

NCERT QUESTIONS WITH SOLUTIONS

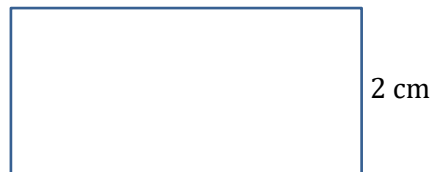
FIGURE IT OUT

6.1 PERIMETER

1. Find the missing terms:

- a. Perimeter of a rectangle = 14 cm; breadth = 2 cm; length = ?.
- b. Perimeter of a square = 20 cm; side of a length = ?.
- c. Perimeter of a rectangle = 12 m; length = 3 m; breadth = ?.

Sol. a. We know that perimeter of a rectangle = $2(\ell + b)$



Length = ?

Here, the perimeter of the rectangle = 14 cm and breadth $b = 2$ cm, $\ell = ?$

$$\text{Thus } 14 = 2(\ell + 2)$$

$$\Rightarrow 14 = 2\ell + 4$$

$$\Rightarrow 2\ell = 14 - 4 = 10$$

$$\Rightarrow \ell = 10 \div 2 = 5 \text{ cm}$$

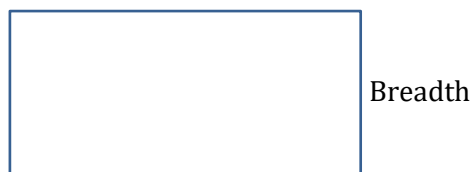
- b. Perimeter of a square = 20 cm; side of a length = ?.
- We know that the perimeter of the square = $4 \times a$
where a = side of the square



Side

$$\therefore 20 = 4 \times a \Rightarrow a = 5 \text{ cm}$$

- c. Perimeter of rectangle = $2(\ell + b)$



3 m

$$\Rightarrow 12 = 2(3 + b)$$

$$\Rightarrow 12 = 6 + 2b$$

$$\Rightarrow 12 - 6 = 2b$$

$$\Rightarrow 2b = 6$$

$$\Rightarrow b = 3$$

$$\text{breadth} = 3 \text{ m}$$

2. A rectangle having side lengths 5 cm and 3 cm is made using a piece of wire. If the wire is straightened and then bent to form a square, what will be the length of a side of the square?

Sol. Perimeter of rectangle = $2(5 + 3)$

$$= 2 \times 8$$

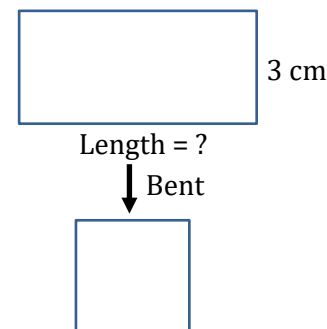
$$= 16 \text{ cm}$$

Now the wire is straightened and then bent to form a square.

$$\therefore \text{Perimeter of square} = 16 \text{ cm}$$

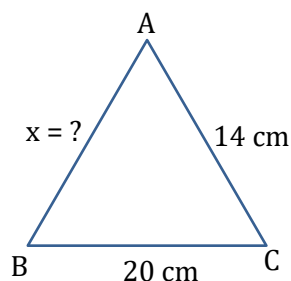
$$\Rightarrow 4a = 16 \text{ cm}$$

$$\Rightarrow a = 4 \text{ cm, the required length of the side of the square.}$$



3. Find the length of the third side of a triangle having a perimeter of 55 cm and having two sides of length 20 cm and 14 cm, respectively.

Sol. Let the length of the third side of the triangle be x cm then



$$\text{Perimeter of triangle} = AB + BC + CA$$

$$\Rightarrow 55 = 20 + 14 + x$$

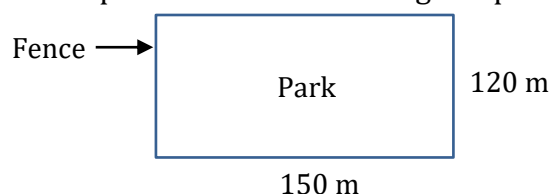
$$\Rightarrow 55 = 34 + x$$

$$\Rightarrow x = 55 - 34$$

$$\Rightarrow x = 21 \text{ cm}$$

4. What would be the cost of fencing a rectangular park whose length is 150 m and breadth is 120 m, if the fence costs ₹40 per metre?

Sol. The length of the fence is the perimeter of the rectangular park.



Given that the length of the rectangular park = 150 m and breadth = 120 m

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

$$= 2(150 + 120)$$

$$= 2(270)$$

$$= 540 \text{ m}$$

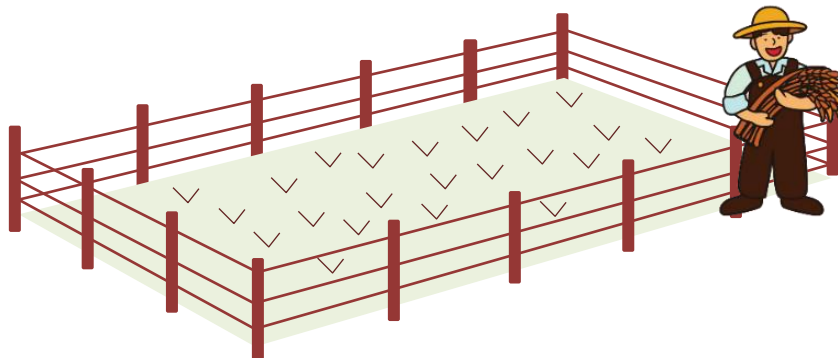
Now cost of fencing per meter = ₹ 40

$$\text{Cost of fencing the rectangular park} = ₹ 40 \times 540 = ₹ 21600$$

5. A piece of string measure 36 cm in length. What will be the length of each side if it is used to form:
- A square,
 - A triangle with all sides of equal length, and
 - A hexagon (a six-sided closed figure) with equal-length sides?

- Sol.**
- Given, a piece of string is 36 cm long
 $\therefore$ length of each side of the square = a
 perimeter = 36
 $\Rightarrow 4a = 36$
 $\Rightarrow a = 9$ cm
 - Length of each side of the triangle = a (Given)
 perimeter = 36
 $\Rightarrow 3a = 36$
 $\Rightarrow a = 12$ cm
 - Length of each side of hexagon = a
 perimeter = 36
 $\Rightarrow 36 = 6a$
 $\Rightarrow a = 6$ cm

6. A farmer has a rectangular field having length 230 m and breadth 160 m. He wants to fence it with 3 rounds of rope as shown. What is the total length of rope needed?



- Sol.** Perimeter of the rectangular field = $2(\ell + b)$

Here $\ell = 230$ m, $b = 160$ m

$$\therefore P = 2(230 + 160)$$

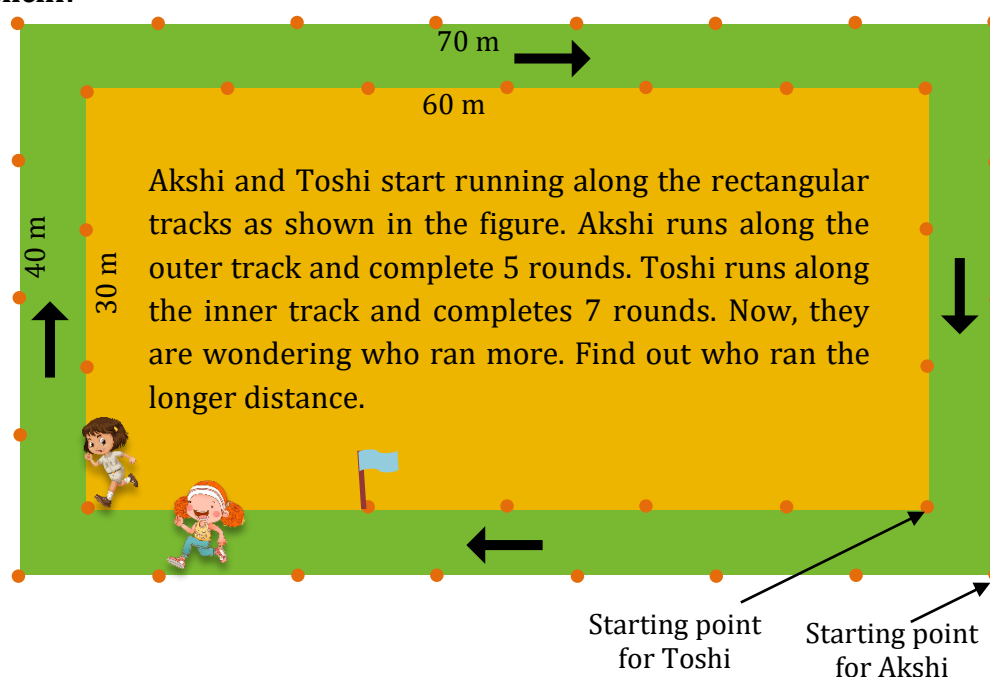
$$= 2(390)$$

$$= 780 \text{ m}$$

Distance covered by a farmer in one round = 780 m

$$\therefore \text{Total length of rope needed} = 3 \times 780 = 2340 \text{ m}$$

Matha Pachchi!



1. Find out the total distance Akshi has covered in 5 rounds.

Sol. Distance covered by Akshi in 5 rounds = $5 \times \text{perimeter of PQRS}$

$$= 5 \times 220$$

$$= 1100 \text{ m}$$

2. Find out the total distance Toshi has covered in 7 rounds. Who ran a longer distance?

Sol. Distance covered by Toshi in 7 rounds = $7 \times 180 = 1260 \text{ m}$

$$\therefore 1260 \text{ m} > 1100 \text{ m}$$

Hence, Toshi ran the longer distance.

3. Think and mark the positions as directed-

- Mark 'A' at the point where Akshi will be after she runs 250 m.
- Mark 'B' at the point where Akshi will be after she runs 500 m.
- Now, Akshi ran 1000 m. How many full rounds has she finished running around her track? Mark her position as 'C'.
- Mark 'X' at the point where Toshi will be after she runs 250 m.
- Mark 'Y' at the point where Toshi will be after she runs 500 m.
- Now, Toshi ran 1000 m. How many full rounds has she finished running around her track? Mark her position as 'Z'.

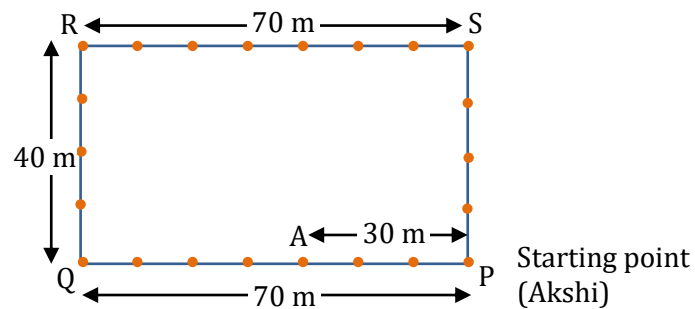
Sol. a. Here,

1. One complete round = 220 meters.

2. Distance Akshi has run = 250 meters.

3. Extra distance beyond one round = $250 - 220 = 30 \text{ meters}$.

Since Akshi has already completed one full round, she will be 30 meters into her second round. So, after running 30 meters more, she will be on the length side of the track, 30 meters from the starting point. Therefore, mark 'A' at the point 30 meters along the length of the track from the starting point.



- b. Distance per round = 220 meters

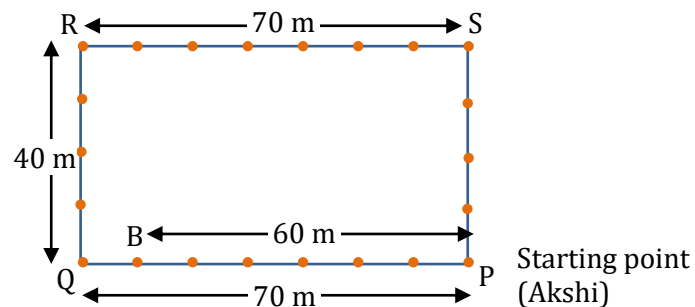
Total distance Akshi runs = 500 meters.

First, we will find out how many complete rounds she runs:

Number of complete rounds = $500 \div 220 = 2.27$ (approx.)

This means Akshi completes 2 full rounds and then runs an additional distance
 $= 500 - (2 \times 220) = 60$ m

Therefore, Akshi will be 60 meters along the length of the track from the starting point, we can mark point 'B' at this position on the track.



- c. Now, Akshi ran 1000 meters. To find out how many full rounds she completed, we divide the total distance she ran by the perimeter of the track:

Number of full rounds = $1000 \div 220 = 4.545$ rounds.

Akshi has completed 4 full rounds and is partway through her 5th round.

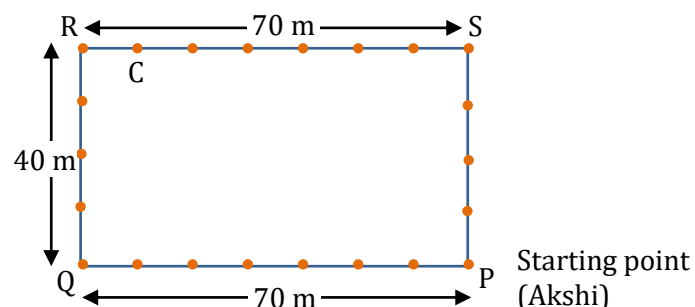
To find her position on the track, we calculate the remaining distance after 4 full rounds:

Remaining distance = $1000 \text{ m} - (4 \times 220 \text{ m})$

$= 1000 \text{ m} - 880 \text{ m}$

$= 120 \text{ m}$

Since she has run an additional 120 meters after completing 4 full rounds, her position will be 120 meters from the starting point. If we mark her starting point as 'P', her position after running 1000 meters can be marked as 'C', which is 120 meters from 'P' along the track.

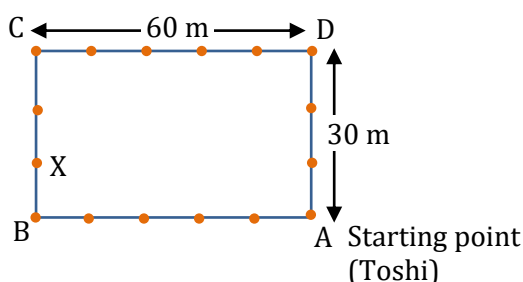


d. Here,

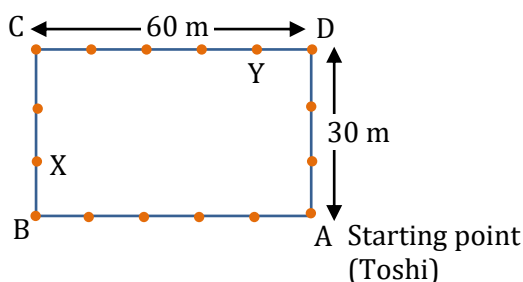
1. Perimeter of the track = 180 meters

2. Distance Toshi runs = 250 meters

Since 250 meters is more than one complete round (180 meters), Toshi will have completed one full round and will have 70 meters left to run ($250 - 180 = 70$ meters). So, Toshi will be 70 meters along the length of the track from the starting point. You can mark 'X' at this point on the track.



e. Given, that Toshi has run an additional 140 meters after completing 2 rounds, her position will be 140 meters from the starting point. If we mark her starting point as 'A', her position after running 500 meters can be marked as 'Y'.



f. Here, we need to find out how many full rounds Toshi has completed by dividing the total distance she ran by the perimeter of the track:

Number of full rounds = $1000 \div 180 = 5.56$ rounds

Toshi has finished 5 full rounds.

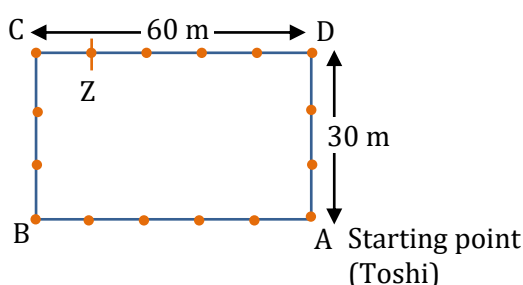
Remaining distance = $1000 \text{ meters} - (5 \times 180 \text{ meters})$

= $1000 \text{ meters} - 900 \text{ meters}$

= 100 meters

Starting from the initial point, Toshi would be 100 meters into her 6th round. Since the track is 60 meters long and 30 meters wide, she would be somewhere along the length of the track.

Let's mark this position as 'Z'.



6.2 AREA

1. The area of a rectangular garden 25 m long is 300 sq m. What is the width of the garden?

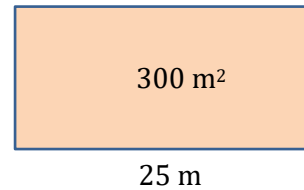
Sol. Given, area of rectangular garden = 300 sq. m

And length = 25 m

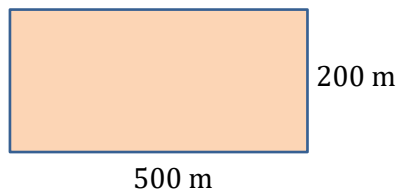
Area of rectangular field = $\ell \times b$

$$\Rightarrow 300 = 25 \times b$$

$$\Rightarrow b = 12 \text{ m}$$



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



Sol. Length = 500 and breadth = 200 m

Hence the area of the rectangular plot = length $\times$ breadth

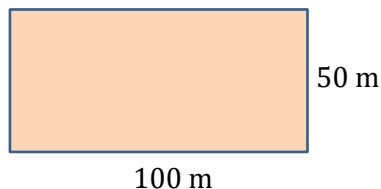
$$= 500 \times 200$$

$$= 1,00,000 \text{ m}^2$$

$$\text{Now cost of tilling a rectangular plot} = \frac{8}{100}$$

$$\text{Hence the cost of tilling } 1,00,000 \text{ sq. m of rectangular plot} = \frac{8}{100} \times 100000 = ₹ 8,000$$

3. A rectangular coconut grove is 100 m long and 50 m wide. If each coconut tree requires 25 sq. m, what is the maximum number of trees that can be planted in this grove?

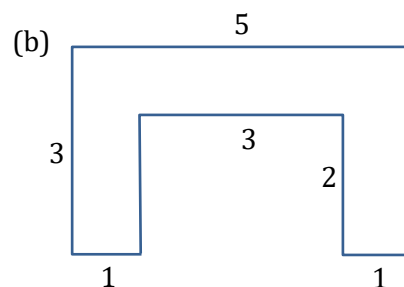
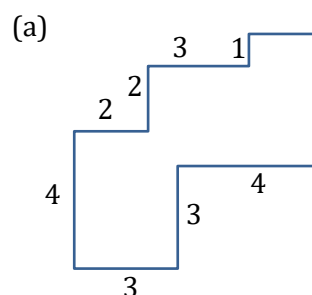


Sol. Area of rectangular coconut grove = $100 \times 50 = 5000 \text{ sq. m}$

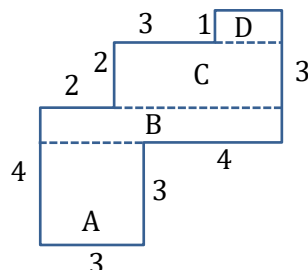
Given each coconut tree requires 25 sq. m

$$\text{Then the maximum number of trees that can be planted in this grove} = \frac{5000}{25} = 200 \text{ trees}$$

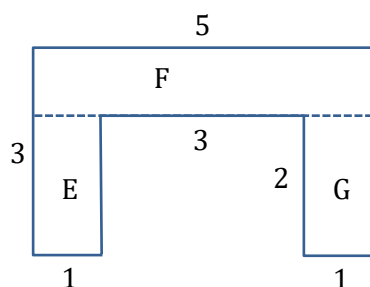
4. By splitting the following figures into rectangles, find their areas (all measures are given in metres):



Sol. (a) Area of the figure = Area of sq. A + Area of sq. B + Area of sq. C + Area of sq. D
 $= (3 \times 3) + (1 \times 7) + (5 \times 2) + (1 \times 2)$
 $= 9 + 7 + 10 + 2$
 $= 28 \text{ m}^2$

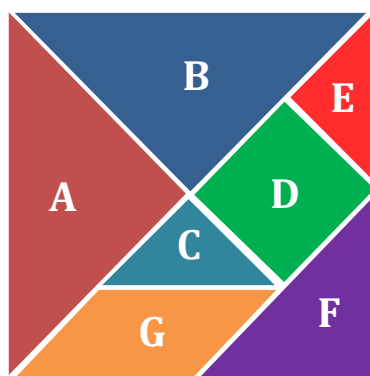


(b) Area of the figure = Area of rectangle E + Area of rectangle F + Area of rectangle G
 $= (1 \times 2) + (1 \times 5) + (1 \times 2)$
 $= 2 + 5 + 2$
 $= 9 \text{ m}^2$



6.2 AREA

Cut out the tangram pieces given at the end of your textbook.



1. Explore and figure out how many pieces have the same area.

Sol. There are two pieces (A and B) that have the same area.

2. How many times bigger is Shape D as compared to Shape C? What is the relationship between Shapes C, D and E?

Sol. Shape D is two times bigger than shape C. Clearly from the figure, the area of shapes C and E is equal to the area of shape D.

3. Which shape has more area: Shape D or F? Give reasons for your answer.

Sol. Since the medium triangle and the square are each made up of two small tangram triangles, they each have an area $2x$ that of the small triangle. Hence both have the same area.

4. Which shape has more area: Shape F or G? Give reasons for your answer.

Sol. Since the medium triangle and the rhomboid are each made up of two small tangram triangles, they each have an area $2x$ that of the small triangle. Hence both have the same area.

5. What is the area of Shape A as compared to Shape G? Is it twice as big? Four times as big?
Hint: In the tangram pieces, by placing the shapes over each other, we can find out that Shapes A and B have the same area, Shapes C and E have the same area. You would have also figured out that Shape D can be exactly covered using Shapes C and E, which means Shape D has twice the area of Shape C or shape E, etc.

Sol. Shape A has twice the area of shape G.

6. Can you now figure out the area of the big square formed with all seven pieces in terms of the area of Shape C?

Sol. Let's say the area of C = x

$$\text{Area of D} = \text{Area of } 2C = 2x$$

$$\text{Area of E} = \text{Area of C} = x$$

$$\text{Area of F} = \text{Area of } 2C = 2x$$

$$\text{Area of G} = \text{Area of } 2C = 2x$$

$$\text{Area of A} = \text{Area of } 2F = 2 \times 2x = 4x$$

$$\text{Area of B} = \text{Area of A} = 4x$$

$$\text{Hence total area of big shape} = \text{Area of A} + \text{B} + \text{C} + \text{D} + \text{E} + \text{F} + \text{G}$$

$$= 4x + 4x + x + 2x + x + 2x + 2x$$

$$= 16x$$

$$= 16C$$

That means the area of a big square is 16 times the area of shape C.

7. Arrange these 7 pieces to form a rectangle. What will be the area of this rectangle in terms of the area of Shape C now? Give reasons for your answer.

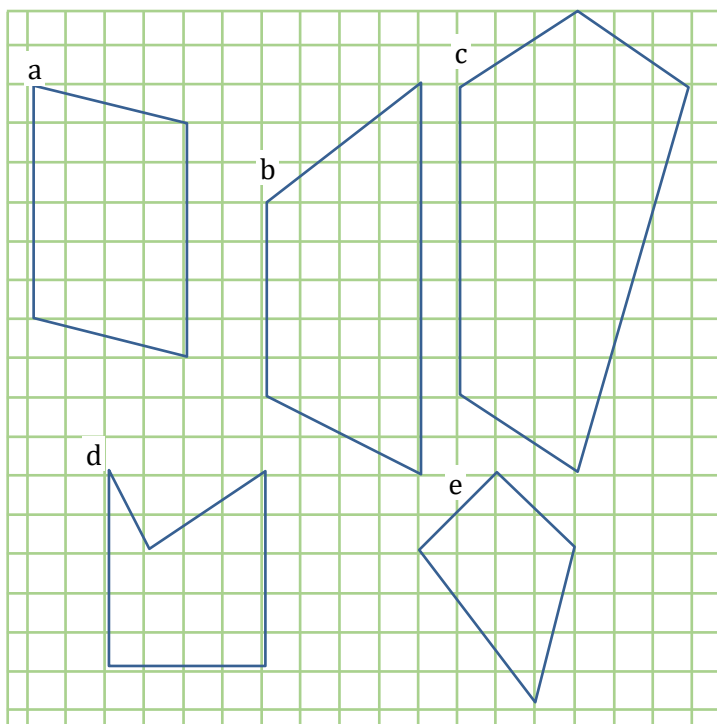
Sol. The tangram rectangle with all 7 pieces is a tangram square with 5 pieces extended with two big triangles. All seven tans fit together to form a rectangle. Hence area of this rectangle in terms of Shape C is 16 small triangles.

8. Are the perimeters of the square and the rectangle formed from these 7 pieces different or the same? Give an explanation for your answer.

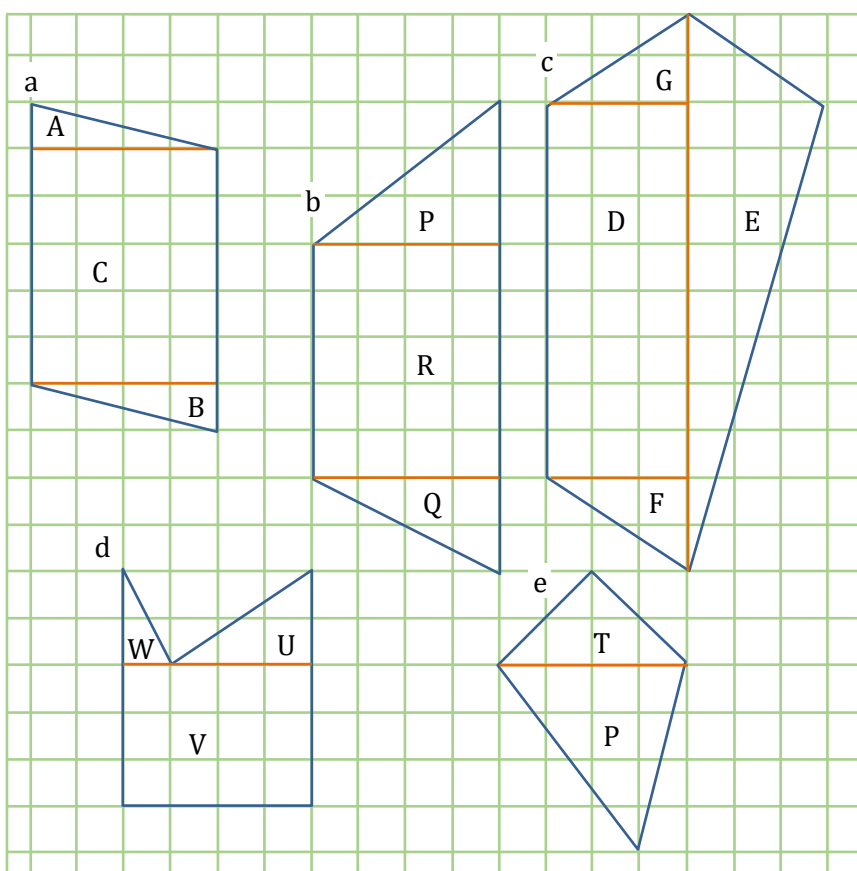
Sol. The perimeter of the square is equal to the square formed from these 7 pieces because these are the arrangements of pieces.

6.3 AREA OF A TRIANGLE

1. Find the areas of the below by dividing them into rectangles and triangles.



Sol.



(a)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	20	$20 \times 1 = 20$
Half-filled squares	0	0
More than half-filled squares	4	$4 \times 1 = 4$
Less than half-filled squares	4	0

$\therefore$ Total area of the figure = $20 + 4 = 24$ sq. units

(b)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	25	$25 \times 1 = 25$
Half-filled squares	0	0
More than half-filled squares	4	$4 \times 1 = 4$
Less than half-filled squares	4	0

$\therefore$ Total area of the figure = $25 + 4 = 29$ sq. units

(c)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	36	$36 \times 1 = 36$
Half-filled squares	2	$2 \times \frac{1}{2} = 1$
More than half-filled squares	8	$8 \times 1 = 8$
Less than half-filled squares	6	$6 \times 0 = 0$

$\therefore$ Total area of the figure = $36 + 1 + 8 = 45$ sq. units

(d)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	13	$13 \times 1 = 13$
Half-filled squares	0	0
More than half-filled squares	3	$3 \times 1 = 3$
Less than half-filled squares	2	$2 \times 0 = 0$

$\therefore$ Total area of the figure = $13 + 3 = 16$ sq. units

(e)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	5	$5 \times 1 = 5$
Half-filled squares	4	$4 \times \frac{1}{2} = 2$
More than half-filled squares	4	$4 \times 1 = 4$
Less than half-filled squares	3	$3 \times 0 = 0$

$\therefore$ Total area of the figure = $5 + 2 + 4 = 11$ sq. units

6.3 AREA OF A TRIANGLE

1. Give the dimensions of a rectangle whose area is the sum of the areas of these two rectangles having measurements: $5 \text{ m} \times 10 \text{ m}$ and $2 \text{ m} \times 7 \text{ m}$.

Sol. Here, Area of rectangle 1 = $5 \times 10 = 50 \text{ sq. m}$

Area of rectangle 2 = $2 \times 7 = 14 \text{ sq. m}$

The Sum of the areas of these 2 rectangles = $50 + 14 = 64 \text{ sq. m}$

Now, the total area of the rectangle = 64

Let's say the sides of the rectangle are Length = x and Width = y

Area of rectangle = $x \times y$

Hence $x \times y = 64$

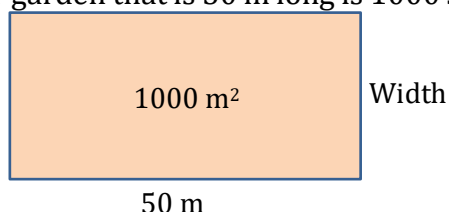
$xy = 64$

Let's say $x = 1$, then $y = \frac{64}{1} = 64$

if $x = 2$, then $y = \frac{64}{2} = 32$

Hence the dimensions of the rectangle are (1×64) , (2×32)

2. The area of a rectangular garden that is 50 m long is 1000 sq m. Find the width of the garden.



Sol. Length of the garden = 50 m

Area of the garden = 1000 m^2

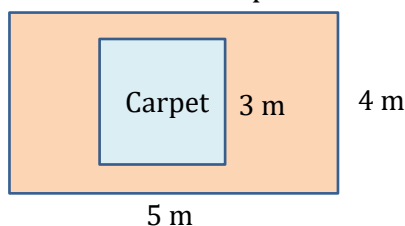
Length $\times$ Width = 1000

$50 \times \text{Width} = 1000$

Width = $\frac{1000}{50} = 20 \text{ m}$

Therefore, the width of the garden = 20 m

3. The floor of a room is 5 m long and 4 m wide. A square carpet whose sides are 3 m in length is laid on the floor. Find the area that is not carpeted.



Sol. A square carpet of side 3 m.

Area of the floor = length $\times$ breath

Area of the floor = $5 \times 4 = 20 \text{ m}^2$

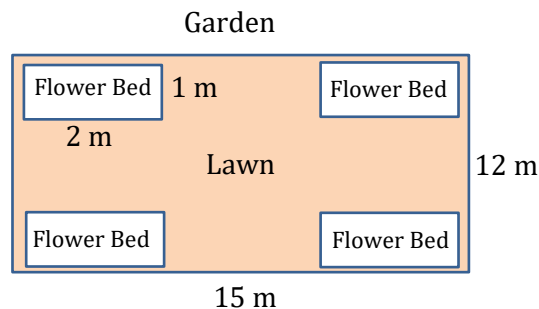
Area of the square carpet = $3 \times 3 = 9 \text{ m}^2$

Now, we will subtract the square carpet area from the floor's area to get the area of the floor that is not carpeted.

Hence, the area of the floor that is not carpeted = $20 - 9 = 11 \text{ m}^2$

Thus, the area of the floor that is not carpeted is 11 m^2 .

4. Four flower beds having sides 2 m long and 1 m wide are dug at the four corners of a garden that is 15 m long and 12 m wide. How much area is now available for laying down a lawn?



Sol. Length of garden = 15 m

Width of garden = 12 m

So, the area of the garden = 15×12 sq. m = 180 sq. m

Now, the length of the flower bed = 2 m

Width of flower bed = 1 m

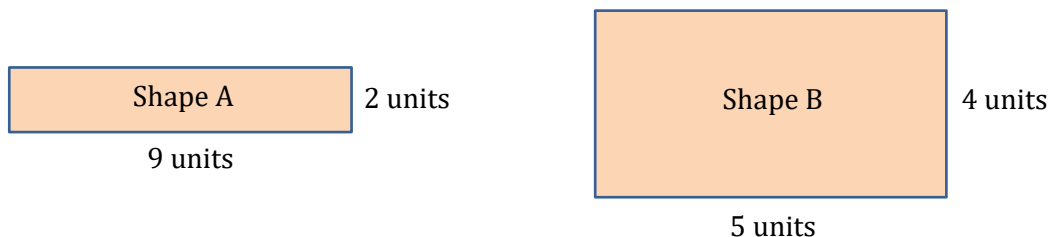
Area of the flower bed = 2×1 sq. m = 2 sq. m

Since, the area of four flower beds = 2×4 sq. m = 8 sq. m

Now the area is available for laying down a lawn = $(180 - 8)$ sq. m = 172 sq. m

5. Shape A has an area of 18 square units and Shape B has an area of 20 square units. Shape A has a longer perimeter than Shape B. Draw two such shapes satisfying the given conditions.

Sol.



Shape A has an area of 18 sq. units.

$\therefore$ Possible sides are $18 \times 1, 2 \times 9, 6 \times 3$

Also, shape B has an area of 20 sq. units.

$\therefore$ Possible sides are $20 \times 1, 4 \times 5, 10 \times 2$

Given shape A has a longer perimeter than shape B, hence two such shapes satisfying the given conditions are:

Here Perimeter of shape A = $9 + 2 + 9 + 2 = 22$ units

Here Perimeter of shape B = $5 + 4 + 5 + 4 = 18$ units

6. On a page in your book, draw a rectangular border that is 1 cm from the top and bottom and 1.5 cm from the left and right sides. What is the perimeter of the border?

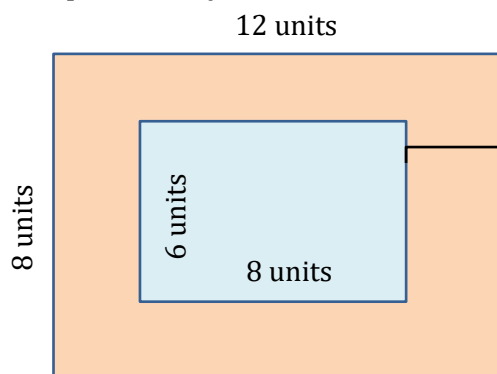
Sol. Perimeter of the rectangle border = $2 \times (\text{Length} \times \text{Width})$

$$= 2 \times (1 + 1.5)$$

$$= 2 \times 2.5$$

$$= 5 \text{ cm}$$

7. Draw a rectangle of size 12 units $\times$ 8 units. Draw another rectangle inside it, without touching the outer rectangle that occupies exactly half the area.



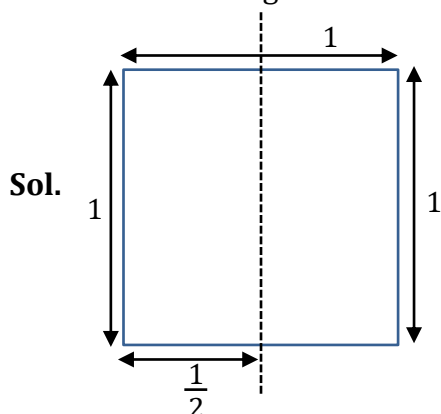
Sol. Area of given rectangle = $12 \times 8 = 96 \text{ units}^2$

And area of new rectangle = $\frac{1}{2} \times 96 = 48 \text{ sq. units}$

$\therefore$ Possible sides of new rectangle are 12×4 , 16×3 , 8×6 , 1×48

$\therefore$ Hence dimensions of the new rectangle fill in the rectangle of $12 \times 8 \text{ units}^2$
 $= 8 \text{ units} \times 6 \text{ units}$

8. A square piece of paper is folded in half. The square is then cut into two rectangles along the fold. Regardless of the size of the square, one of the following statements is always true. Which statement is true here?
- The area of each rectangle is larger than the area of the square.
 - The perimeter of the square is greater than the perimeters of both the rectangles added together.
 - The perimeters of both the rectangles added together is always $1\frac{1}{2}$ times the perimeter of the square.
 - The area of the square is always three times as large as the areas of both rectangles added together.



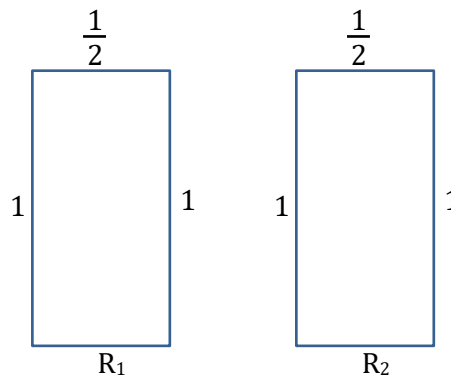
Now in the above square piece

side of square = 1 unit

area of square = $1 \times 1 = 1 \text{ sq. unit}$.

and perimeter of square = $1 + 1 + 1 + 1 = 4 \text{ units}$.

Now after folding the above square piece in half becomes 2 rectangles



Perimeter of rectangle $R_1 = 1 + \frac{1}{2} + 1 + \frac{1}{2} = 3$ units.

Area of rectangle $R_1 = \frac{1}{2} \times 1 = \frac{1}{2}$ sq. unit.

Perimeter of rectangle $R_2 = 1 + \frac{1}{2} + 1 + \frac{1}{2} = 3$ units.

Area of rectangle $R_2 = \frac{1}{2} \times 1 = \frac{1}{2}$ sq. unit.

a. Now, area of rectangle $R_1 = \text{area of rectangle } R_2 = \frac{1}{2} < 1$.

Hence, option (a) is not true.

b. Here perimeter of square = 4 units
and perimeters of both the rectangles = $3 + 3 = 6$ units.
which is greater than 4 units.

Hence option (b) is not true

c. Here perimeters of both the rectangles = 6 units

And perimeter of square = $4 \text{ units} \times 1\frac{1}{2} = 4 \times \frac{3}{2} = 6$ units

The perimeters of both the rectangle added together are $1\frac{1}{2}$ times the perimeter of the square.

Hence, option (c) is true.

d. Here, the area of the square = 4 units

and areas of both the rectangles = $\frac{1}{2} + \frac{1}{2} = 1$ unit.

The area of the square is four times the area of both rectangles.

Hence, option (d) is not true.