

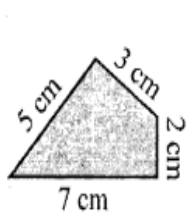
Chapter 14

Mensuration

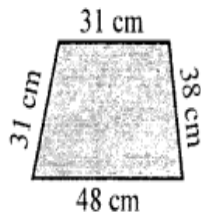
Exercise 14.1

Question 1.

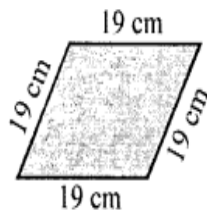
Find the perimeter of each of the following figures:



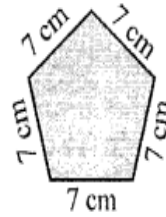
(i)



(ii)



(iii)



(iv)

Solution:

Perimeter = Sum of all the sides.

(i) Perimeter = 5 cm + 3 cm + 2 cm + 7 cm = 17 cm

(ii) Perimeters = 31 cm + 38 cm + 48 cm + 38 cm = 155cm

(iii) Perimeters = 19 cm + 19 cm + 19 cm + 19 cm = 76 cm

(iv) Perimeter = 7 cm + 7 cm + 7 cm + 7 cm + 7 cm = 35 cm

Question 2.

Find the perimeter of each of the following shapes :

(i) A triangle of sides 3 cm, 4 cm and 6 cm.

(ii) A equilateral triangle of side 11 cm.

(iii) An equilateral triangle of side 11 cm.

(iv) An isosceles triangle with equal side 10 cm each and third side 7 cm.

Solution:

(i) Perimeter of the triangle with sides 3cm, 4 cm and 6 cm

$$= 3 \text{ cm} + 4 \text{ cm} + 6 \text{ cm}$$

$$= 13 \text{ cm}$$

(ii) Perimeter of the triangle with sides 7 cm, 5.4 cm, 10.2 cm

$$= 7 \text{ cm} + 5.4 \text{ cm} + 10.2 \text{ cm}$$

$$= 22.6 \text{ cm}$$

(iii) Perimeter of an equilateral triangle

$$= 3 \times \text{length of a side}$$

$$= 3 \times 11 \text{ cm}$$

$$= 33 \text{ cm}$$

(iv) Perimeter of isosceles triangle

$$= 10 \text{ cm} + 10 \text{ cm} + 7 \text{ cm}$$

$$= 27 \text{ cm}$$

Question 3.

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

Solution:

$$\begin{aligned}&\text{Length of the tape required} \\&= \text{Perimeter of the rectangular box} \\&= 2 \times (\text{Length} + \text{Breadth}) \\&= 2 \times (40 \text{ cm} + 10 \text{ cm}) \\&= 2 \times (50 \text{ cm}) \\&= 100 \text{ cm} \\&= 1\text{m}\end{aligned}$$

Question 4.

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

Solution:

$$\begin{aligned}&\text{Perimeter of the table-top} \\&= 2 \times (\text{Length} + \text{Breadth}) \\&= 2 \times (2\text{m } 25 \text{ cm} + 1\text{m } 50 \text{ cm}) \\&= 2 \times (3.75\text{m}) \\&= 7.5 \text{ m}\end{aligned}$$

Question 5.

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

Solution:

$$\begin{aligned}&\text{Perimeter of the rectangle} \\&= 2 \times (\text{Length} + \text{Breadth}) \\&= 2 \times (0.7 \text{ km} + 0.5 \text{ km}) \\&= 2 \times (.2 \text{ km}) \\&= 2.4 \text{ km} \\&\text{Length of the wire needed} \\&= 4 \times \text{Perimeter of the rectangle}\end{aligned}$$

$$= 4 \times (2.4 \text{ km})$$

$$= 9.6 \text{ km}$$

Question 6.

Find the perimeter of a regular hexagon with each side measuring 7.5 m.

Solution:

The Perimeter of a regular hexagon

$$= 6 \times \text{Length of a side}$$

$$= 6 \times 7.5 \text{ m}$$

$$= 45 \text{ m}$$

Question 7.

The lengths of two sides of a triangle are 12 cm and 14 cm. The perimeter of the triangle is 36 cm. What is the length of its third side ?

Solution :

$$\text{Perimeter of a triangle} = 12 \text{ cm} + 14 \text{ cm} + l$$

$$\Rightarrow 36 \text{ cm} = 12 \text{ cm} + 14 \text{ cm} + l$$

$$\Rightarrow 36 \text{ cm} = 26 \text{ cm} + l$$

$$\Rightarrow l = 36 \text{ cm} - 26 \text{ cm}$$

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

Question 8.

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

Solution:

$$\text{Perimeter of the regular pentagon} = 5 \times \text{Length of a side}$$

$$\Rightarrow \text{Length of one (each) side}$$

$$= \frac{\text{Perimeter of the regular pentagon}}{5}$$

$$= \frac{100}{5} \text{ cm}$$

$$= 20 \text{ cm}$$

Question 9.

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 ?

Solution:

(a) Perimeter of the square = $4 \times$ Length of a side

$\Rightarrow$ Length of a side

$$= \frac{\text{Perimeter of the square}}{4} = \frac{30}{4} \text{ cm}$$
$$= 7.5 \text{ cm}$$

(b) Perimeter of the equilateral triangle = $3 \times$ Length of a side

$\Rightarrow$ Length of a side

$$= \frac{\text{Perimeter of the equilateral triangle}}{3} = \frac{30}{3} \text{ cm}$$
$$= 10 \text{ cm}$$

(c) Perimeter of the regular hexagon = $6 \times$ Length of a side

$\Rightarrow$ Length of a side

$$= \frac{\text{Perimeter of the regular hexagon}}{6}$$

$$= \frac{30}{6} \text{ cm}$$

$$= 5 \text{ cm}$$

Question 10.

Find the cost of fencing a rectangular park of length 225 m and breadth 115m at the rate of ₹ 13 per metre.

Solution:

Perimeter of the rectangular park

$$= 2 \times (\text{Length} + \text{Breadth})$$

$$= 2 \times (225\text{m} + 115\text{m})$$

$$= 2 \times (340\text{m})$$

$$= 680\text{m}$$

∴ Cost of fencing the rectangular park at the rate of

∴ Cost of fencing the rectangular park ₹ 13 per metre

$$= ₹13 \times 680\text{m}$$

$$= ₹8840$$

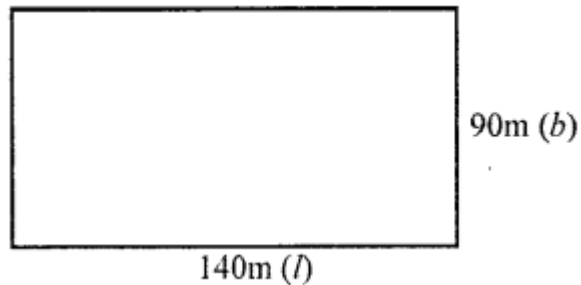
Question 11.

Meera went to a rectangular park 140m long and 90m wide. She took 5 complete rounds on its boundary. What is the distance covered by her ?

Solution:

Length (l) = 140 m

Width (b) = 90 m



$$\therefore \text{Perimeter of park} = 2(l + b)$$

$$= 2 (140 + 90)$$

$$= 2 (230)$$

$$= 460\text{m}$$

She takes 5 complete round,
therefore distance covered by her = $5 \times 460 \text{ m} = 2300\text{m}$

Question 12.

Pinky runs 8 times around a rectangular park with length 80m and breadth 55m while Pankaj runs 7 times around a square park of side 75 cm. Who covers more distance and by how much ?

Solution:

$$\text{Perimeter of rectangular park} = 2 \times (\text{Length} + \text{Breadth})$$

$$= 2 \times (80 + 55)$$

$$= 270 \text{ m}$$

$$\text{Pinky runs 8 times} = 8 \times 270 = 2160\text{m}$$

$$\text{And, perimeter of square park} = 4 \times \text{Length of a side} =$$

$$= 4 \times 75$$

$$= 300$$

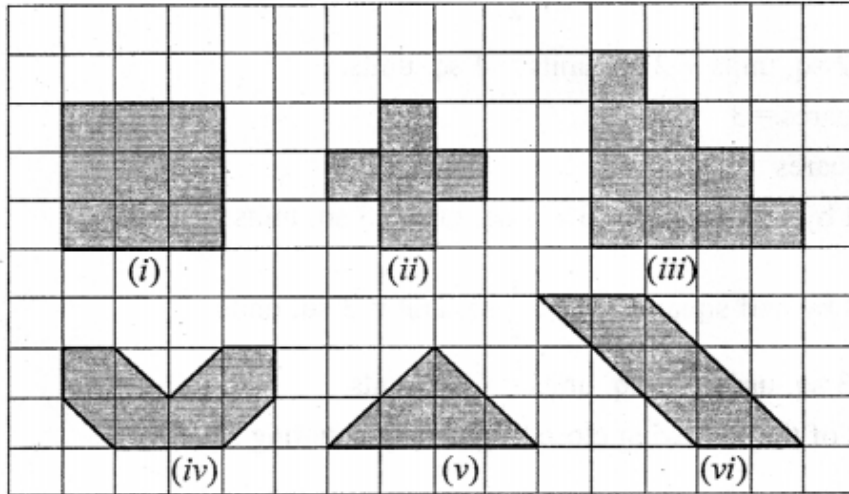
$$\text{Pankaj runs 7 times} = 7 \times 300 = 2100\text{m}$$

$$\therefore \text{Pinky covers more distance i.e., } 2160 - 2100 = 60\text{m}$$

Exercise 14.2

Question 1.

Find the area of the region enclosed by the following figures by counting squares :



Solution:

(i) Cover	Number estimate	Area
(a) Full-filled squares	9	9 sq. units
(b) Half-filled squares	_____	_____
(c) More than half-filled squares	_____	_____
(d) Less than half-filled squares	_____	_____
∴ Total area of the figure		
= 9 sq. units		

(ii) Cover	Number estimate	Area
(a) Full-filled squares	5	5 sq. units
(b) Half-filled squares	_____	_____
(c) More than half-filled squares	_____	_____
(d) Less than half-filled squares	_____	_____
$\therefore$ Total area of the figure $= 5 \text{ sq. units}$		

(iii) Fill-filled squares = 10

$\therefore$ Total Area = Area covered by full squares
 $= 10 \times 1 \text{ sq. unit} = 10 \text{ sq. units}$

(iv) Full-filled squares = 4

Half-filled squares = 4

Area covered by full squares = $4 \times 1 \text{ sq. unit} = 4 \text{ sq. units}$

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

$\therefore$ Total area = $4 \text{ sq. units} + 2 \text{ sq. units} = 6 \text{ sq. units}$

(v) Full-fulled squares = 2

Half-filled squares = 4

Area covered by full squares = $2 \times 1 \text{ sq. unit} = 2 \text{ sq. units}$

Area covered by half squares = $4 \times \frac{1}{2} \text{ sq. unit} = 2 \text{ sq. units}$

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

(vi) Full- filled squares = 3

Half –filled squares = 6

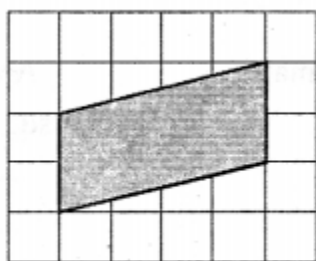
Area covered by full squares = 3×1 sq. unit = 3 sq. units

Area covered by half squares = $6 \times \frac{1}{2}$ sq. unit = 3 sq. units

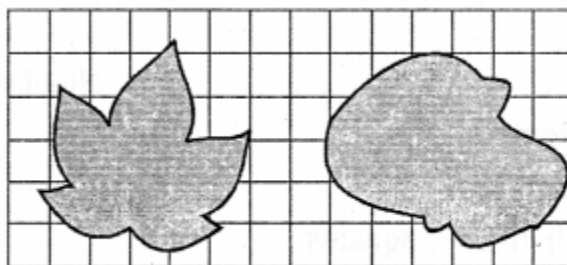
$\therefore$ Total area = 3 sq. units + 3 sq. units = 6 sq. units.

Question 2.

Find the area of the following closed figures by counting squares :



(i)



(ii)

(iii)

Solution:

Cover	Number estimate	Area
(a) Full-filled squares	4	4×1 sq. unit = 4 sq. units
(b) half filled squares	_____	_____

(c) More than half-filled squares	4	$4 \times 1 \text{ sq. unit}$ $= 4 \text{ sq. units}$
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(d) Less than half-filled squares	_____	_____
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$\therefore$ Total area = 4 sq. units + 4 sq. unit = 8 sq. units

(ii) Cover	Number estimate	Area
(a) Full-filled squares	6	$6 \times 1 \text{ sq. unit}$ $= 6 \text{ sq. units}$
(b) Half-filled squares	_____	_____
(c) More than half-filled squares	8	$8 \times 1 \text{ sq. unit}$ $= 8 \text{ sq. units}$
(d) Less than half-filled squares	_____	_____

$\therefore$ Total area = 6 sq. units + 8 sq. units = 14 sq. units

(iii) Cover	Number estimate	Area
(a) Full		
(a) Full-filled squares	9	$9 \times 1 \text{ sq. unit}$ $= 9 \text{ sq. units}$
(b) Half-filled	_____	_____

squares

(c) More than half-filled squares	9	$9 \times 1 \text{ sq. unit}$ $= 9 \text{ sq. units}$
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(d) Less than half-filled squares	4	_____
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$\therefore$ Total area = 9 sq. units + 9 sq. unit = 18 sq. units

Question 3.

Find the areas of the rectangles whose lengths and breadths are :

(i) 9m and 6m

(ii) 17m and 3m

(iii) 14 m and 4m

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

Solution:

(i) Area of the rectangle = Length $\times$ Breadth = $9\text{m} \times 6\text{m} = 54 \text{ sq. m}$

(ii) Area of the rectangle = Length $\times$ Breadth
 $= 17\text{m} \times 3\text{m} = 51 \text{ sq. m}$

(iii) Area of the rectangle = Length $\times$ Breadth
 $= 14 \text{ m} \times 4\text{m} = 56 \text{ sq. m.}$

The rectangle (iii) has the largest area and rectangle (ii) smallest area.

Question 4.

Find the areas of the rectangles whose two adjacent sides are:

(i) 14 cm and 23 cm

(ii) 3 km and 4 km

(iii) 2m and 90 cm

Solution:

(i) 14 cm and 23 cm

$$\begin{aligned}\text{Area of the rectangle} &= \text{Length} \times \text{Breadth} \\ &= 14 \text{ cm} \times 23 \text{ cm} \\ &= 322 \text{ sq. cm}\end{aligned}$$

(ii) 3 km and 4 km

$$\begin{aligned}\text{Area of the rectangle} &= \text{Length} \times \text{Breadth} \\ &= 3 \text{ km} \times 4 \text{ km} \\ &= 12 \text{ sq. km}\end{aligned}$$

(iii) 2m and 90 cm

$$90 \text{ cm} = 0.9 \text{ m}$$

$$\begin{aligned}\text{Area of the rectangle} &= l \times b \\ &= 2m \times 0.9m \\ &= 1.8 \text{ sq. m}\end{aligned}$$

Question 5.

Find the areas of the squares whose sides are:

(i) 8 cm

(ii) 14m

(iii) 2m 50 cm

Solution:

(i) 8 cm

$$\text{Area of the square} = \text{Side} \times \text{Side} = 8 \text{ cm} \times 8 \text{ cm} = 64 \text{ sq. cm}$$

(ii) 14 m

$$\text{Area of the square} = \text{Side} \times \text{Side}$$

$$= 14\text{m} \times 14\text{m}$$

$$= 196 \text{ sq. m}$$

(iii) 2m 50 cm

$$50 \text{ cm} = \frac{50}{100} = 0.5\text{m}$$

$$\therefore \text{Side} = 2.5 \text{ m}$$

$$\text{Area of the square} = \text{Side} \times \text{Side} = 2.5 \text{ m} \times 2.5\text{m}$$

$$= 6.25\text{sq. m}$$

Question 6.

A room is 4m long and 3m 25 cm wide. How many square metres of carpet is needed to cover the floor of the room ?

Solution:

Length of the room = 4m

Breadth of the room = 3m 25 cm = 3.25m

∴ Area of the room = Length $\times$ Breadth

$$= 4 \times 3.25 \text{ m}$$

$$= 13 \text{ sq. m}$$

Hence, 13 square metres of carpet is needed to cover the floor of the room.

Question 7.

What is the cost of tiling a rectangular field 500 m long and 200m wide at the rate of ₹ 7.5 per hundred square metres ?

Solution:

Length of the rectangular field = 500m

Breadth of the rectangular field = 200m

∴ Area of the rectangular field = Length $\times$ Breadth

$$= 500\text{m} \times 200\text{m} = 10000 \text{ sq.m.}$$

$$\therefore \text{Cost of tiling } 100 \text{ sq.m.} = ₹7.5$$

$$\therefore \text{Cost of tiling } 1 \text{ sq. m} = ₹\frac{7.5}{100}$$

$$\therefore \text{Cost of tiling } 10000 \text{ sq. m} = ₹7.5100 \times 10000 = ₹7500$$

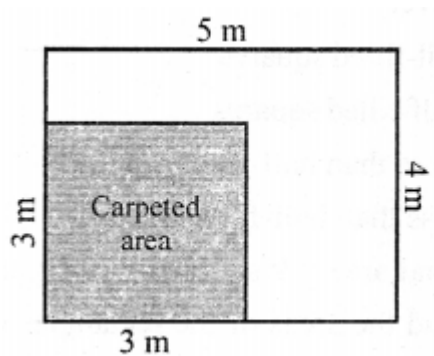
Question 8.

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

Solution:

Length of the floor = 5m

Breadth of the floor = 4m



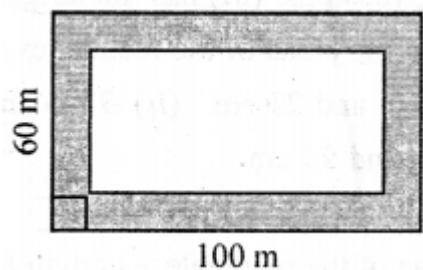
$$\therefore \text{Area of the floor} = \text{Length} \times \text{Breadth} = 5\text{m} \times 4\text{m} = 20 \text{ sq m}$$

$$\text{Area of the square carpet} = \text{Side} \times \text{Side} = 3\text{m} \times 3\text{m} = 9 \text{ sq m}$$

$$\therefore \text{Area of the floor that is not carpeted} = 20 \text{ sq m} - 9 \text{ sq m} = 11 \text{ sqm}$$

Question 9.

In the given figure, find the area of the path (Shown shaded) which is 2m wide all around.



Solution:

length of field = 100m

Breadth of field = 60 m

Area of the field = $L \times B$

$$= 100 \times 60 = 6000m^2$$

Length of field exclude path = $100 - (2 + 2) = 96$ m

Breadth of field exclude path = $60 - (2 + 2) = 56$

Area of field exclude path = $L \times B = 96m \times 56m = 5376m^2$

Area of path = Area of field – Area of field exclude path

$$= 6000 - 5376$$

$$= 624 \text{ sq. m}$$

Question 10.

four square flower beds of side 1m 50cm are dug on a rectangular piece of land 8m long and 6m 50 cm wide. What is the area of the remaining part of the land ?

Solution:

Area of 1 square flower bed = $a^2 = 1.5 \times 1.5 = 2.25m^2$

Area of 4 square flower bed = $4 \times 2.25 = 9m^2$

Length of land = 8m

Breadth of land = 6.5m

$$\text{Area of land} = l \times b = 8 \times 6.5 = 52m^2$$

$$\text{Area of remaining part of bed} = 52 - 9 = 43 \text{ sq.m}$$

Question 11.

How many tiles whose length and breadth are 12cm and 5cm respectively will be needed to cover a rectangular region whose length and breadth are respectively :

(i) 70 cm and 36 cm

(ii) 144 cm and 1 m

Solution:

(i) Length (l) of tile = 12 cm

breadth (b) of tile = 5 cm

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

Length (l) of rectangular region = 70 cm

breadth (b) of rectangular region = 36cm

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

If $60cm^2$ area is covered then tile required = 1

$$\begin{aligned}\text{If } 2520cm^2 \text{ area is covered then tile required is} &= 160cm \times 2520cm^2 \\ &= 42\end{aligned}$$

Hence, 42 tiles are required.

(ii) Area of the tile = 60cm^2 (as in(i)above)

Length (l) of rectangular region = $1\text{m} = 100\text{ cm}$

breadth (b) of rectangular region = 144 cm

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

if 60cm^2 are is covered then tile required = 1

If 14400cm^2 is covered then tile required

$$= \frac{1}{60} \text{ cm} \times 2520\text{cm}^2 = 240$$

Hence, 240 tiles are required.

Question 12.

The area of a rectangular polt is 340 sq. m . If its breadth 17m , find its length and the perimeter.

Solution:

Area of plot A = 340m^2

Length (l) = ?

Area = $l \times b$

$$= 340 = l \times 17$$

$$= \frac{340}{17}$$

$$= l = 20$$

Length = 20m

$$\text{Perimeter} = 2(l + b)$$

$$= 2 (20 + 17)$$

$$= 2 (37)$$

$$= 74\text{m}$$

Question 13.

If the area of a rectangular plot is 144 sq. m and its length is 16 m. Find the breadth of the plot and the cost of fencing it at the rate of ₹ 6 per meter.

Solution:

$$\text{Area of plot} = 144\text{m}^2$$

$$\text{Length (l)} = 16\text{m}$$

$$\text{Breadth (b)} = ?$$

$$\text{Area} = l \times b$$

$$\Rightarrow 144 = 16 \times b$$

$$\Rightarrow \frac{144}{16} = b$$

$$\Rightarrow b = 9\text{m}$$

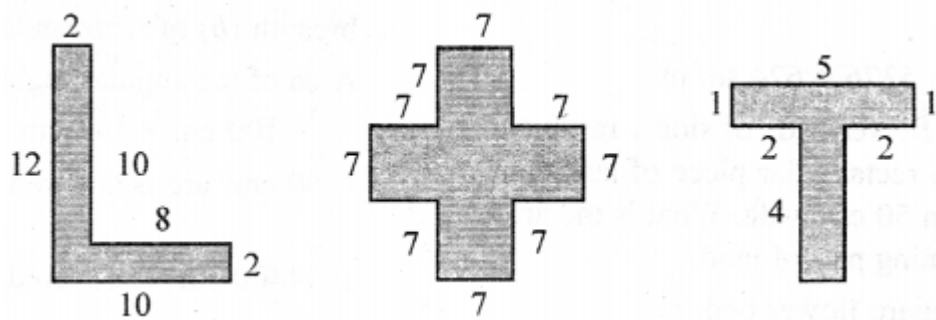
Cost of fencing is ₹ 6 per metre

$$\text{Perimeter of field} = 2(l + b) = 2 (16 + 9) = 50 \text{ m}$$

$$\text{Cost of fencing} = 50 \times 6 = ₹300$$

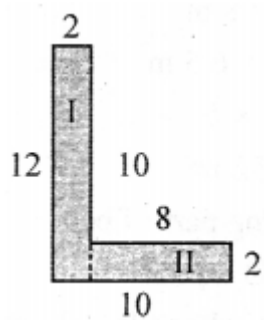
Question 14.

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



Solution:

(a) The given figure is split into 2 rectangles.



Length of Part I = 12 cm

Breadth of Part I = 2 cm

Area of Part I = Length $\times$ Breadth = $(12 \times 2) \text{ cm}^2 = 24 \text{ cm}^2$

Length of Part II = 8 cm

Breadth of Part II = 2 cm

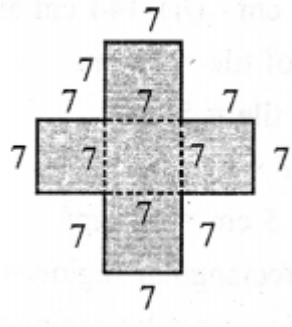
Area of Part II = $l \times b = (8 \times 2) \text{ cm}^2 = 16 \text{ cm}^2$

$\therefore$ Total area = Area of part I + Area of Part II

$= (24 + 16) \text{ cm}^2$

$= 40 \text{ cm}^2$

(b) The given figure is divided into 5 parts



Here length of all the rectangles = 7cm

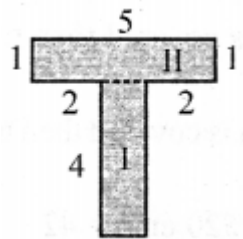
and breadth of all the rectangles = 7cm

$$\text{Area} = l \times b = 7 \times 7 = 49 \text{ cm}^2$$

Total rectangles = 5

$$\therefore \text{Total area} = 5 \times 49 \text{ cm}^2 = 245 \text{ cm}^2$$

(c) The given figure is divided into 2 rectangles



Length of 1st part = 4 cm

Breadth of IInd part = 1 cm

$$\text{Area} = l \times b = 4 \times 1 = 4 \text{ cm}^2$$

Length of IInd part = 5 cm

Breadth of IInd part = 1 cm

$$\text{Area} = l \times b = 5 \times 1 = 5 \text{ cm}^2$$

$$\therefore \text{Total area} = 4 \text{ cm}^2 + 5 \text{ cm}^2 = 9 \text{ cm}^2$$

Objective Types Questions

Mental Maths

Question 1.

Fill in the blanks :

- (i) The perimeter of a closed plane figure is the length of its
- (ii) The unit of measurement of perimeter is same as that of
- (iii) If the side of a rhombus is 7 cm then its perimeter is.....
- (iv) The area of a closed plane figure is measured in.....

Solution:

- (i) The Perimeter of a closed plane figure is the length of its boundary.
- (ii) The unit of measurement of perimeter is same as that of length.
- (iii) If the side of a rhombus is 7cm then its perimeter is $4 \times 7 \text{ cm} = 28 \text{ cm}$.
- (iv) The area of a closed plane figure is measured in sq. units.

Question 2.

State whether the following statements are true (T) or false (F):

- (i) Centimetre is the unit of area.
- (ii) The sum of lengths of a polygon is called its area.
- (iii) If the sides of a rectangle are given in centimetres, then its perimeter is measures in sqaure centimeters.
- (iv) if the side of a sqaure is doubled, then its perimeter is also doubled.

(v) If the side of a square is doubles, then its area is also doubled.

(vi) To find the cost of fencing a field, we find its perimeter.

Solution:

(i) Centimetre is the unit of area. **False**

(ii) The sum of lengths of a polygon is called its area. **False**

(iii) If the sides of a rectangle are given in centimetres, then its perimeter is measured in square centimetres. **False**

(iv) If the side of a square is doubled, then its perimeter is also doubled. **False**

(v) If the side of a square is doubled, then its area is also doubled. **False**

(vi) To find the cost of constructiong a road, we find its area. **True**

(vii) To find the cost of fencing a field, we find its perimeter. **True**

Multiple Choice Questions

Choose the correct answer from, the given four options (3 to 15):

Question 3.

If the perimeter of a square is 50cm, then its side is

(a) 200 cm

(b) 150 cm

(c) 25cm

(d) 12.5 cm

Solution:

Perimeter of a square = 50cm

$$\Rightarrow 4 \times \text{length of a side} = 50 \text{ cm}$$

$$\Rightarrow \text{length of a side} = \frac{50}{4} \text{ cm} = 12.5(d)$$

Question 4.

The area of the rectangle with length 25 cm and breadth 12 cm is

- (a) 300 sq. m
- (b) 74 cm
- (c) 300 sq. cm.
- (d) 74 sq. cm

Solution:

Length = 25cm

Breadth = 12 cm

Area = Length $\times$ Breadth

$$= 25 \text{ cm} \times 12 \text{ cm}$$

$$= 300 \text{ sq. cm (c)}$$

Question 5.

If the perimeter of a square is 36 cm, then its area is

- (a) 6 sq. cm
- (b) 18 sq. cm
- (c) 81 sq. cm

Solution:

Perimeter of a square = 36 cm

$$\Rightarrow 4 \times \text{length of a side} = 36$$

$$\Rightarrow \text{length of a side} = 36 \div 4 = 9 \text{ cm}$$

Area of a square = $(\text{Length of a side})^2$

$$= (9 \text{ cm})^2$$

$$= 81 \text{ cm}^2 \text{ (d)}$$

Question 6.

If the area of rectangular plot is 180 sq. m. and its length is 15m, then its breadth is

(a) 12m

(b) 12 cm

(c) 60m

(d) 9m

Solution:

Length = 15m

Breadth = x

Area of rectangle = 180 sq.m

Length $\times$ Breadth = 180 sq. m

$$\text{Breadth} = \frac{180}{15} = 12\text{m (a)}$$

Question 7.

If the length and the breadth of a rectangle are doubled, then its perimeter

- (a) remains the same
- (b) doubles
- (c) becomes four times
- (d) becomes half

Solution:

Let the length of rectangle = l

Let the breadth of rectangle = b

$$\text{Perimeter} = 2(l + b)$$

If length and breadth are doubled then

$$\text{Length} = 2l$$

$$\text{Breadth} = 2b$$

$$\text{Perimeter} = 2(2l + 2b) = 2 \times 2(l + b)$$

Hence perimeter becomes doubles . (b)

Question 8.

If the length and the breadth of a rectangular are doubled then its area

- (a) remains same
- (b) becomes half
- (c) doubles
- (d) becomes four times.

Solution:

If length = x

and breadth = y

Then area of rectangle = $x \times y = xy$

And if length and breadth are doubled

i.e. length = $2x$ and breadth = $2y$

Then area of rectangle becomes = $2x \times 2y = 4xy$

Hence, it shows that the area of rectangle becomes four times. (d)

Question 9.

If the sides of a square are halved, then its area

- (a) remains same
- (b) becomes half
- (c) becomes one-fourth
- (d) doubles

Solution:

Let us assume side of a square = x cm

$$\therefore \text{Area} = (x)^2 = x^2 \text{ cm}^2$$

and if we half the side

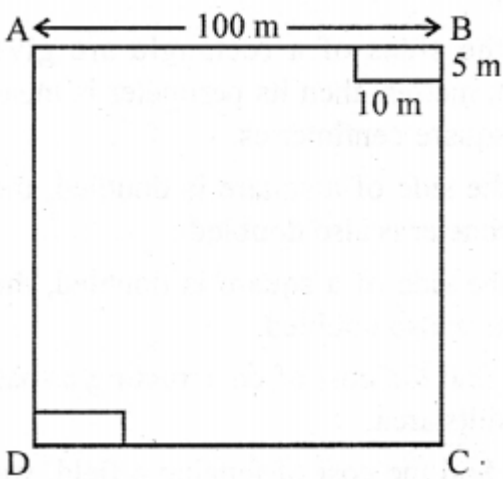
$$\therefore \text{New side of a square} = \frac{x}{2} \text{ cm}$$

$$\therefore \text{Area} = \frac{x^2}{4} \text{ cm}^2$$

Hence, it shows if side of square are halved,
then its area become one-fourth. (c)

Question 10.

A square-shaped park. ABCD of side 100m has two equal flower beds of size $10\text{m} \times 5\text{m}$ as show in the given figure. The perimeter of the remaining park is



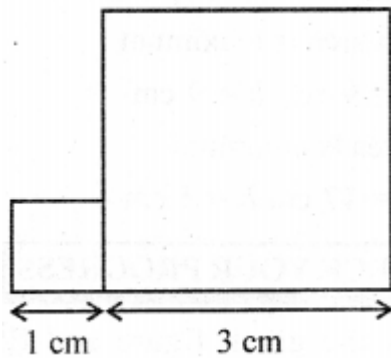
- (a) 340 m
- (b) 370 m
- (c) 400 m
- (d) 430 m

Solution:

$$\begin{aligned}\text{Perimeter of square} &= 4 \times \text{Side} \\ &= 4 \times \text{Side} \\ &= 4 \times 100\text{m} \\ &= 400\text{m (c)}\end{aligned}$$

Question 11.

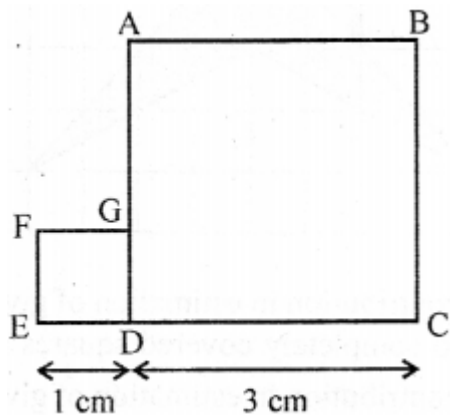
In the given figure, a square of side 1 cm is joined to a square of side 3 cm. The perimeter of the new figure is



- (a) 13 cm
- (b) 14 cm
- (c) 15 cm
- (d) 16 cm

Solution :

The given figure is



$$\text{Perimeter} = AB + BC + CD + DE + EF + FG + GA$$

As we know all the sides of square are equal

$$\therefore AB = BC = CD = DA = 3\text{cm}$$

Also, $ED = DG = GF = FE = 1 \text{ cm}$

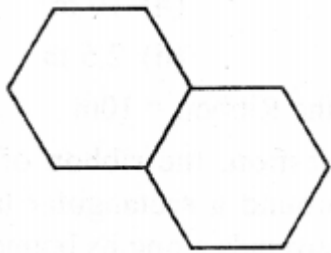
But in perimeter we need AG

$$AG = AD - GD = 3\text{cm} - 1\text{cm} = 2\text{cm}$$

$$\text{Hence perimeter} = (3 + 3 + 3 + 1 + 1 + 1 + 2)\text{cm} = 14 \text{ cm(b)}$$

Question 12.

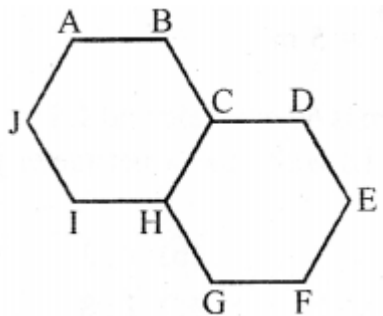
Two regular hexagons of perimeter 300 cm each are joined as shown in the given figure. The perimeter of the new figure is



- (a) 65 cm
- (b) 60 cm
- (c) 55 cm
- (d) 50 cm

Solution:

As per given figure,



Perimeter = 30 cm

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

Hence, remaining perimeter

$$= AB + BC + CD + DE + EF + FG + GH + HI + IJ + JA$$

$$= (5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5) \text{ cm}$$

$$= 50 \text{ cm (d)}$$

Question 13.

If the area of a square is numerically equal to its perimeter, then the length of each side is

- (a) 1 unit
- (b) 2 units
- (c) 3 units
- (d) 4 units

Solution:

Let the side of the square be s

$$\therefore \text{Area} = (\text{side})^2 = s^2$$

$$\text{And perimeter} = 4 \times \text{length of the side} = 4s$$

But, we have, area = perimeter

$$\therefore s^2 = 4s$$

$$\Rightarrow s = 4$$

$\therefore$ The length of each side is 4 units (d).

Question 14.

If a ribbon of length 10m is stitched around a rectangular table cloth making 2 rounds along its boundary, then the perimeter of the table cloth is

- (a) 20m
- (b) 10m
- (c) 5m
- (d) 2.5 m

Solution:

Length of the Ribbon = 10m

As per the question,

the ribbon of length is stitched around a rectangular table

∴ Perimeter of the table cloth

$$= \frac{\text{length of the ribbon}}{2}$$

$$= \frac{10}{2} = 5\text{m} \quad \text{..(c)}$$

Question 15.

A picture is 60 cm wide and 1.8m long. The ratio of its width to its perimeter in lowest form is

- (a) 1 : 2
- (b) 1 : 3
- (c) 1 : 6
- (d) 1 : 8

Solution :

Width of picture = 60 cm

Length = 1.8m = 180cm

Perimeter = $2(l + b) = 2(60 + 180)$

= 2 (240)

= 480 cm

Ratio = $\frac{60}{480} = \frac{1}{8} = 1 : 8$ (d)

Higher Order Thinking Skills (HOTS)**Question 1.**

How many envelopes of size 25cm × 15 cm can be made from a rectangular sheet of size 4m × 1.2m ?

Solution:

size of envelope = 25 cm × 15 cm

Area of envelope = $25 \times 15 \text{ cm}^2 = 375 \text{ cm}^2$

size of rectangular sheet = 4m × 1.2 m

Area of rectangular sheet = 400 cm × 120 cm

= 48000 cm^2

No. of envelopes = $\frac{\text{Area of rectangle}}{\text{Area of envelope}}$

$$= \frac{48000}{375}$$

= 128 envelopes

Question 2.

The perimeter of a rectangle is 36cm. What will be length and breadth (in natural number) of that rectangle whose area is

(i) maximum ?

(ii) minimum ?

Solution:

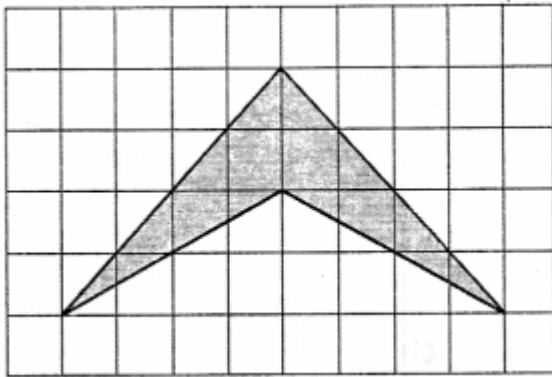
(i) When area is maximum Then, $l = 9\text{cm}$, $b = 9\text{cm}$

(ii) When area is minimum Then, $l = 17\text{cm}$ $b = 1\text{ cm}$

Check Your Progress

Question 1.

Look at the given figure and fill in the following blanks:



- (i) The contribution in estimation of given area due to completely covered squares is
- (ii) The contribution in estimation of given area due to more than half covered squares is
- (iii) The contribution in estimation of given area due to exactly half covered square, is
- (iv) The contribution in estimation of given area due to less than half covered squares is
- (v) The total estimated area is

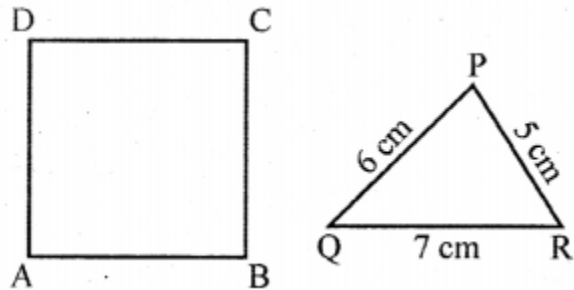
Solution:

- (i) The contribution in estimation of given area due to completely covered squares is 2 sq. units
- (ii) The contribution in estimation of given area due to more than half covered squares is 2 sq. units.
- (iii) The contribution in estimation of given area due to exactly half covered square is 3 sq. units.

- (iv) The contribution in estimation of given area due to less than half covered squares is 0 sq. units.
- (v) The total estimated area is 7 sq. units.

Question 2.

The perimeter of a square ABCD is twice the perimeter of $\triangle PQR$. Find the area of the square ABCD.



Solution :

$$\text{Perimeter of } \triangle PQR = 6\text{cm} + 5\text{cm} + 7\text{cm} = 18\text{ cm}$$

$$\text{Perimeter of square} = 2 \times 18 = 36\text{cm}$$

$$\text{Side of square} = ?$$

$$4 \times \text{side} = 36$$

$$\Rightarrow \text{Side} = \frac{36}{4} = 9$$

$$\text{Area of square} = (\text{Side})^2 = (9)^2 = 81\text{cm}^2$$

Question 3.

A wire is in the shape of a square of side 10cm. If the wire is rebent into a rectangle of length 12 cm, find its breadth. Which encloses more area, the square or the rectangle and by how much ?

Solution:

Side of square = 10cm

Perimeter of square = $4 \times 10\text{cm} = 40\text{cm}$

According to question,

Perimeter of rectangular = $2(l + b)$

$$\Rightarrow 40\text{ cm} = 2(12\text{ cm} + b)$$

$$\Rightarrow 40\text{ cm} = 24\text{cm} + 2b$$

$$\Rightarrow 2b = 40\text{ cm} - 24\text{cm}$$

$$\Rightarrow 2b = 16\text{ cm}$$

$$\Rightarrow b = \frac{16}{2}$$

$$\Rightarrow b = 8\text{ cm}$$

$$\text{Area of square} = (a)^2 = (10\text{ cm})^2 = 100\text{cm}^2$$

$$\text{Area of rectangular} = (l \times b) = 12 \times 8 = 96\text{cm}^2$$

$$\text{Area of square is more and it is} = 100\text{cm}^2 - 96\text{ cm}^2 = 4\text{cm}^2$$

Question 4.

A rectangular room is 9m long and 6m wide. Find the cost of covering the floor with carpet 2m wide at ₹35 per metre.

Solution:

Length of room = 9m

Width of room = 6m

Area of room = $l \times b = 9 \times 6 = 54m^2$

Width of carpet = 2m

Area of carpet = $54m^2$

Length = ?

Length of carpet = $\frac{54}{2} = 27m$

Cost of covering = ₹35 × 27 m = ₹945

Question 5.

If the cost of fencing a square plot at the rate of ₹2.50 per metre is ₹200, then find the length of each side of the field.

Solution:

Total cost of fencing a square plot = ₹200

Rate of fencing = ₹2.50

∴ Perimeter of square = $\frac{\text{Total cost}}{\text{Rate}} = \frac{200}{2.50} = 80m$

Since, we know that,

Perimeter of square = $4a$

$$\Rightarrow 80\text{m} = 4a$$

$$\Rightarrow a = 20\text{m}$$

$\therefore$ Length of a square plot = 20 m

Question 6.

If the cost of fencing a rectangular park at the rate of ₹7.50 per metre is ₹600 and the length of the park is 24m, find the breadth of the park.

Solution:

Cost of fencing a rectangular park = ₹600

Rate of fencing = ₹7.50

$$\text{Perimeter of a park} = \frac{\text{Total cost}}{\text{Rate}} = \frac{600}{7.5} = 80\text{m}$$

Length of the park = 24cm

Let breadth of the park = b

$\therefore$ Perimeter of a square = 80m

$$\Rightarrow 2(l + b) = 80\text{m}$$

$$\Rightarrow 2(24 + b) = 80\text{ m}$$

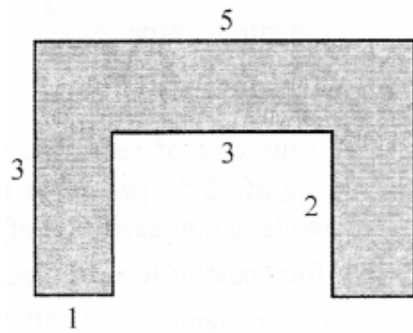
$$\Rightarrow 24 + b = 80\text{m}$$

$$\Rightarrow b = 80 - 24\text{m}$$

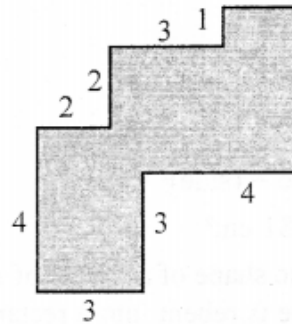
$$\therefore b = 16\text{m}$$

Question 7.

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



(i)



(ii)

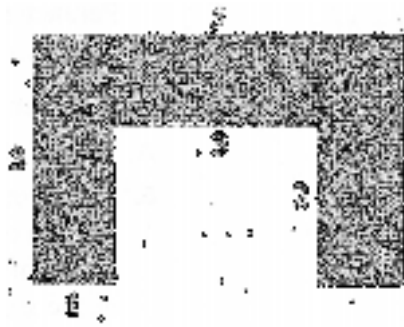
Solution:

(a) Area of the figure,

$$= (3 \times 1 + 3 \times 1 + 3 \times 1) \text{ sq m}$$

$$= (3 + 3 + 3) \text{ sq m}$$

$$= 9 \text{ sq m}$$



(b) Area of the figure,

$$= (3 \times 3 + 1 \times 2 + 3 \times 3 + 4 \times 2) \text{ sq cm}$$

$$= (9 + 2 + 9 + 8) \text{ sq cm}$$

$$= 28 \text{ sq cm}$$

