have same perimeter.

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?

Sol: 6 m

(b) Shari does not like his arrangement. She gets him to lay them out like a cross. What is the perimeter of her arrangement?

Sol: 10 m

(c) Which has greater perimeter?

Sol: Second arrangement 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.)

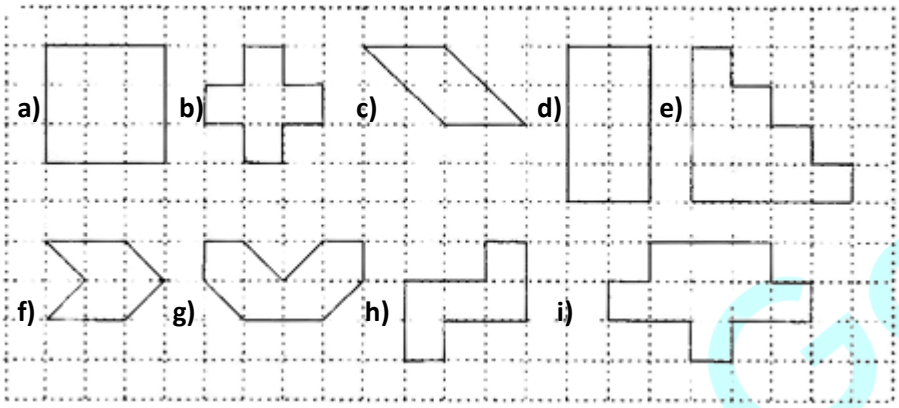
Sol: Yes, if all the squares are arranged in row, the perimeter be 10 cm.

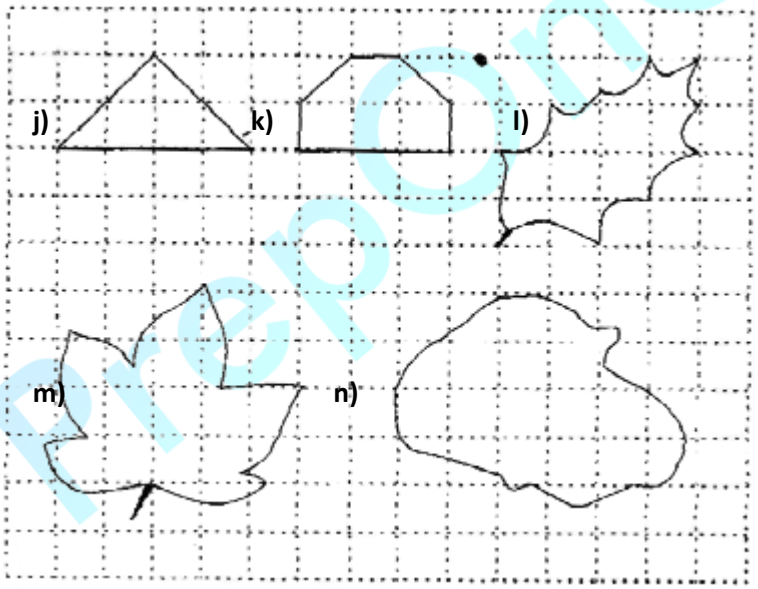
Class VI Mathematics

Chapter-10 MENSURATION

Exercise 10.2

1. Find the areas of the following figures by counting squares:





Sol:

(a) Number of filled square = 9

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

(b) Number of filled squares = 5

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

(c) 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 $= 2 + 2 = 4\ sq.units$

(d) Number of filled squares = 8

∴ Area covered by filled squares $= 8 \times 1 = 8\ sq.units$

(e) Number of filled squares = 10

∴ Area covered by filled squares = $10 \times 1 = 10$ 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 = 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 $= 4 + 2 = 6\ sq.units$

(h) Number of filled squares = 5

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

(i) Number of filled squares = 9

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

(j) 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 $= \cancel{4} \times \frac{1}{\cancel{2}} = 2\ sq.units$

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

(k) Number of full filled squares = 4

Number of half-filled squares = 2

$\therefore$ Area covered by full filled squares $= 4 \times 1 = 4\ sq.units$

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

$\therefore$ Total area $= 4 + 1 = 5\ sq.units$

(l) Number of full filled squares = 3

Number of half-filled squares = 10

$\therefore$ Area covered by full filled squares $= 3 \times 1 = 3\ sq.units$

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

$\therefore$ Total area $= 3 + 5 = 8\ sq.units$

(m) Number of full filled squares = 7

Number of half-filled squares = 14

$\therefore$ Area covered by full filled squares $= 7 \times 1 = 7\ sq.units$

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

$\therefore$ Total area $= 7 + 7 = 14\ sq.units$

(n) Number of full filled squares = 10

Number of half-filled squares = 16

$\therefore$ Area covered by full filled squares $= 10 \times 1 = 10\ sq.units$

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

$\therefore$ Total area $= 10 + 8 = 18\ sq.units$

Class VI Mathematics
Chapter-10 MENSURATION

Exercise 10.3

1. Find the areas of the rectangles whose sides are:

(a) 3 *cm* and 4 *cm*

Sol: $Area\ of\ rectangle\ =\ length\ x\ breadth$

$= 3\ cm\ \times\ 4\ cm\ =\ 12\ cm^2$

(b) 12 *m* and 21 *m*

Sol: $Area\ of\ rectangle\ =\ length\ x\ breadth$

$= 12\ m\ \times\ 21\ m\ =\ 252\ m^2$

(c) 2 *km* and 3 *km*

Sol: $Area\ of\ rectangle\ =\ length\ \times\ breadth$

$= 2\ km\ \times\ 3\ km\ =\ 6\ km^2$

(d) 2 *m* and 70 *cm*

Sol: $Area\ of\ rectangle\ =\ length\ \times\ breadth$

$= 2\ m\ \times\ 70\ cm\ =\ 2\ m\ \times\ 0.7\ m\ =\ 1.4\ m^2$

2. Find the areas of the squares whose sides are:

(a) 10 *cm*

Sol: $Area\ of\ square\ =\ side\ \times\ side\ =\ 10\ cm \times 10\ cm\ =\ 100\ cm^2$

(b) 14 *cm*

Sol: $Area\ of\ square\ =\ side\ \times\ side\ =\ 14\ cm\ \times\ 14\ cm\ =\ 196\ cm^2$

(c) 5 *cm*

Sol: $Area\ of\ square\ =\ side \times side\ =\ 5\ cm \times 5\ cm\ =\ 25\ cm^2$

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

(a) 9 *m* and 6 *m*

Sol: $Area\ of\ rectangle\ =\ length \times breadth\ =\ 9\ m \times 6\ m\ =\ 54m^2$

(b) 17 *m* and 3 *m*

Sol: $Area\ of\ rectangle\ =\ length \times breadth =\ 3\ m \times 17\ m\ =\ 51m^2$

(c) 4 m and 14 m

Sol: $Area\ of\ rectangle\ =\ length\ \times\ breadth = 4\ m\ \times\ 14\ m\ =\ 56\ m^2$

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

Ans: Thus, the rectangle (c) has largest area, i.e. 56 m^2 and rectangle (b) has smallest area, i.e., 51 m^2.

4. The area of a rectangle garden 50 m long is 300 m^2, find the width of the garden.

Ans: Length of rectangle $=$ 50 m and Area of rectangle $=$ 300 m^2

Since, $Area\ of\ rectangle\ =\ length\ \times\ breadth$

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

Thus, the breadth of the garden is 6 m.

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?

Sol: Length of land $=$ 500 m and Breadth of land $=$ 200 m

Area of land $=\ length\ \times\ breadth = 500\ m\ \times\ 200\ m\ =\ 1{,}00{,}000\ m^2$

$\because$ Cost of tilling 100 sq. m of land = ₹ 8

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

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

Sol: Length of table $=$ 2 m and breadth of table $=$ 1 m 50 $cm\ =$ 1.50 m

$Area\ of\ table\ =\ length\ \times\ breadth$

$= 2\ m\ \times\ 1.50\ m\ =\ 3\ m^2$

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?

Sol: Length of room $=$ 4 m and breadth of room $=$ 3 m 50 $cm\ =$ 3.50 m

$Area\ of\ carpet\ =\ length \times\ breadth$

$= 4\ \times\ 3.50\ =\ 14\ m^2$

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.

Sol: Length of floor $= 5\ m$ and breadth of floor $= 4\ m$

$$Area\ of\ floor = length \times breadth$$

$$= 5\ m \times 4\ m = 20\ m^2$$

Now, Side of square carpet $= 3\ m$

Area of square carpet $= side \times side = 3 \times 3 = 9\ m^2$

Area of floor that is not carpeted $= 20m^2 - 9m^2 = 11\ m^2$

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?

Sol: Side of square bed $= 1\ m$

$$Area\ of\ square\ bed = side \times side$$

$$= 1\ m \times 1\ m = 1\ m^2$$

$\therefore$ Area of 5 square beds $= 1 \times 5 = 5\ m^2$

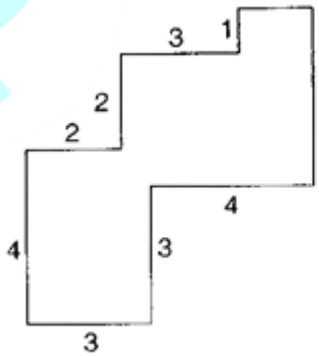
Now, Length of land $= 5\ m$ and breadth of land $= 4\ m$

$\therefore$ Area of land $= length \times breadth = 5\ m \times 4\ m = 20\ m^2$

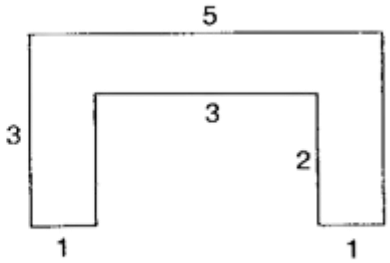
Area of remaining part $= Area\ of\ land - Area\ of\ 5\ flower\ beds$

$$= 20\ m^2 - 5\ m^2 = 15m^2$$

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



(a)



(b)

Sol:

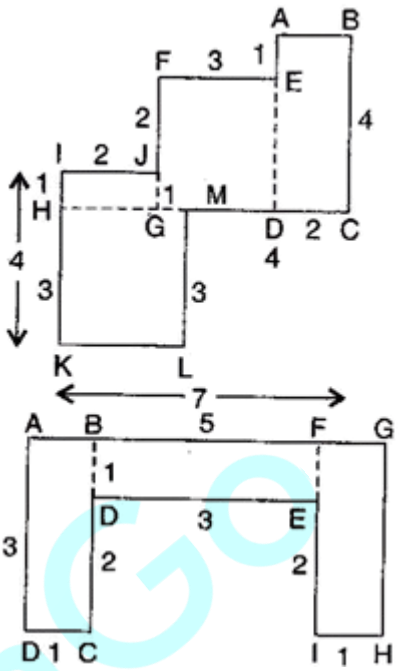
(a) Area of HKLM $= 3 \times 3 = 9\ cm^2$

Area of IJGH $= 1 \times 2 = 2\ cm^2$

Area of FEDG $= 3 \times 3 = 9\ cm^2$

Area of ABCD $= 2 \times 4 = 8\ cm^2$

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



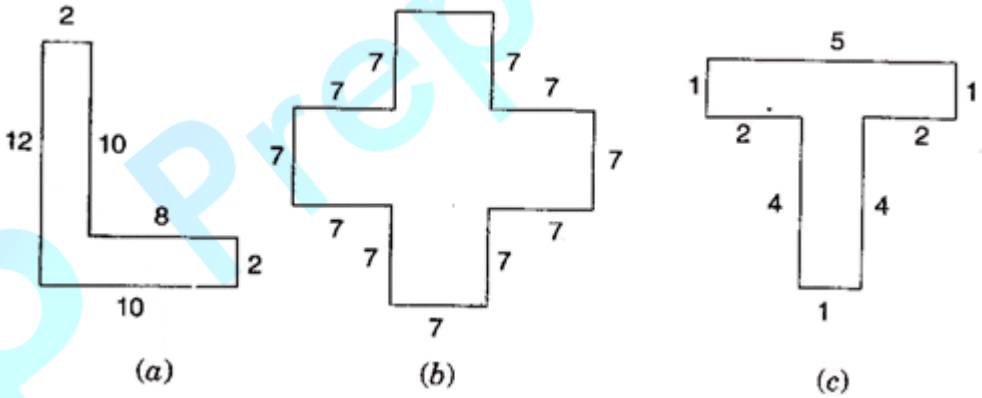
(b) Area of ABCD $= 3 \times 1 = 3\ cm^2$

Area of BDEF $= 3 \times 1 = 3\ cm^2$

Area of FGHI $= 3 \times 1 = 3\ cm^2$

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

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

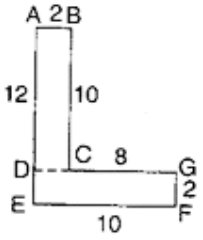


Sol:

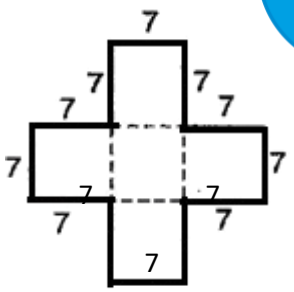
(a) Area of rectangle ABCD $= 2 \times 10 = 20\ cm^2$

Area of rectangle DEFG $= 10 \times 2 = 20\ cm^2$

Total area of the figure $= 20 + 20 = 40\ cm^2$



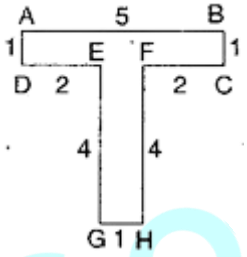
(b) There are 5 squares each of side 7 cm.



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

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

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



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

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

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*

Sol:

Area of region $= 100\ cm \times 144\ cm = 14400\ cm^2$

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

$$Number\ of\ tiles = \frac{Area\ of\ region}{Area\ of\ one\ tile} = \frac{14400}{60} = 240$$

Thus, 240 tiles are required.

(b) 70 *cm* and 36 *cm*

Sol:

Area of region $= 70\ cm \times 36\ cm = 2520\ cm^2$

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

$$Number\ of\ tiles = \frac{Area\ of\ region}{Area\ of\ one\ tile} = \frac{2520}{60} = 42$$

Thus, 42 tiles are required.