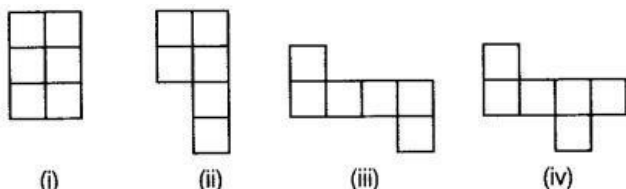


Unit 6 (Mensuration)

Multiple Choice Questions (MGQs)

Question 1:

Following figures are formed by joining six unit squares. Which figure has the smallest perimeter in figures?



- (a) (ii) (b) (iii) (c) (iv) (d) (v)

Solution:

(i) Let the square $\square = 1$ unit

$$\begin{aligned} \text{Then, perimeter} &= \text{Sum of all sides} \\ &= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 \\ &= 10 \text{ units} \end{aligned}$$

(ii) Perimeter = Sum of all sides

$$\begin{aligned} &= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 \\ &= 12 \text{ units} \end{aligned}$$

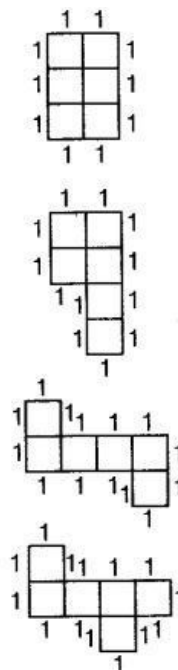
(iii) Perimeter = Sum of all sides

$$\begin{aligned} &= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 \\ &= 14 \text{ units} \end{aligned}$$

(iv) Perimeter = Sum of all sides

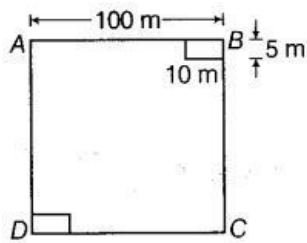
$$\begin{aligned} &= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 \\ &= 14 \text{ units} \end{aligned}$$

Hence, smallest perimeter = 10 units
which is the perimeter of figure (i).



Question 2:

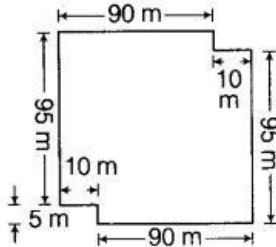
A square shaped park ABCD of side 100 m has two equal rectangular flower beds each of size 10 m x 5 m (see the figure). Length of the boundary of the remaining park is



- (a) 360 m (b) 400 m (c) 340 m (d) 460 m

Solution:

(b) In order to find the length of the boundary of the remaining park, we add two flower beds each of length 10 m and breadth 5 m, then remaining park is shown below



Now, length of the boundary of the remaining park = Perimeter of remaining park
 $= (90 + 5 + 10 + 95 + 90 + 5 + 10 + 95) \text{ m} = 400 \text{ m}$

Question 3:

The side of a square is 10 cm. How many times will the new perimeter become, if the side of the square is doubled?

- (a) 2 times (b) 4 times (c) 6 times (d) 8 times

Solution:

(a) Given, side of a square = 10 cm

We know that, perimeter of a square = $4 \times \text{Side} = 4 \times 10$

$= 40 \text{ cm}$

\therefore Perimeter of old square = 40 cm

Now, according to the question, side of the square is doubled.

New side $= 2 \times 10 = 20 \text{ cm}$

Again, perimeter of new square = $4 \times \text{Side}$

$= 4 \times 20 = 80 \text{ cm}$

\therefore New perimeter

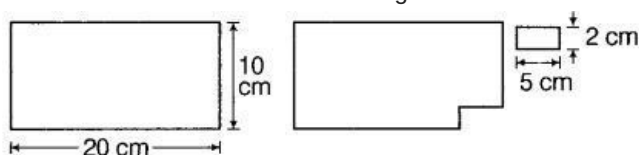
$= 2 \times (\text{Old perimeter})$

$= 2 \times 40 = 80 \text{ cm}$

Hence, the new perimeter is 2 times of the old perimeter.

Question 4:

Length and breadth of a rectangular sheet of a paper are 20 cm and 10 cm, respectively. A rectangular piece is cut from the sheet as shown in the given figure. Which of the following statements is correct for the remaining sheet?

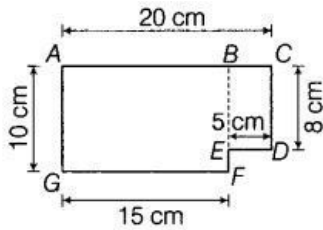


- (a) Perimeter remains the same but area changes
 (b) Area remains the same but perimeter changes
 (c) Both area and perimeter are changing
 (d) Both area and perimeter remain the same

Solution:

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

$$\begin{aligned}
 &= 2 \times (20 + 10) \\
 &= 2 \times 30 = 60 \text{ cm} \\
 \therefore \text{A} \times \text{Breadth} \\
 &= 200 \text{ cm}^2
 \end{aligned}$$



Now, perimeter of rectangular sheet after cutting the rectangular piece = Sum of all sides = $20 + 8 + 5 + 2 + 15 + 10 = 60 \text{ cm}$

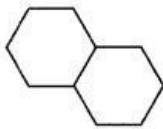
Area = Area of rectangle ABFG + Area of rectangle BCDE = (Length \times Breadth) + (Length \times Breadth)

$$\begin{aligned}
 &= (15 \times 10) + (5 \times 8) \\
 &= 150 + 40 = 190 \text{ sq cm}
 \end{aligned}$$

Hence, perimeter remains the same but area changes after cutting the piece.

Question 5:

Two regular hexagons of perimeter 30 cm each are joined as shown in the given figure. The perimeter of the new figure is



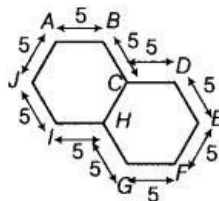
- (a) 65 cm (b) 60 cm
(c) 55 cm (d) 50 cm

Solution:

Given, perimeter of hexagon = 30 cm

and number of sides in hexagon = 6

$$\begin{aligned}
 \therefore \text{Length of one side} &= \frac{\text{Perimeter of hexagon}}{\text{Total number of sides}} \\
 &= \frac{30}{6} \\
 &= 5 \text{ cm}
 \end{aligned}$$

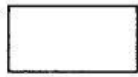


Now, two hexagons are joined then perimeter = Sum of all sides

$$\begin{aligned}
 &= AB + BC + CD + DE + EF + FG + GH + HI + IJ + JA \\
 &= 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 \\
 &= 50 \text{ cm}
 \end{aligned}$$

Question 6:

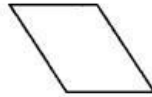
In the given figure, which of the following is a regular polygon? All have equal side except (i).



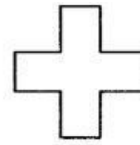
(i)



(ii)



(iii)



(iv)

(a) (i)

(c) (iii)

(b) (ii)

(d) (iv)

Solution:

(b) In regular polygon, all sides and angles are equal.

According to the question,

In figure (i), all sides are not equal.

So, it is not a regular polygon.

In figure (ii), it is a square and in square all sides are equal and all angles are of 90° .

So, it is a regular polygon.

In figure (iii), it is a parallelogram and in parallelogram opposite sides are equal and opposite angles are equal.

So, it is not a regular polygon.

In figure (iv), all sides are not equal. So, it is not a regular polygon.

Question 7:

Match the shapes (each side measures 2 cm) in Column I with the corresponding perimeters in Column II.

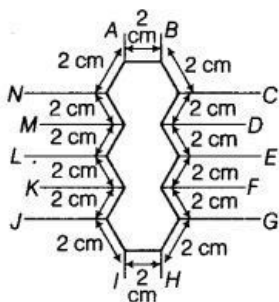
| | Column I | Column II |
|----|----------|-------------|
| A. | | (i) 16 cm |
| B. | | (ii) 20 cm |
| C. | | (iii) 24 cm |
| D. | | (iv) 28 cm |
| | | (v) 32 cm |

Solution:

A. (iv) Perimeter of figure = Sum of all sides

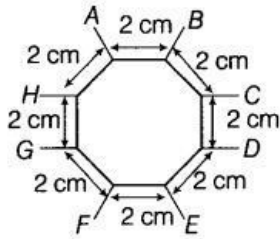
= $AB + BC + CD + DE + EF + FG + GH + HI + IJ + JK + KL + LM + MN + NA$

= $2+2+2+2+2+2+2+2+2+2+2+2+2+2 = 28 \text{ cm}$



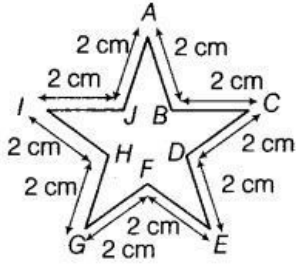
B. (i) Perimeter of figure = Sum of all sides

$$= AB + BC + CD + DE + EF + FG + GH + HA = 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16 \text{ cm}$$



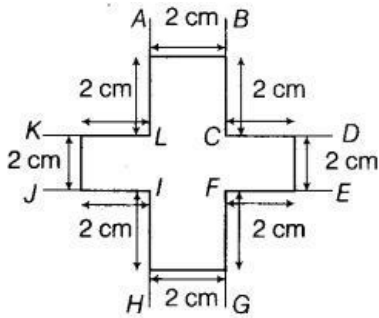
C. (ii) Perimeter of figure = Sum of all sides

$$= AB + BC + CD + DE + EF + FG + GH + HI + IJ + JA = 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 20 \text{ cm}$$



D. (iii) Perimeter of figure = Sum of all sides

$$= AB + BC + CD + DE + EF + FG + GH + HI + IJ + JK + KL + LA = 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 24 \text{ cm}$$



Question 8:

Match the following:

| Shapes | | Perimeter | |
|--------|--------------------------|-----------|----|
| A. | Rectangle | (i) | 10 |
| B. | Square | (ii) | 18 |
| C. | Equilateral triangle | (iii) | 20 |
| D. | Isosceles triangle | (iv) | 25 |

Solution:

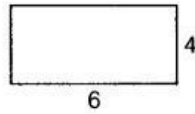
A. (iii) We know that,

Perimeter of a rectangle

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

Here, length = 6 and breadth = 4

$$\therefore \text{Perimeter of a rectangle} = 2 \times (6 + 4) = 2 \times 10 = 20$$



B. (iii) Here, side = 5

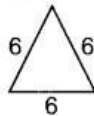
$$\therefore \text{Perimeter of a square} = 4 \times \text{Side} = 4 \times 5 = 20$$



[\because in square all sides are equal]

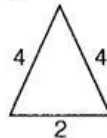
C. (ii) Here, side = 6

$$\therefore \text{Perimeter of an equilateral triangle} = 3 \times \text{Length of a side} = 3 \times 6 = 18$$



D. (i) Given sides are 4, 4 and 2.

$$\therefore \text{Perimeter of an isosceles triangle} = \text{Sum of all sides} = 4 + 4 + 2 = 10$$

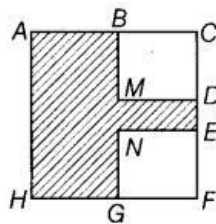


Fill in the Blanks

In questions 9 to 13, fill in the blanks to make the statements true.

Question 9:

Perimeter of the shaded portion in the given figure is



$$AB + _ + _ + _ + _ + _ + _ + HA$$

Solution:

Perimeter of the shaded portion = Sum of all sides

$$= AB + BM + MD + DE + EN + NG + GH + HA$$

Question 10:

The amount of region enclosed by a plane closed figure is called its _____.

Solution:

The region enclosed by a plane closed figure is called its area.

Question 11:

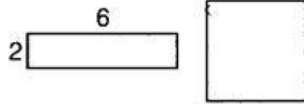
Area of a rectangle with length 5 cm and breadth 3 cm is _____.

Solution:

$$\text{Area} = \text{Length} \times \text{Breadth} = 5 \times 3 = 15 \text{ sq cm}$$

Question 12:

A rectangle and a square have the same perimeter (see the figure)



(a) The area of the rectangle is

(b) The area of the square is

Solution:

(a) Given, length of rectangle = 6 units
and breadth of rectangle = 2 units

∴ Area of a rectangle = Length × Breadth = $6 \times 2 = 12$ sq units

(b) According to question,

Perimeter of square = Perimeter of rectangle

$$\Rightarrow 4 \times \text{Side} = 2 \times (\text{Length} + \text{Breadth})$$

$$\Rightarrow 4 \times \text{Side} = 2 \times (6 + 2)$$

$$\Rightarrow 4 \times \text{Side} = 2 \times 8$$

$$\Rightarrow 4 \times \text{Side} = 16$$

$$\Rightarrow \frac{4 \times \text{Side}}{4} = \frac{16}{4}$$

[dividing both sides by 4]

$$\therefore \text{Side} = 4 \text{ units}$$

Now, area of square = Side × Side = $4 \times 4 = 16$ sq units

Question 13:

(a) 1 m = cm

(b) 1 sq cm = cm × 1 cm

(c) 1 sq m = 1 m × 1 m 100 cm × cm

(d) 1 sq m = sq cm

Solution:

(a) 1 m = 100 cm

(b) 1 sq cm = 1 cm × 1 cm

(c) 1 sq m = 1 m × 1 m and 1 sq m = 100 cm × 100 cm

(d) 1 sq m = 100 × 100 = 10000 sq cm

True/False

In questions 14 to 20, state whether the given statements are True or False.

Question 14:

If length of a rectangle is halved and breadth is doubled, then the area of the rectangle obtained remains same.

Solution:

True

$$\text{New area} = \left(\frac{l}{2}\right) \times 2b = l \times b = \text{Old area}$$

Question 15:

Area of a square is doubled, if the side of the square is doubled,

Solution:

False

Area becomes four times.

Question 16:

Perimeter of a regular octagon of side 6 cm is 36 cm.

Solution:

False

Perimeter of the regular octagon = $8 \times \text{Side of the octagon} = 8 \times 6 = 48 \text{ cm}$

Question 17:

A farmer who wants to fence his field, must find the perimeter of the field.

Solution:

True

Since, perimeter is the measure of the boundary.

Question 18:

An engineer who plans to build a compound wall on all the sides of a house must find the area of the compound.

Solution:

False

He must find the perimeter of the compound.

Question 19:

To find the cost of painting a wall we need to find the perimeter of the wall.

Solution:

False

To find the cost of painting a wall we need to find the area of the wall.

Question 20:

To find the cost of a frame of a picture, we need to find the perimeter of the picture.

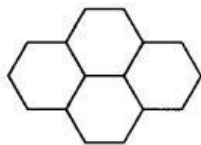
Solution:

True

Length of frame = Perimeter

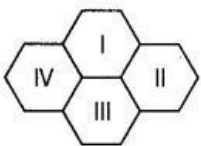
Question 21:

Four regular hexagons are drawn so as to form the design as shown in the given figure. If the perimeter of the design is 28 cm, find the length of each side of the hexagon.



Solution:

Given, four regular hexagons as shown below



Perimeter of the given design = Sum of all outer sides of the four hexagon Here, this figure has 14 outer equal sides.

Perimeter of the design = $14 \times \text{Length of one side of hexagon} \Rightarrow 28 = 14 \times \text{Length of one side of hexagon}$

Length of one side of hexagon = $28/14 = 2 \text{ cm}$

Hence, the length of each side of the hexagon is 2 cm.

Question 22:

Perimeter of an isosceles triangle is 50 cm. If one of the two equal sides is 18 cm, find the third side.

Solution:

Given, perimeter = 50 cm

Perimeter of an isosceles triangle = Sum of its all sides \Rightarrow Perimeter = $a + b + c \Rightarrow 50$

$= 18 + 18 + \text{Third side}$

$\Rightarrow 50 - 36 = \text{Third side}$

Third side = 14 cm

Question 23:

Length of a rectangle is three times its breadth. Perimeter of the rectangle is 40 cm. Find its length and width.

Solution:

Let width of rectangle (b) = x cm Then, length of rectangle (l) = $3x$ cm.

As we know, Perimeter of rectangle = $2(l + b)$

$\Rightarrow 40 = 2(3x + x)$

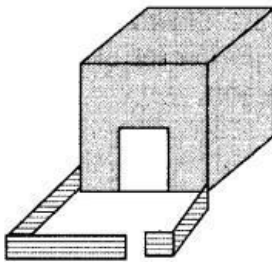
$\Rightarrow 8x = 40$

$\Rightarrow x = 40/8 = 5$ cm

Hence, the length is 15 cm and the width is 5 cm.

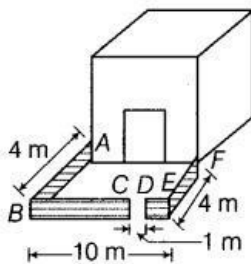
Question 24:

There is a rectangular lawn 10 m long and 4 m wide in front of Meena's house (see the figure). It is fenced along the two smaller sides and one longer side leaving a gap of 1 m for the entrance. Find the length of fencing.



Solution:

Given, width of the lawn, $AB = EF = 4$ m and length of the lawn, $BE = 10$ m



Also, given length of gap, $CD = 1$ m

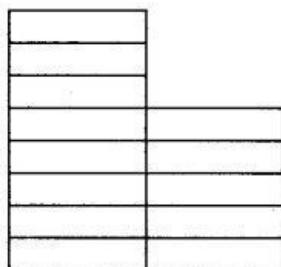
Total length of fencing = $AB + (BC + DE) + EF = AB + (BE - CD) + EF = 4 \text{ m} + (10 - 1) \text{ m} + 4 \text{ m} = (4 + 9 + 4) \text{ m} = 17 \text{ m}$ Hence, the length of fencing of the lawn is 17 m.

Question 25:

The region given in the following figure is measured by taking



as a unit. What is the area of the region?



Solution:

Given, $\square = 1 \text{ unit}$
 and total region = 13
 \therefore Area of region = $13 \times \square$
 $= 13 \times 1$
 $= 13 \text{ sq units}$

Question 26:

Tahir measured the distance around a square field as 200 rods (lathi). Later he found that the length of this rod was 140 cm. Find the side of this field in metre.

Solution:

Given, total distance around a square field = 200 rods
 and 1 rod = 140 cm
 Total distance around a square field = Perimeter of square field
 $\Rightarrow 200 = 4 \times \text{Side}$
 $\Rightarrow \frac{200}{4} = \frac{4 \times \text{Side}}{4}$ [dividing both sides by 4]
 $\Rightarrow \text{Side} = 50 \text{ rods}$
 $\therefore 1 \text{ rod} = 140 \text{ cm}$
 $\therefore 50 \text{ rods} = 50 \times 140 = 7000 \text{ cm}$
 $= \frac{7000}{100} \text{ m}$ [$\therefore 1 \text{ m} = 100 \text{ cm}$]
 $= 70 \text{ m}$

Hence, the side of the field is 70 m.

Question 27:

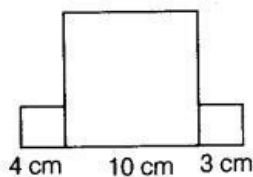
The length of a rectangular field is twice its breadth. Jamal jogged around it four times and covered a distance of 6 km. What is the length of the field?

Solution:

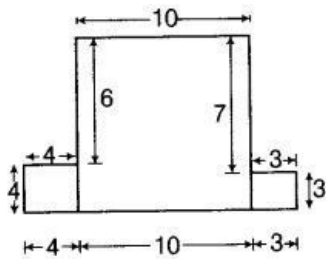
Let breadth of rectangular field = $x \text{ m}$
 Then, length of rectangular field = $2x \text{ m}$
 \therefore Distance covered in one round = Perimeter
 \therefore Distance covered in four rounds = $4 \times \text{Perimeter}$
 $\Rightarrow 4 \times 2(l + b) = 6 \text{ km}$ [$\therefore \text{perimeter} = 2(\text{length} + \text{breadth})$]
 $\Rightarrow 8 \times (l + b) = 6000 \text{ m}$ [$\therefore 1 \text{ km} = 1000 \text{ m}$]
 $\Rightarrow 8(2x + x) = 6000 \text{ m} \Rightarrow 8 \times 3x = 6000 \text{ m}$
 $\Rightarrow 24x = 6000 \text{ m}$
 $\Rightarrow \frac{24x}{24} = \frac{6000}{24}$ [dividing both sides by 24]
 $\Rightarrow x = 250 \text{ m}$
 \therefore Length of the field = $2x = 2 \times 250 = 500 \text{ m}$

Question 28:

Three squares are joined together as shown in the given figure. Their sides are 4 cm, 10 cm and 3 cm. Find the perimeter of the figure.

**Solution:**

Given sides of three squares are 4 cm, 10 cm and 3 cm, respectively.

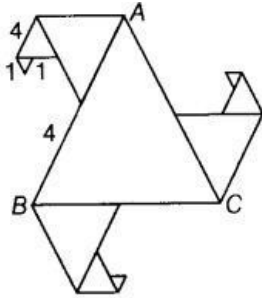


Total perimeter of given squares

= Sum of all outer sides of the figure = $4+4+4+6+10+7+3+3+3+10= 54$ cm

Question 29:

In the given figure, all triangles are equilateral and $AB = 8$ units. Other triangles have been formed by taking the mid-points of the sides. What is the perimeter of the figure?



Solution:

Firstly, find the all outer sides of the given triangles and then find the perimeter by using sum of all sides of the triangles.

Given, $\triangle ABC$ is an equilateral triangle.

Here, $AB = 8$ units

$\therefore AB = BC = CA = 8$ units Thus, $\triangle ADE$ is an equilateral triangle.

Here, E is the mid-point of AB .

$\therefore AE = BE = AB/2 = 8/2 = 4$ units

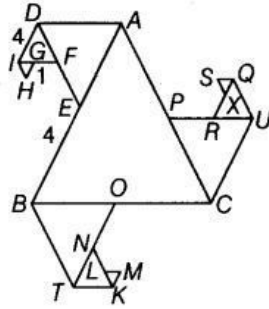
Now, in $\triangle ADE$,

$AD = DE = EA = 4$ units

Similarly, equilateral triangles are $\triangle BOT$ and $\triangle UPC$, having each sides equal, i.e.

$BO = OT = BT = UC = PC = PU = 4$ units It is also clear that, $OC = PA = 4$ units Also, $\triangle ADIF$ is an equilateral triangle.

Here, F is the mid-point of DE .



$$\therefore DF = FE = \frac{DE}{2} = \frac{4}{2} = 2 \text{ units}$$

In $\triangle DIF$, $DI = IF = DF = 2$ units

Similarly, in $\triangle TKN$ and $\triangle RQU$,

$$TK = KN = TN = RQ = UQ = UR = 2 \text{ units}$$

It is also clear that, $NC = RP = 2$ units

Also, $\triangle HIG$ is an equilateral triangle.

Here, G is the mid-point of IF .

$$\therefore IG = GF = \frac{IF}{2} = \frac{2}{2} = 1 \text{ unit}$$

Now, in $\triangle HIG$, $HG = HI = GI = 1$ unit

Similarly, in $\triangle MLK$ and $\triangle XQS$,

$$ML = MK = LK = SQ = XS = QX = 1 \text{ unit}$$

It is also clear that, $LN = XR = 1$ unit

Now, perimeter of the given figure

= Sum of all outer sides of the given figure

$$= AD + DI + IH + HG + GF + FE + EB + BT + TK + KM + LM + LN + NO$$

$$+ OC + CU + UQ + QS + XS + XR + PR + PA$$

$$= [4 + 2 + 1 + 1 + 1 + 2 + 4 + 4 + 2 + 1 + 1 + 1 + 2 + 4 + 4 + 2 + 1 + 1 + 1 + 2 + 4] \text{ cm}$$

$$= 45 \text{ cm}$$

Hence, the perimeter of the given figure is 45 cm.

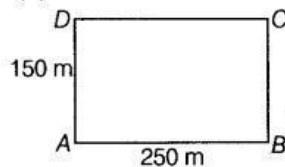
Question 30:

Length of a rectangular field is 250 m and width is 150 m. Anuradha runs around this field 3 times. How far did she run? How many times she should run around the field to cover a distance of 4 km?

Solution:

Given, length of rectangular field (l) = 250 m

and width of rectangular field (b) = 150 m



$$\text{Perimeter of the field} = 2(l + b) = 2(250 + 150) \text{ m} = 2 \times 400 \text{ m} = 800 \text{ m}$$

$$\therefore \text{Distance covered in one round} = \text{Perimeter} = 800 \text{ m}$$

$$\therefore \text{Distance covered in three rounds} = 3 \times 800 = 2400 \text{ m}$$

$$\text{Now, number of rounds to cover 4 km, i.e. } 4000 \text{ m} = \frac{4000}{800} = 5 \quad [\because 1 \text{ km} = 1000 \text{ m}]$$

Hence, she should run 5 times around the field to cover the distance of 4 km.

Question 31:

Bajinder runs ten times around a square track and covers 4 km. Find the length of the track.

Solution:

Given, total length of track covered by Bajinder = 4 km = 4000 m [$\because 1 \text{ km} = 1000 \text{ m}$]

$$\therefore \text{Length of track covered in 10 rounds} = 4000 \text{ m}$$

$$\text{Length of track covered in 1 round} = 4000/10 = 400 \text{ m}$$

Hence, the length of the track is 400 m.

Question 32:

The lawn in front of Molly's house is 12 m x 8 m. Whereas the lawn in front of Dolly's house is 15 m x 5 m. A bamboo fencing is built around both the lawns. How much fencing is required for both?

Solution:

In order to find the total length of fencing around both the gardens, we will calculate the perimeter of both the gardens and then add them.

Given, size of lawn in front of Molly's house = 12 m x 8 m Perimeter = $2(\text{Length} + \text{Breadth})$
 $= 2(12 + 8)\text{m} = 40\text{m} \dots(i)$

Now, size of lawn in front of Dolly's house = 15 m x 5 m Perimeter = $2(15 + 5)\text{m} = 40\text{m} \dots$
(ii)

From Eqs. (i) and (ii), we get total length = $40 + 40 = 80\text{m}$ Hence, total length of bamboo fencing is 80 m.

Question 33:

The perimeter of a regular pentagon is 1540 cm. How long is its each side?

Solution:

Given that, perimeter of regular pentagon = 1540 cm

\therefore Perimeter of regular pentagon = $5 \times \text{Length of its side}$

[\because pentagon has 5 sides of equal length]

$\Rightarrow 5 \times \text{Length of side} = 1540$

1540

Length of side = $\frac{1540}{5} = 308\text{ cm}$

5

Hence, the length of each side is 308 cm.

Question 34:

The perimeter of a triangle is 28 cm. One of its sides is 8 cm. Write all the sides of the possible isosceles triangles with these measurements.

Solution:

Given, perimeter of triangle = 28 cm and one side = 8 cm

Let other sides be a and b. [\because in isosceles triangle, two sides are equal]

Then, $a = b$

According to the question,

Perimeter of triangle = Sum of its all sides

[transposing 8 to LHS] [dividing both sides by 2]

Hence, sides are 8 cm, 10 cm and 10 cm.

Again, let two equal sides be 8 cm and 8 cm

and third side = a

Now, according to the question,

Perimeter of triangle = Sum of its all sides $\Rightarrow 28 = 8 + 8 + a$

$\Rightarrow 28 = 16 + a$

$\Rightarrow 28 - 16 = a$ [transposing 16 to LHS]

$\Rightarrow 12 = a$

Hence, sides are 8 cm, 8 cm and 12 cm.

Question 35:

The length of an aluminium strip is 40 cm. If the lengths in cm are measured in natural numbers, write the measurement of all the possible rectangular frames which can be made out of it. (e.g. a rectangular frame with 15 cm length and 5 cm breadth can be made from this

strip.)

Solution:

Given, length of an aluminium strip = 40 cm

If this aluminium strip is used to make rectangular frame, then

Perimeter of rectangular frame = 40 cm

$$\Rightarrow 2(x + y) = 40 \text{ cm} \quad [\text{assuming } x \text{ and } y \text{ as the length and breadth of rectangular frame, respectively}]$$

$$\Rightarrow \frac{2(x + y)}{2} = \frac{40}{2} \quad [\text{dividing both sides by 2}]$$

$$\Rightarrow x + y = 20 \text{ cm}$$

Now, if the value of both length and breadth are natural numbers, then possible dimensions are as follows

Dimensions (in cm): $1 \times 19, 2 \times 18, 3 \times 17, 4 \times 16, 5 \times 15, 6 \times 14, 7 \times 13, 8 \times 12, 9 \times 11, 10 \times 10$

Question 36:

Base of a tent is a regular hexagon of perimeter 60 cm. What is the length of each side of the base?

Solution:

Given, perimeter of hexagon = 60 cm

and total sides in hexagon = 6

$$\text{Now, length of each side} = \frac{\text{Perimeter of hexagon}}{\text{Total number of sides}} = \frac{60}{6} = 10 \text{ cm}$$

Question 37:

In an exhibition hall, there are 24 display boards each of length 1 m 50 cm and breadth 1 m. There is a 100 m long aluminium strip, which is used to frame these boards. How many boards will be framed using this strip? Find also the length of the aluminium strip required for the remaining boards.

Solution:

Given, total display boards = 24

$$\begin{aligned} \text{Length of one display boards} &= 1 \text{ m} + 50 \text{ cm} = 1 \text{ m} + \frac{50}{100} \text{ m} && [\because 1 \text{ m} = 100 \text{ cm}] \\ &= (1 + 0.5) \text{ m} \\ &= 1.5 \text{ m} \end{aligned}$$

Breadth of one display board = 1 m

$$\begin{aligned} \therefore \text{Perimeter of one display board} &= 2 \times (\text{Length} + \text{Breadth}) \\ &= 2 \times (1.5 + 1) \text{ m} = 2 \times 2.5 \text{ m} \\ &= 5 \text{ m} \end{aligned}$$

Length of strip = 100 m

$$\begin{aligned} \text{Now, number of boards will be framed} &= \frac{\text{Length of strip}}{\text{Perimeter of one board}} && [\text{given}] \\ &= \frac{100}{5} = 20 \end{aligned}$$

This means that out of 24 only 20 boards will be framed.

Number of boards left unframed = $24 - 20 = 4$

$$\begin{aligned} \therefore \text{Length of the strip required for remaining boards} &= 4 \times \text{Perimeter of one board} \\ &= 4 \times 2(1.5 + 1) = 4 \times 2 \times 2.5 \\ &= 20 \text{ m} \end{aligned}$$

Question 38:

In the above question, how many square metres of cloth is required to cover all the display boards? What will be the length in metre of the cloth used, if its breadth is 120 cm?

Solution:

Given, total display boards = 24

Length of display board = $1\text{ m} + 50\text{ cm}$

$$= 1\text{ m} + \frac{50}{100}\text{ m} = 1\text{ m} + \frac{1}{2}\text{ m}$$

[$\because 1\text{ m} = 100\text{ cm}$]

$$= \left(\frac{2+1}{2}\right)\text{ m}$$

$$= \frac{3}{2}\text{ m}$$

Breadth of display board = 1 m

Now, area of one display board = Length \times Breadth

$$= 1 \times \frac{3}{2} = \frac{3}{2}\text{ sq m}$$

$$\therefore \text{Area of 24 display boards} = 24 \times \text{Area of one board} = 24 \times \frac{3}{2}$$

$$= 36\text{ sq m}$$

Hence, 36 sq m cloth is required to cover all the display boards.

Now, breadth = 120 cm

[given]

$$\therefore 1\text{ m} = 100\text{ cm}$$

$$\therefore 1\text{ cm} = \frac{1}{100}\text{ m}$$

$$\Rightarrow 120\text{ cm} = \frac{120}{100} = \frac{6}{5}\text{ m}$$

Let length = $l\text{ m}$

\therefore Area of display board = Length \times Breadth

$$36 = l \times \frac{6}{5}$$

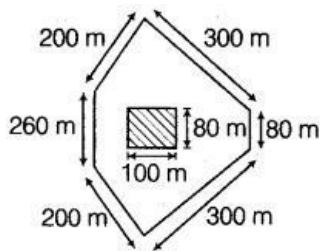
$$\Rightarrow \frac{36 \times 5}{6} = l \times \frac{6}{5} \times \frac{5}{6}$$

[multiply both sides by $\frac{6}{5}$]

$$\Rightarrow l = 30\text{ m}$$

Question 39:

What is the length of outer boundary of the park shown in the given figure? What will be the total cost of fencing it at the rate of Rs. 20 per metre? There is a rectangular flower bed in the center of the park. Find the cost of manuring the flower bed at the rate of Rs. 50 per square metre.



Solution:

Length of outer boundary = Perimeter of park = Sum of all sides length

$$= (200 + 300 + 80 + 300 + 200 + 260)\text{ m} = 1340\text{ m}$$

Also, rate of fencing per metre = Rs. 20

Then, rate of fencing 1340 metre = $20 \times 1340 = \text{Rs. } 26800$

Now, length of rectangular flower bed = 100 m and breadth of rectangular flower bed = 80 m

\therefore Area of rectangular flower bed = Length \times Breadth

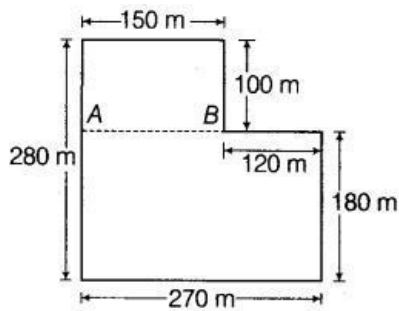
$$= 100 \times 80 = 8000\text{ sq m}$$

Also, rate of manuring the flower bed per square metre = Rs. 50

Then, rate of manuring the flower bed of area $8000\text{ sq m} = 50 \times 8000 = \text{Rs. } 400000$

Question 40:

Total cost of fencing the park shown in the given figure is Rs. 55000. Find the cost of fencing per metre.

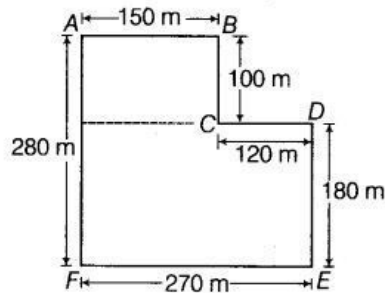


Solution:

Perimeter of ABCDEFA = Sum of all sides

$$= AB + BC + CD + DE + EF + FA$$

$$= (150 + 100 + 120 + 180 + 270 + 280) \text{ m} = 1100 \text{ m}$$



Total cost = ₹ 55000

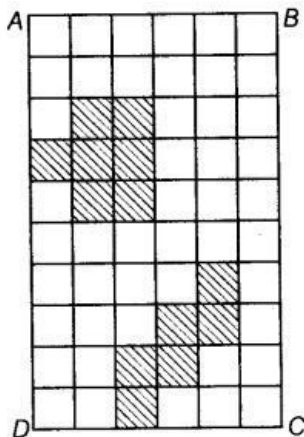
[given]

$$\text{Now, cost of fencing per metre} = \frac{\text{Total cost}}{\text{Perimeter}} = \frac{55000}{1100} = ₹ 50$$

Question 41:

In the given figure, each square is of unit length

- What is the perimeter of the rectangle ABCD?
- What is the area of the rectangle ABCD?
- Divide this rectangle into ten parts of equal area by shading squares, (two parts of equal area are shown here)
- Find the perimeter of each part which you have divided. Are they all equal?



Solution:

Given, each side of square is of unit length. Figure contains length of 10 squares and width of 6 squares.

Now, length of rectangle, AD = BC

$$= \text{Sum of length of a side of 10 squares} = 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 10 \times 1 = 10$$

units and breadth of rectangle, AB = DC = Width of 6 squares = 6 × 1 = 6 units

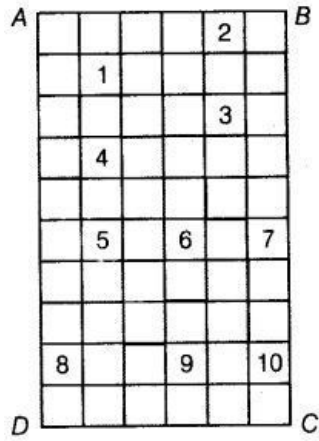
$$(a) \text{ The perimeter of the rectangle ABCD} = AB + BC + CD + DA = 6 + 10 + 6 + 10$$

$$= 32 \text{ units}$$

$$(b) \text{ The area of the rectangle ABCD} = \text{Length} \times \text{Breadth}$$

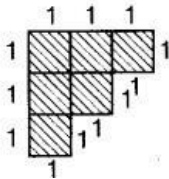
$$= AD \times AB = 10 \times 6 = 60 \text{ sq units}$$

(c) The total area of rectangle = 60 sq units.



Now, we have to divide the rectangle into 10 equal parts i.e. $6 \times 1 = 6$ square units, i.e., we have to take a group of 6-6 square blocks, which is shown in the figure.

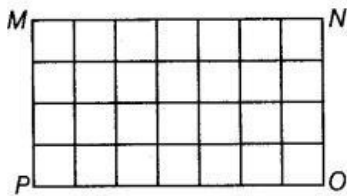
(d) Now, we find the perimeter of part I. We know that perimeter of a figure is the total length of its boundary.



Perimeter of part 1 = $1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 12$ units Similarly, we can find the perimeters of remaining 9 parts, all the parts have same perimeter, i.e. 12 units. Yes, all the parts have same perimeter.

Question 42:

Rectangular wall MNOP of a kitchen is covered with square tiles of 15 cm length (as shown in the given figure). Find the area of the wall.



Solution:

In rectangular wall MNOP,

Number of square tiles = 28 Length of one square tile = 15 cm In square, all sides are equal

\therefore Area of one square tile = Side \times Side = $15 \times 15 = 225 \text{ cm}^2$

Area of 28 tiles = $225 \times 28 = 6300 \text{ sq cm}$

Hence, total area of wall MNOP is 6300 sq cm.

Question 43:

Length of a rectangular field is 6 times its breadth. If the length of the field is 120 cm, find the breadth and perimeter of the field.

Solution:

Given, length of rectangular field (l) = 120 cm

Let breadth of rectangular field = b

According to question, length is 6 times its breadth.

$$\therefore l = 6b$$

$$\Rightarrow 120 = 6b$$

$$\Rightarrow \frac{120}{6} = \frac{6b}{6}$$

$$\Rightarrow b = 20 \text{ cm}$$

[dividing both sides by 6]

We know that,

$$\text{Perimeter of the field} = 2 \times (\text{Length} + \text{Breadth})$$

$$= 2 (120 + 20)$$

$$= 2 \times (140)$$

$$= 280 \text{ cm}$$

Question 44:

Anmol has a chart paper of measure 90 cm x 40 cm, whereas Abhishek has one which measures 50 cm x 70 cm. Which will cover more area on the table and by how much?

Solution:

Given, Anmol's chart paper size = 90 cm x 40 cm

Here, let 90 cm = length and 40 cm = breadth

$$\therefore \text{Area of rectangle} = \text{Length} \times \text{Breadth} = 90 \times 40 = 3600 \text{ sq cm}$$

Similarly, Abhishek's chart paper size = 50 cm x 70 cm

Here, let 50 cm = length and 70 cm = breadth

$$\therefore \text{Area of rectangle} = \text{Length} \times \text{Breadth} = 50 \times 70 = 3500 \text{ sq cm}$$

Hence, Anmol's chart paper will cover more area as the table.

$$\text{More area} = 3600 - 3500 = 100 \text{ sq cm}$$

Question 45:

A rectangular path of 60 m length and 3 m width is covered by square tiles of side 25 cm.

How many tiles will there be in one row along its width? How many such rows will be there?

Find the number of tiles used to make this path?

Solution:

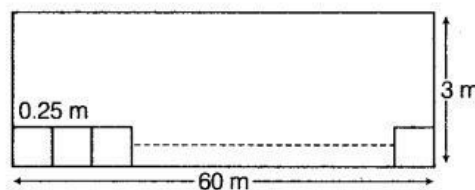
Given, length of path = 60 m

and width of path = 3 m

$$\text{Side of square tile} = 25 \text{ cm} = \frac{25}{100} \text{ m} = 0.25 \text{ m}$$

[$\because 1 \text{ m} = 100 \text{ cm}$]

Diagram of path is shown below



$$\text{Number of tiles in one row along width} = \frac{\text{Width}}{\text{Side of one tile}} = \frac{3}{0.25} = \frac{3 \times 100}{25} = 12$$

$$\text{Number of rows} = \frac{\text{Length}}{\text{Side of one tile}} = \frac{60}{0.25} = \frac{60}{25} \times 100 = 240$$

$$\text{Also, number of tiles} = \text{Number of tiles in one row} \times \text{Number of rows} = 12 \times 240 = 2880$$

Question 46:

How many square slabs each with side 90 cm are needed to cover a floor of area 81 sq m?

Solution:

Given, side of square slab = 90 cm

∴ Area of square slab = Side × Side = $90 \times 90 = 8100$ sq cm

But according to the question, area = 81 sq m

∴ $1\text{ m} = 100\text{ cm}$

$1\text{ sq m} = 100 \times 100\text{ cm} = 10000\text{ cm}$

and

$81\text{ sq m} = 810000\text{ sq cm}$

Now, number of slabs = $\frac{\text{Area of floor}}{\text{Area of one square slab}} = \frac{810000}{8100} = 100$

Question 47:

The length of a rectangular field is 8 m and breadth is 2 m. If a square field has the same perimeter as this rectangular field, find which field has the greater area.

Solution:

Given, length of a rectangular field = 8 m

Breadth of a rectangular field = 2 m

Now, perimeter of rectangle = $2 \times (\text{Length} + \text{Breadth})$

$$= 2 \times (8 + 2) = 2 \times 10$$

$$= 20\text{ m}$$

∴ Area of rectangle = Length × Breadth = $8 \times 2 = 16\text{ m}^2$

According to the question,

Perimeter of square = Perimeter of rectangle

$$\Rightarrow 4 \times \text{Side} = 20$$

$$\Rightarrow \frac{4 \times \text{Side}}{4} = \frac{20}{4}$$

[dividing both sides by 4]

$$\Rightarrow \text{Side} = 5\text{ m}$$

Now, area of square = Side × Side = $5 \times 5 = 25\text{ m}^2$

Hence, the area of square field is greater than the area of rectangular field.

Question 48:

Parmindar walks around a square park once and covers 800 m. What will be the area of this park?

Solution:

Given, distance covered in one around = 800 m

∴ Distance covered in one round = Perimeter of square park

$$\Rightarrow 800 = 4 \times \text{side}$$

[∵ perimeter = $4 \times \text{side}$]

$$\Rightarrow \frac{800}{4} = \frac{4 \times \text{side}}{4}$$

[dividing both sides by 4]

$$\Rightarrow \text{Side} = 200\text{ m}$$

Now, area of square = Side × Side

$$= 200 \times 200$$

$$= 40000\text{ sq m}$$

Question 49:

The side of a square is 5 cm. How many times does the area increase, if the side of the square is doubled?

Solution:

Given, side of square = 5 cm

$$\therefore \text{Area of square} = \text{Side} \times \text{Side} = 5 \times 5 \\ = 25 \text{ sq cm}$$

Now, according to question,

$$\text{New side} = 2 \times \text{Old side} \\ = 2 \times 5 = 10 \text{ cm}$$

$$\therefore \text{Area of new square} = \text{Side} \times \text{Side} = 10 \times 10 \\ = 100 \text{ sq cm}$$

$$\therefore \frac{\text{Area of new square}}{\text{Area of old square}} = \frac{100}{25} = 4$$

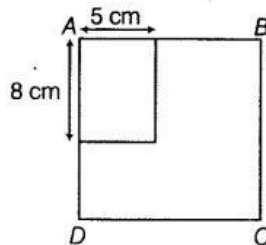
Hence, the area of new square is 4 times increase.

Question 50:

Amita wants to make rectangular cards measuring 8 cm x 5 cm. She has a square chart paper of side 60 cm. How many complete cards can she make from this chart? What area of the chart paper will be left?

Solution:

Let $ABCD$ be a square chart of side 60 cm. We have to cut out rectangular cards measuring 8 cm x 5 cm out of this chart.



Now, if we cut chart along AB as shown in the figure, then we can cut 12 rectangular cards from one row.

Similarly, we can cut 7 rows with 12 rectangular cards in each.

$$\text{Area of cut outs of the rectangular cards} = 7 \times 12 \times (8 \times 5) \text{ cm}^2 \\ = 3360 \text{ cm}^2$$

The left part of square chart is of dimensions 4 cm x 60 cm.

$$\text{Now, area of the left part} = 4 \times 60 \\ = 240 \text{ cm}^2$$

Question 51:

A magazine charges Rs. 300 per 10 sq cm area for advertising. A company decided to order a half page advertisement. If each page of the magazine is 15 cm x 24 cm, what amount will the company has to pay for it?

Solution:

Given, charges for 10 sq cm advertisement = ₹ 300

$$\therefore \text{Charges for 1 sq cm advertisement} = \frac{\text{₹ 300}}{10 \text{ sq cm}} \times 1 \text{ sq cm} = \text{₹ 30}$$

In order to find out the amount the company has to pay for a half page advertisement, we will find the area of half page of magazine and then multiply it with the charges for 1 sq cm advertisement.

Now, area of 1 page of magazine = $15 \text{ cm} \times 24 \text{ cm} = 360 \text{ cm}^2$

$$\begin{aligned}\therefore \text{Area of a half page of magazine} &= \frac{\text{Area of 1 page of magazine}}{2} \\ &= \frac{360}{2} = 180 \text{ cm}^2\end{aligned}$$

So, charges for half page advertisement

$$\begin{aligned}&= \text{Area of half page of magazine} \times \text{Charges for 1 sq cm advertisement} \\ &= 180 \times 30 \\ &= \text{₹ 5400}\end{aligned}$$

Hence, the company has to pay ₹ 5400 for it.

Question 52:

The perimeter of a square garden is 48 m. A small flower bed covers 18 sq m area inside this garden. What is the area of the garden that is not covered by the flower bed? What fractional part of the garden is covered by flower bed? Find the ratio of the area covered by the flower bed and the remaining area.

Solution:

Let side of square garden be x cm.

Given that, perimeter of a squared garden = 48 m

$$\Rightarrow 4 \times \text{Side of a square} = 48$$

$$\Rightarrow 4x = 48$$

$$\Rightarrow x = \frac{48}{4} = 12 \text{ m}$$

Now, area of the square garden = $(x)^2 = (12)^2 = 144 \text{ m}^2$

Also given, area of small flower bed cover inside the garden = 18 m^2

\therefore Area of the garden not covered by flower bed

$$\begin{aligned}&= \text{Area of square garden} - \text{Area of flower bed} \\ &= 144 - 18 = 126 \text{ m}^2\end{aligned}$$

$$\begin{aligned}\text{The fractional part of the garden covered by flower bed} &= \frac{\text{Area covered by flower bed}}{\text{Total area of garden}} \\ &= \frac{18}{144} = \frac{1}{8}\end{aligned}$$

Ratio of the area covered by the flower bed and remaining area

$$= \frac{\text{Area covered by the flower}}{\text{Area of remaining garden}} = \frac{18}{126} = \frac{1}{7}$$

Hence, the ratio of area covered by the flower bed and the remaining area is 1 : 7.

Question 53:

Perimeter of a square and a rectangle is same. If a side of the square is 15 cm and one side of the rectangle is 18 cm, find the area of the rectangle.

Solution:

Let breadth of rectangle = b cm
 Given, length of rectangle = 18 cm
 and side of a square = 15 cm
 \therefore Perimeter of a square = $4 \times \text{Side}$
 $= 4 \times 15$
 $= 60 \text{ cm}$

But according to question,
 Perimeter of Rectangle = Perimeter of Square

$$\Rightarrow 2 \times (\text{Length} + \text{Breadth}) = 60$$

$$\Rightarrow 2(18 + b) = 60$$

$$\Rightarrow \frac{2 \times (18 + b)}{2} = \frac{60}{2} \quad [\text{dividing both sides by 2}]$$

$$\Rightarrow 18 + b = 30$$

$$\Rightarrow b = 30 - 18 \quad [\text{transposing 18 to RHS}]$$

$$\Rightarrow b = 12$$

$$\begin{aligned} \text{Now, area of rectangle} &= \text{Length} \times \text{Breadth} \\ &= 18 \times 12 \\ &= 216 \text{ sq cm} \end{aligned}$$

Question 54:

A wire is cut into several small pieces. Each of the small pieces is bent into a square of side 2 cm. If the total area of the small squares is 28 sq cm, what was the original length of the wire?

Solution:

Given, side of square made by bending a small piece of wire = 2 cm

and total area of the small squares made by bending small pieces of wire = 28 sq cm

$$\begin{aligned} \text{Now, number of small squares} &= \frac{\text{Total area of small squares}}{\text{Area of one small squares}} \\ &= \frac{28}{2 \times 2} \quad [\because \text{area of square} = \text{side} \times \text{side}] \\ &= \frac{28}{4} = 7 \end{aligned}$$

$$\begin{aligned} \text{Now, perimeter of a small square} &= 4 \times \text{Side} \\ &= 4 \times 2 \\ &= 8 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter of 7 such small squares} &= \text{Perimeter of one small square} \times 7 \\ &= 8 \times 7 \\ &= 56 \text{ cm} \end{aligned}$$

\therefore Original length of wire = Perimeter of 7 small squares = 56 cm

Hence, the original length of wire is 56 cm.

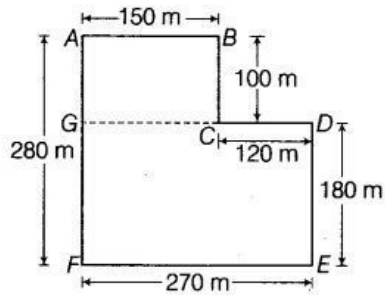
Question 55:

Divide the park shown in figure of question 40 into two rectangles. Find the total area of this park. If one packet of fertilizer is used for 300 sq m, how many packets of fertilizer are required for the whole park?

Solution:

$$\begin{aligned}\therefore \text{Area of rectangle } ABCG &= \text{Length} \times \text{Breadth} \\ &= 150 \times 100 \\ &= 15000 \text{ sq m}\end{aligned}$$

$$\begin{aligned}\text{and area of rectangle } DEFG &= \text{Length} \times \text{Breadth} \\ &= 270 \times 180 \\ &= 48600 \text{ sq m}\end{aligned}$$



$$\begin{aligned}\text{Now, total area of park} &= \text{Area of } ABCG + \text{Area of } DEFG \\ &= 15000 + 48600 \\ &= 63600 \text{ sq m}\end{aligned}$$

Area uses by one packet of fertiliser = 300 sq m

[given]

\therefore In 300 sq m, used packet = 1

$$\begin{aligned}\therefore \text{In } 63600 \text{ sq m, used packet} &= \frac{63600}{300} \\ &= 121\end{aligned}$$

Question 56:

The area of a rectangular field is 1600 sq m. If the length of the field is 80 m, find the perimeter of the field.

Solution:

Given, area of the rectangular field = 1600 sq m

and length of the rectangular field = 80 m

We know that, area of rectangle = Length \times Breadth

Let breadth of the rectangular field = b

Then,

$$\text{Area} = 80 \times b$$

\Rightarrow

$$1600 = 80 \times b$$

\Rightarrow

$$\frac{1600}{80} = \frac{80 \times b}{80}$$

[dividing both sides by 80]

\Rightarrow

$$b = 20 \text{ m}$$

Now, perimeter of the rectangular field = $2 \times (\text{Length} + \text{Breadth})$

$$= 2 \times (80 + 20)$$

$$= 2 \times 100$$

$$= 200 \text{ m}$$

Question 57:

The area of each square on a chess board is 4 sq cm. Find the area of the board.

(a) At the beginning of game when all the chess men are put on the board, write area of the squares left unoccupied.

(b) Find the area of the squares occupied by chess men.

Solution:

Given, area of each square on a chess board = 4 sq cm We know that, there are 64 squares on a chess board.

Area of the chess board = Area of 64 squares on a chess board

$$= 64 \times \text{Area of 1 square on a chess board} = 64 \times 4 \text{ sq cm} = 256 \text{ sq cm}$$

(a) We know that, there are 32 chess men at the beginning of game.

Number of squares occupies by 32 chess men = 32

and number of squares left unoccupied . = Total number of squares – 32

$$= 64 - 32 = 32$$

So, area of squares left unoccupied

$$= 32 \times \text{Area of a square}$$

$$= 32 \times 4 = 128 \text{ sq cm}$$

(b) Area of squares occupied by 32 chess men

$$= 32 \times \text{Area of a square}$$

$$= 32 \times 4 = 128 \text{ sq cm}$$

Question 58:

(a) Find all the possible dimensions (in natural numbers) of a rectangle with a perimeter 36 cm and find their areas.

(b) Find all the possible dimensions (in natural numbers) of a rectangle with an area of 36 sq cm and find their perimeters.

Solution:

(a) Let x and y be the length and breadth of the given rectangle whose perimeter is 36 cm.

$$\therefore \text{Perimeter of rectangle} = 2(\text{Length} + \text{Breadth}) = 2(x + y)$$

$$\Rightarrow 2(x + y) = 36$$

$$\Rightarrow \frac{2x + y}{2} = \frac{36}{2} \quad [\text{dividing both sides by 2}]$$

$$\Rightarrow x + y = 18$$

Now, if the value of both length and breadth are natural numbers, then possible dimensions and their areas are as follows

| Dimensions (in cm) | Area (in cm ²) |
|--------------------|----------------------------|
| 17×1 | 17 |
| 16×2 | 32 |
| 15×3 | 45 |
| 14×4 | 56 |
| 13×5 | 65 |
| 12×6 | 72 |
| 11×7 | 77 |
| 10×8 | 80 |
| 9×9 | 81 |

(b) Let x and y be the length and breadth of the given rectangle whose area is 36 sq cm.

$$\therefore \text{Area of rectangle} = \text{Length} \times \text{Breadth} = x \times y$$

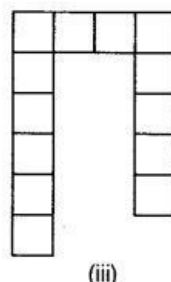
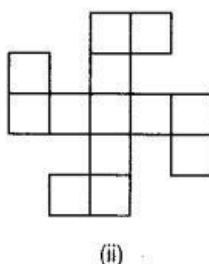
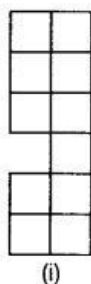
$$\Rightarrow x \times y = 36 \text{ sq cm}$$

If the value of both length and breadth are natural numbers, then possible dimensions and their perimeters are as follows

| Dimensions (in cm) | Perimeter (in cm) |
|--------------------|-------------------|
| 36×1 | 74 |
| 18×2 | 40 |
| 9×4 | 26 |
| 12×3 | 30 |
| 6×6 | 24 |

Question 59:

Find the area and perimeter of each of the following figures, if area of each small square is 1 sq cm.

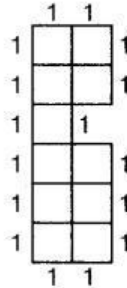


Solution:

- Given, area of 1 small square = 1 sq cm

\therefore Area of 11 small squares = $11 \times$ Area of a small square

$$= 11 \text{ sq cm}$$

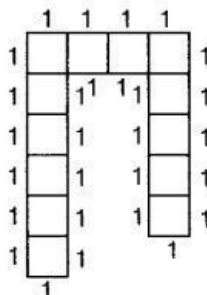
$$= 16 \text{ cm}$$


- Given, area of 1 small square = 1 sq cm

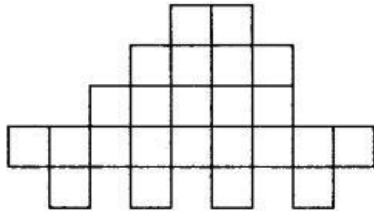
$$= 13 \text{ sq cm}$$

[illegible]
$$= 27 \text{ cm}$$

- $$= 13 \text{ sq cm}$$

$$= 28 \text{ cm}$$


What is the area of each small square in the given figure, if the area of entire figure is 96 sq cm? Find the perimeter of the figure.



Solution:

Given, area of entire figure = 96 sq cm

In order to find out the area of each small square we will divide the area of entire figure by the number of small square in the figure.

$$\begin{aligned}\therefore \text{Area of a small square} &= \frac{\text{Area of entire figure}}{\text{Total number of small squares in the figure}} \\ &= \frac{96}{24} \quad [\because \text{total number of small squares} = 24] \\ &= 4 \text{ sq cm}\end{aligned}$$

We know that,

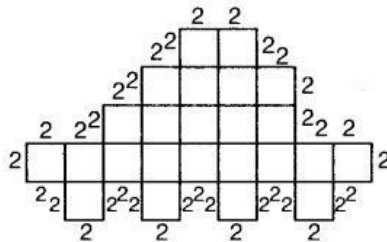
Area of a small square = Side \times Side

$$\Rightarrow 4 = \text{Side} \times \text{Side}$$

Taking square root on both the sides, we get

$$\sqrt{4} = \sqrt{\text{Side} \times \text{Side}}$$

\Rightarrow Side = 2 cm



Perimeter of the given figure = Sum of all sides

$$= (2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2) \text{ cm}$$
$$= 68 \text{ cm}$$