NCERT Solutions Class 6 Maths (Ganita Prakash)

Chapter 6 Perimeter and Area

Figure it Out (Page No. 132)

Question 1. Find the missing terms: (a) Perimeter of a rectangle = 14 cm; breadth = 2 cm; length = ?.
(b) Perimeter of a square = 20 cm; length of a side = ?.
(c) Perimeter of a rectangle = 12 m; length = 3 m; breadth = ?.

Solution: (a) Given, perimeter of rectangle =14 cm, breadth = 2 cm
Perimeter of rectangle = 2 (length + breadth)
⇒ 14 cm = 2 (length + 2 cm)
⇒ 7 cm = length + 2 cm
⇒ length = 5 cm

(b) Given, perimeter of a square = 20 cm
⇒ 4 × side = 20 cm
⇒ side = 5 cm
Therefore, length of a side = 5 cm

(c) Perimeter of a rectangle = 12 m
⇒ 2 (length + breadth) = 12 m
⇒ 3 m + breadth = 6 m
⇒ breadth = 3 m

Question 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?

Solution: Given, length of rectangle = 5 cm and breadth = 3 cm
We know that
perimeter of rectangle = 2 × (length × breadth)
= 2 × (5 + 3) = 16 cm

Now, if we bend the wire to form a square, the total length of the wire (16 cm) will be divided equally among the four sides of the square.
So, each side of the square = Perimeter 4
= 164 = 4 cm

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

Solution: Let ABC be the given triangle such that AB = 20 cm, BC = 14 cm
So, perimeter = AB + BC + CA = 55 cm
⇒ 55 = 20 + 14 + CA
⇒ CA = 55 – (20 + 14)
⇒ CA = 21 cm
∴ the length of the third side of the triangle = 21 cm.

Question 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 meter?

Solution: 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
∴ Perimeter = 2(l + b)
= 2(150 + 120)
= 2(270)
= 540 m
Now cost of fencing per meter = ₹ 40
Cost of fencing the rectangular park = ₹ 40 × 540 = ₹ 21600

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

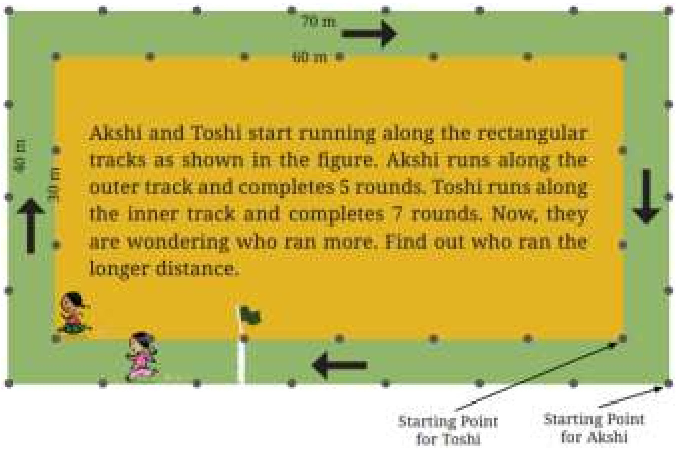
Solution: Length of piece of string = 36 cm
(a) Length of side of a square = 364 cm = 9 cm
(b) Length of side of a triangle when all sides are equal = 363cm = 12 cm
(c) Length of a side of a hexagon when all sides are equal
= 366cm = 6 cm

Question 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?

Solution: Perimeter of a rectangular field = 2 (length + breadth)

= 2 (230 m + 160 m)
= 780 m
The farmer wants 3 rounds of rope to fence.
Total length of rope needed = 780 m × 3
= 2340 m

Figure it Out (Page No. 133 – 134)



Each track is a rectangle. Akshi's track has length 70 m and breadth 40 m. Running one complete round on this track would cover 220 m, i.e., 2 × (70 + 40) m = 220 m. This is the distance covered by Akshi in one round.

Question 1. Find out the total distance Akshi has covered in 5 rounds.
Solution: Akshi runs on a rectangular track with a length of 70 metres and a breadth of 40 metres.
∴ Perimeter of track = 2 × (length + breadth)
= 2 × (70 + 40) = 220 m
Since, the distance covered in one round = 220 m
∴ Total distance covered in 5 rounds = 5 × 220 m
= 1100 m

Question 2. Find out the total distance Toshi has covered in 7 rounds.
Who ran a longer distance?
Solution: Toshi runs on a rectangular track with a length of 60 m and breadth of 30 m.
∴ Perimeter of track = 2 × (length + breadth)
= 2 × (60 + 30) = 180 m
Since, the distance covered in ope round = 180 m
∴ Total distance covered in 7 rounds = 7 × 180 m
= 1260 m
So, Toshi ran a longer distance.

Question 3. Think and mark the positions as directed:
(a) Mark 'A' at the point where Akshi will be after she runs 250 m.
(b) Mark 'B' at the point where Akshi will be after she runs 500 m.

(c) Now, Akshi ran 1000 m. How many full rounds has she finished running around her track? Mark her position as ‘C’.
(d) Mark ‘X’ at the point where Toshi will be after she runs 250 m.
(e) Mark ‘Y’ at the point where Toshi will be after she runs 500 m.
(f) Now, Toshi ran 1000 m. How many full rounds has she finished running around her track? Mark her position as ‘Z’.

Solution: (a) Distance covered by Akshi in 1 complete round = 220 m.
so, to cover ‘250 m Akshi have to move 30 m more = 220 + 30 = 250 m.

(b) Since the perimeter of the outer rectangle is 220 m, it implies that the distance covered till the starting point in 2 rounds will be 2 × 220 = 440 m
Now, the point where Akshi will cover 500 m will be 60 m away from this point.

(c) Distance covered by Akshi = 1000 m
No. of rounds = 1000220 = 4 complete rounds and 120 m more.
Thus, she’ll be 120 m away from the starting point.
(d) Distance covered by Toshi in 1 round = 180 m
So, to cover 250 m, she’ll be 70 m away from the starting point.

(e) Since, the perimeter of the inner rectangle is 180 m, so to cover 500 m, Toshi will be taking 2 complete rounds and then she’ll have to move 140 m more i.e. 140 m away from the starting point.

(f) For 1000 m, Toshi will be covering 1000180 = 5 complete rounds and 100 m more.
This means that she’ll be 100 m away from the starting point.

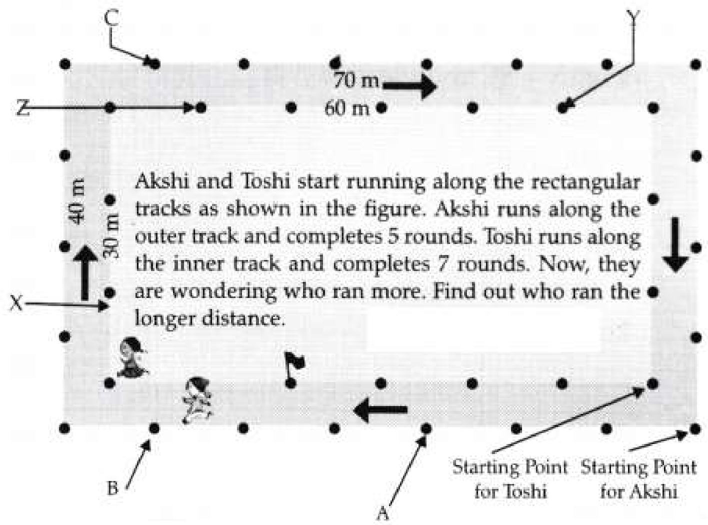


Figure it Out (Page No. 138)

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

Solution: Length of a rectangular garden = 25 m
Area of rectangular garden = length × width
300 sq m = 25 m × width
⇒ Width of the garden = 300sqm25 m = 12 m

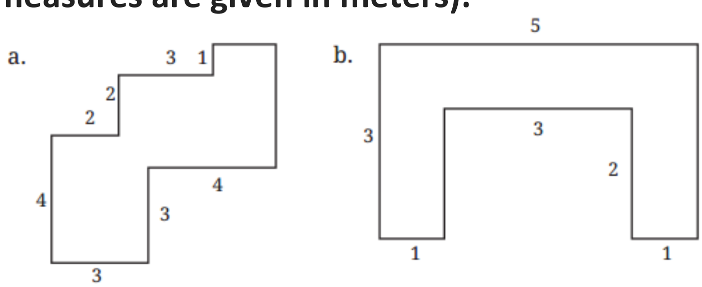
Question 2. What is the cost of tiling a rectangular plot of land 500 m long and 200 m wide at the rate of ₹ 8 per hundred sq m?

Solution: Length of rectangular plot = 500 m
Breadth of rectangular plot = 200 m
Area of rectangular plot = 500 m × 200 m = 1,00,000 sq m
The cost of tiling the plot is given ₹ 8 per hundred sq m.
So, we will convert area into per hundred sq m
1,00,000100 = 1,000 (in hundred sq m)
The cost of tiling per hundred sq m = ₹ 8
∴ The cost of tiling rectangular plot = 1,000 × ₹ 8 = ₹ 8,000

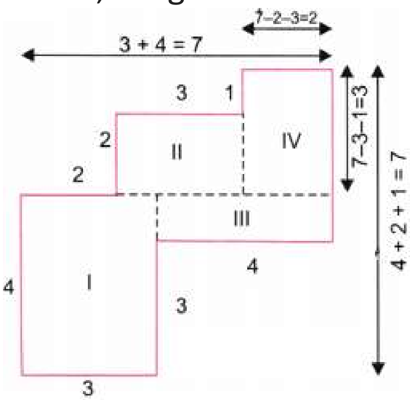
Question 3. A rectangular coconut grove is 100 m long and 50 m wide. If each coconut tree requires 25 sq m, what is the maximum number of trees that can be planted in this grove?

Solution: Area of rectangular coconut grove = 100 × 50 = 5000 sq. m
Given each coconut tree requires 25 sq. m
then the maximum no. of trees that can be planted in this grove = 500025 = 200

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



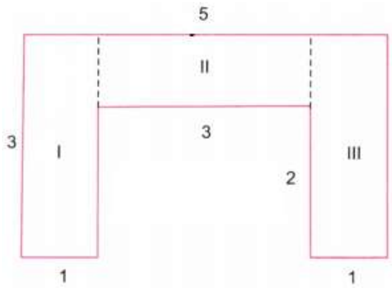
Solution: (a) Splitting the given figure into I, II, III, and IV rectangles as shown in the figure below, we get



Here, the area of rectangle I = length × breadth

= 4 cm × 3 cm
= 12 sq. cm
Area of rectangle II = length × breadth
= 3 cm × 2 cm
= 6 sq. cm
Area of rectangle III = length × breadth
= 4 cm × 1 cm
= 4 sq. cm
Area of rectangle IV = length × breadth
= 3 cm × 2 cm
= 6 sq. cm
The total area of the whole figure = 12 sq. cm + 6 sq. cm + 4 sq. cm + 6 sq. cm = 28 sq. cm.
Therefore, the total area of Figure (a) is 28 sq. cm.

(b) Similarly, by splitting figure (b) into I, II, and III rectangles as shown in the figure below, we get



Area of the rectangle I = length × breadth
= 3 cm × 1 cm
= 3 sq. cm
Area of rectangle II = length × breadth
= 3 cm × 1 cm
= 3 sq. cm
Area of rectangle III = length × breadth
= 3 cm × 1 cm
= 3 sq. cm
The total area of the figure = 3 sq. cm + 3 sq. cm + 3 sq. cm = 9 sq. cm.
Therefore, the total area of Figure (b) is 9 sq. cm.

Figure it Out (Page No. 139)

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

Solution:
Here, we can see that some shapes have identical areas.
Specifically
Shapes A and B These shapes are identical, meaning they cover the same amount of space, so they have the ^ same area.
Shapes C and E These shapes also have the same area because they are identical in size and shape.

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

Solution: Shape D is twice as big as shape C. This means that if you place two shape C pieces together. Then, they exactly cover shape D.
The relationship between these shapes
Shape D can be completely filled by combining shape C and shape E. So, area of shape D is equal to the sum of the area of shape C and E.
Each of shapes C and E has half the area of shape D.

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

Solution: From the figure, we can see that two times Shape C forms Shape D. Similarly two times Shape C forms Shape F. Thus, both Shape D and F are equal.

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

Solution:
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.

Question 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, and 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.]

Solution: Shape A has twice the area of shape G.

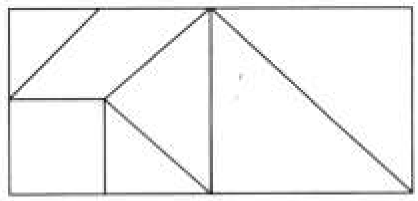
Question 6. Can you now figure out the area of the big square formed with all seven pieces in terms of the area of Shape C?

Answer: Let’s say the area of C = x
Area of D = Area of 2C = 2x

Area of E = Area of C = x
Area of F = Area of 2C = 2x
Area of G = Area of 2C = 2x
Area of A = Area of 2F = 2 × 2x = 4x
Area of B = Area of A = 4x
Hence total area of big shape = Area of A + B + C + D + E + F + 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.

Question 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.

Solution: When arranging the 7 pieces to form a rectangle, the area of the rectangle will be the same as that of area of square.



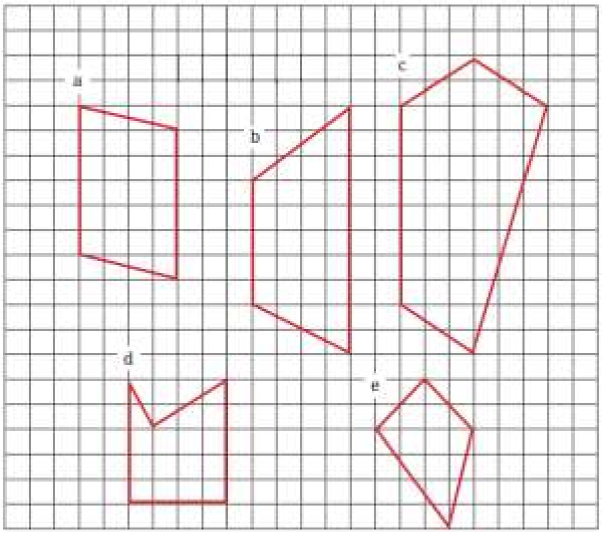
Area of rectangle = 16 × area of shape C.

Question 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.

Solution: For the same area, a square always has the smallest perimeter.
So the perimeter of the square is less than that of the rectangle.

Figure it Out (Page 144)

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



Solution:
(a) Figure have 20 full rectangles + 4 more than half rectangles + 4 less than half rectangles
= 20 × 1 + 4 × 1 + 4 × 0
= 20 + 4
= 24 sq. units

(b) Figure have 24 full rectangles, 2 half rectangles, 3 more than half and 3 less than half
∴ Area of figure = 24 + 1 + 2 × 12 + 3 × 1 + 3 × 0
= 24 + 1 + 3 + 0
= 28 sq. units
(c) Figure have 36 full rectangles, 2 half rectangles, 9 more than half, and 10 less than half rectangles
∴ Area of figure = 36 × 1 + 2 × 12 + 9 × 1 + 10 × 0
= 36 + 1 + 9 + 0
= 46 sq. units.
(d) Figure have 13 full rectangles, 1 half, 2 more than half and 2 less than half.
∴ Area of figure = 13 × 1 + 1 × 12 + 2 × 1 + 2 × 0
= 13 + 0.5 + 2
= 15.5 sq. units
(e) Figure have 5 full rectangles, 5 half, 3 more than half and 4 less than half.
∴ Area of figure = 5 × 1 + 5 × 12 + 3 × 1 + 4 × 0
= 5 + 2.5 + 3
= 10.5 sq. units

Figure it Out (Page 149)

Question 1. Give the dimensions of a rectangle whose area is the sum of the areas of these two rectangles having measurements: 5 m × 10m and 2m × 7m.

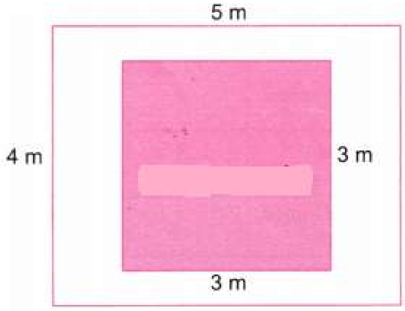
Solution: Dimensions of rectangle 1: 5 m × 10m
Dimensions of rectangle 2:2m × 7m
Area of rectangle 1 = 50 sq m
Area of rectangle 2 = 14 sq m
Now, area of rectangle = sum of areas of rectangle 1 and 2 = 50 sq m + 14 sq m = 64 sq m
So possible dimensions of a rectangle with area 64 sq m are 1 m × 64 m; 2 m × 32 m; 4 m × 16 m; 8 m × 8 m, etc.

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

Solution: Width of rectangular garden = area length of garden
= 100050
= 20 m.

Question 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.

Solution: We have a floor with dimensions 4 m width and 5 m length.



A square carpet of side 3 m.
Area of the floor = length × breath
Area of the floor = $5 \times 4 = 20\ m^2$
Area of the square carpet = $3 \times 3 = 9\ m^2$
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 = $20 - 9 = 11\ m^2$
Thus, the area of the floor that is not carpeted is $11\ m^2$.

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

Solution: We have, length of the garden = 15 m
and width of the garden = 12 m
∴ The area of the garden = Length × Width
= 15 × 12
= 180 sq. m

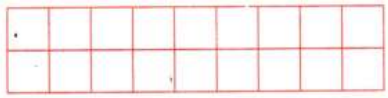
Now, also given that length of a flower bed = 2 m
and width of a flower bed = 1 m
The area of a flower bed = Length × Width
= 2 × 1
= 2 sq. m

Total area of 4 flower beds = 4 × 2
= 8 sq. m

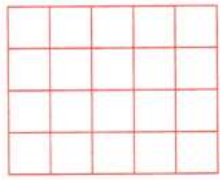
The area available for laying down a lawn
= Area of the garden – Area of 4 flower beds
= 180 – 8
= 172 sq. m

Question 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.

Solution: For shape A, can be arrange it as 9 units by 2 units, giving a perimeter of 22 units.



For shape B, can be arrange it as 5 units by 4 units, giving a perimeter of 18 units.

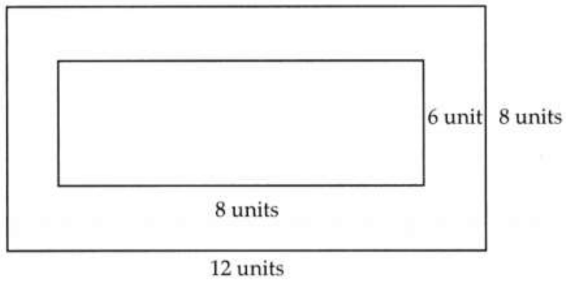


Question 6. On a page in your book, draw a rectangular border that is 1 cm from the top and bottom and 1.5 cm from the left and right sides. What is the perimeter of the border?

Solution: Perimeter of the border = 2(1 + 1.5) = 5 cm^2

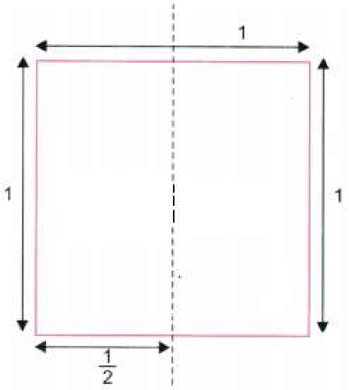
Question 7. Draw a rectangle of size 12 units × 8 units. Draw another rectangle inside it, without touching the outer rectangle that occupies exactly half the area.

Solution: As given, the Area of the rectangle of size 12 units × 8 units = 96 sq units
And the area of an inner rectangle that occupies exactly half the area = 48 sq units

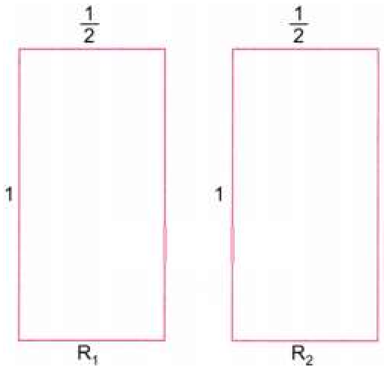


Question 8. A square piece of paper is folded in half. The square is then cut into two rectangles along the fold. Regardless of the size of the square, one of the following statements is always true. Which statement is true here?
(a) The area of each rectangle is larger than the area of the square.
(b) The perimeter of the square is greater than the perimeters of both the rectangles added together.
(c) The perimeters of both the rectangles added together are always 112 times the perimeter of the square.
(d) The area of the square is always three times as large as the areas of both rectangles added together.

Solution:



Now in the above square piece
side of square = 1 unit
area of square = 1 × 1 = 1 sq. unit.
and perimeter of square = 1 + 1 + 1 + 1 = 4 units.
Now after folding the above square piece in half becomes 2 rectangles

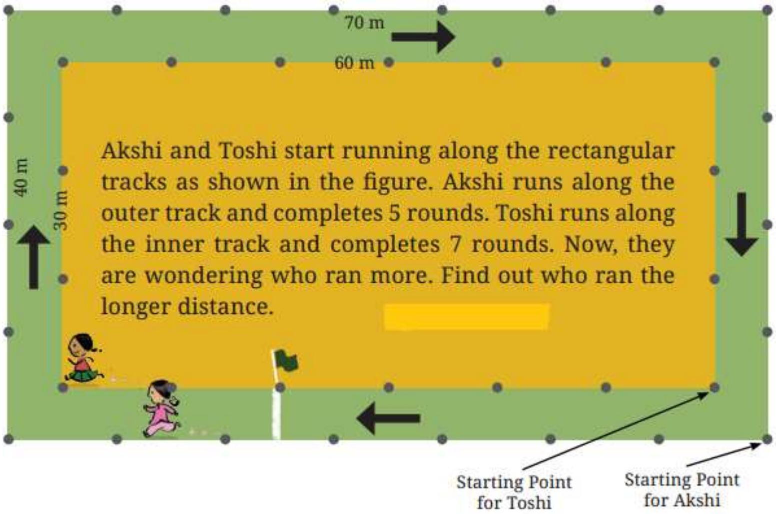


Perimeter of rectangle R_1 = 1 + 12 + 1 + 12 = 3 units.
Area of rectangle R_1 = 12 × 1 = 12 sq. unit.
Perimeter of rectangle R_2 = 1 + 12 + 1 + 12 = 3 units.
Area of rectangle R_2 = 12 × 1 = 12 sq. unit.
(a) Now, area of rectangle R_1 = area of rectangle R_2 = 12 < 1.
Hence, option (a) is not true.
(b) 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.

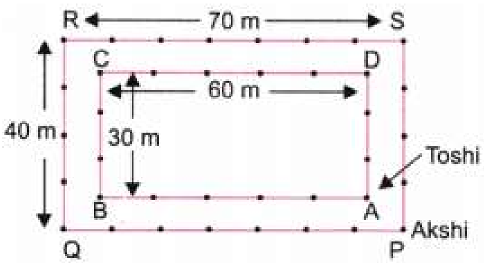
(c) Here perimeters of both the rectangles = 6 units
and perimeter of square = 4 units × 112 = 4 × 32 = 6 units.
The perimeters of both the rectangles added together are 112 times the perimeter of the square.
Hence, option (c) is true.
(d) Here, the area of the square = 4 units
and areas of both the rectangles = 12 + 12 = 1 unit.
The area of the square is four times the area of both rectangles.
Hence, option (d) is not true.

Intext Questions (Page No. 133)

Akshi and Toshi start running along the rectangular tracks as shown in the figure. Akshi runs along the outer track and completes 5 rounds. Toshi runs along the inner track and completes 7 rounds. Now, they are wondering who ran more. Find out who ran the longer distance.



Solution:



Here, perimeter of rectangular track PQRS = 2 × (l + b)

= 2 × (70 + 40)

= 2 × 110

= 220 m

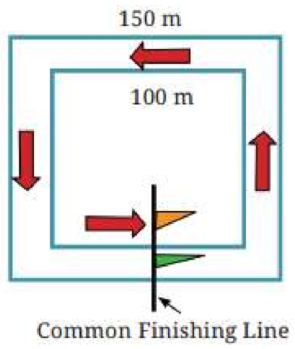
and perimeter of rectangular track ABCD = 2 × (60 + 30)

= 2 × 90

= 180 m

Deep Dive: (Page No. 134)

In races, usually, there is a common finish line for all the runners. Here are two square running tracks with an inner track of 100 m on each side and an outer track of 150 m on each side. The common finishing line for both runners is shown by the flags in the figure which are in the center of one of the sides of the tracks. If the total race is 350 m, then we have to find out where the starting positions of the two runners should be on these two tracks so that they both have a common finishing line after they run for 350 m. Mark the starting points of the runner on the inner track as 'A ' and the runner on the outer track as 'B'.



Solution: Inner Track (100 m per side)
Perimeter Calculation: The perimeter of the inner track is (4 times 100 = 400) meters.
Distance to Run: The runner on the inner track needs to run 350 meters.
Starting Position (A): Since the perimeter is 400 meters, the runner will start 50 meters before the common finish line (400 – 350 = 50 meters).
Outer Track (150 m per side)
Perimeter Calculation: The perimeter of the outer track is (4 times 150 = 600) meters.
Distance to Run: The runner on the outer track also needs to run 350 meters.
Starting Position (B): Since the perimeter is 600 meters, the runner will start 250 meters before the common finish line (600 – 350 = 250 meters).

Perimeter of a Regular Polygon (Page No. 135)

Find various objects from your surroundings that have regular shapes and find their perimeters. Also, generalize your understanding of the perimeter of other regular polygons.
Solution:
Some common objects with regular shapes and calculating their perimeters:
Here are a few examples:

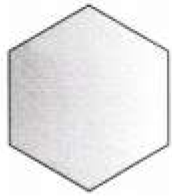
1. Square Table:

Shape: Square
Side Length = 1 meter
Perimeter = 4 × 1 = 4 meters

2. Equilateral Triangle Clock:

Shape: Equilateral Triangle
Side Length = 30 cm
Perimeter = 3 × 30 = 90 cm

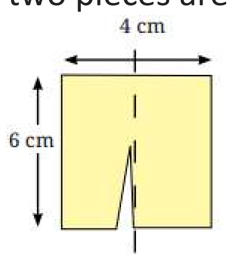
3. Hexagonal Tile:



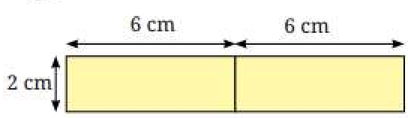
Shape: Regular Hexagon
Side Length = 10 cm
Perimeter = 6 × 10 = 60 cm
In general, the Perimeter of a Regular Polygon = (Number of sides) × (Side length of a polygon) units.

Split and Rejoin (Page No. 136)

A rectangular paper chit of dimension 6 cm × 4 cm is cut as shown into two equal pieces. These two pieces are joined in different ways.

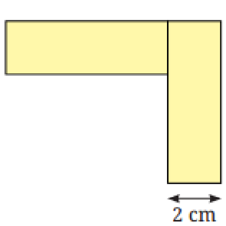


a.

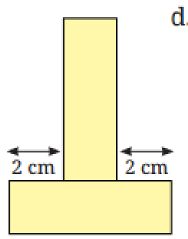


For example, the arrangement a. has a perimeter of 28 cm.
Find out the length of the boundary (i.e., the perimeter) of each of the other arrangements below.

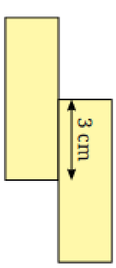
b.



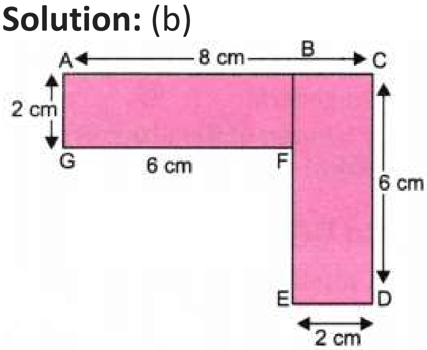
c.



d.

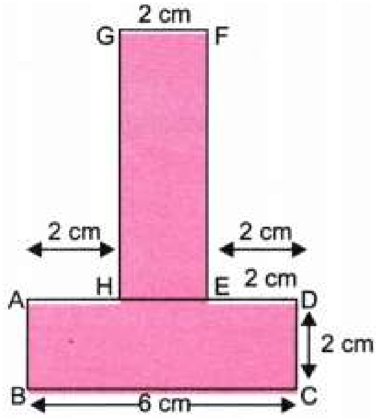


Solution: (b)



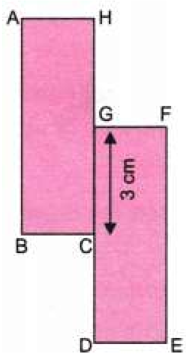
∴ Length of boundary = AB + BC + CD + DE + EF + FG + GA
= 6 + 2 + 6 + 2 + 4 + 6 + 2
= 28 cm

(c)



Total length of boundary = AB + BC + CD + DE +EF + FG + GH + HA
= 2 + 6 + 2 + 2 + 6 + 2 + 6 + 2
= 28 cm

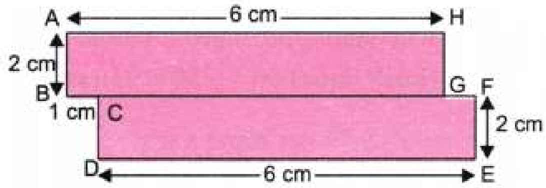
(d)



Total length of boundary = AB + BC + CD + DE + EF + FG + GH + HA
= 6 + 2 + 3 + 2 + 6 + 2 + 3 + 2
= 26 cm

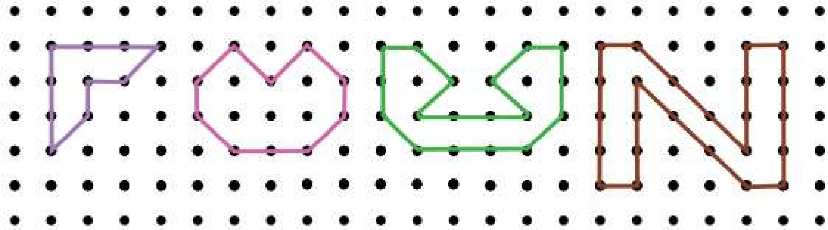
Arrange the two pieces to form a figure with a perimeter of 22 cm.

Solution: Arranging the two pieces in such a way that they form a new shape with the desired perimeter:



Total length of boundary = AB + BC + CD + DE + EF + FG + GH + HA
= 2 + 1 + 2 + 6 + 2 + 1 + 2 + 6
= 22 cm

Find the area of the following figures. (Page No. 140)



Solution: (i)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	3	$3 \times 1 = 3$
Half-filled squares	2	$2 \times ½ = 1$

∴ Total area of the figure = 3 + 1 = 4 sq. units

(ii)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	6	$6 \times 1 = 6$
Half-filled squares	6	$6 \times ½ = 3$

∴ Total area of the figure = 6 + 3 = 9 sq. units

(iii)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	7	$7 \times 1 = 7$
Half-filled squares	6	$6 \times ½ = 3$

∴ Total area of the figure = 7 + 3 = 10 sq. units

(iv)

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	8	$8 \times 1 = 8$
Half-filled squares	6	$6 \times ½ = 3$
More than half of a square	0	

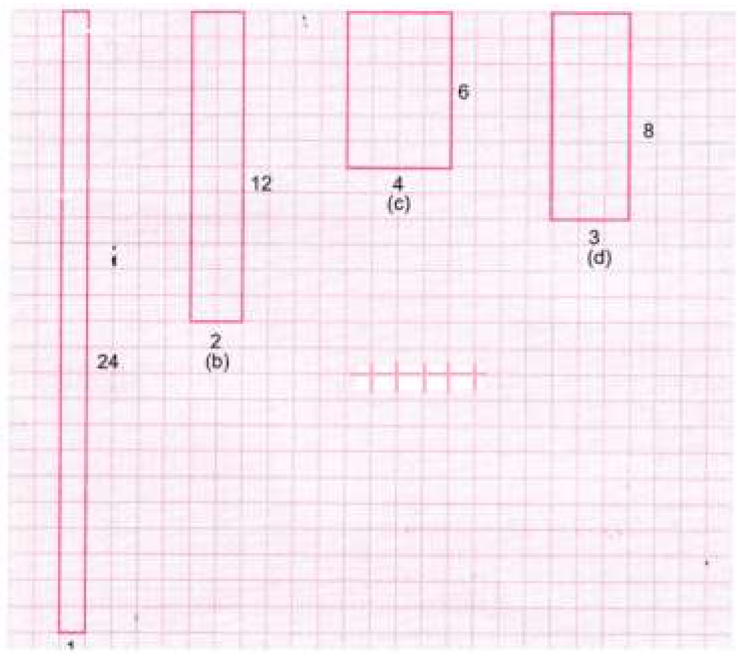
∴ Total area of the figure = 8 + 3 = 11 sq. unit

Let's Explore! (Page No. 141)

On a squared grid paper (1 square = 1 square unit), make as many rectangles as you can

whose lengths and widths are a whole number of units such that the area of the rectangle is 12 square units.
(a) Which rectangle has the greatest perimeter?
(b) Which rectangle has the least perimeter?
(c) If you take a rectangle of area 32 sq cm, what will your answers be? Given any area, is it possible to predict the shape of the rectangle with the greatest perimeter as well as the least perimeter? Give examples and reasons for your answer.

Solution:



Perimeter of (a) = 2(1 + 24) = 2 × 25 = 50 units
Perimeter of (b) = 2(2 + 12) = 2 × 14 = 28 units
Perimeter of (c) = 2(4 + 6) = 2 × 10 = 20 units
Perimeter of (d) = 2(3 + 8) = 2 × 11 = 22 units
(a) Clearly rectangle (a) has the greatest perimeter.
(b) Obviously rectangle (c) has the least perimeter.
(c) Yes, it is possible to predict the shape of a rectangle with the greatest and least perimeter for a given area. Here's how:

Greatest Perimeter: For a given area, the rectangle with the greatest perimeter will have one side as small as possible. This essentially means that the rectangle becomes very elongated.

For example, if the area is 24 square units, a rectangle with dimensions 1 unit by 24 units will have the greatest perimeter.

Example: Area = 24 square units
Dimensions = 1 unit by 24 units
Perimeter = 2(1 + 24) = 50 units

Least Perimeter: The rectangle with the least perimeter for a given area will be as close to a square as possible. This is because a square has the smallest perimeter for a given area among all rectangles.

Example: Area = 24 square units
Dimensions = 4 units by 6 units (since 4 × 6 = 24)
Perimeter = 2(4 + 6) = 20 units

Reasoning
Greatest Perimeter: When one side is minimized, the other side must be maximized to maintain the same area. This increases the sum of the sides, thus increasing the perimeter.
Least Perimeter: A square or a shape close to a square minimizes the sum of the sides for a given area, thus minimizing the perimeter.

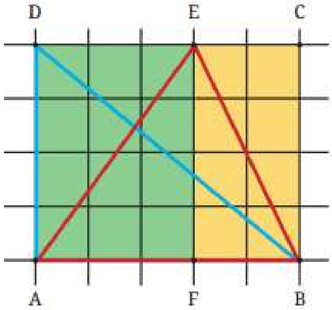
Check! whether the two triangles overlap each other exactly. Do they have the same area? (Page No. 142)

Solution:
Two triangles overlap each other exactly, which means they are congruent. Congruent triangles have the same shape and size, which implies that they also have the same area.

Can you draw any inferences from this exercise? Please write it here. (Page No. 142)

Solution: Congruence: The triangles are congruent, meaning all corresponding sides and angles are equal.
Area: Since the triangles are congruent, their areas are identical.

Use your understanding from previous grades to calculate the area of any closed figure using grid paper and- (Page No. 143)



1. Find the area of the blue triangle BAD.
2. Find the area of the red triangle ABE.

Solution: 1. Area of blue triangle BAD

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	6	6 × 1 = 6
Half-filled squares	2	2 × ½ = 1
More than half-filled squares	3	3 × 1 = 3
Less than half-filled squares	3	0

∴ Total area of BAD = 6 + 1 + 3 = 10 sq. units

2. Area of red triangle ABE

Covered Area	Number	Area Estimated (sq. units)
Fully-filled squares	5	5 × 1 = 5
Half-filled squares	2	2 × ½ = 1
More than half-filled squares	4	4 × 1 = 4
Less than half-filled squares	3	0

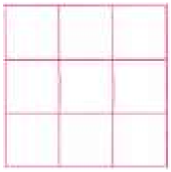
∴ Total area of ABE = 5 + 1 + 4 = 10 sq. units
Area of rectangle ABCD = Number of fully tilled squares
= 20 × 1
= 20 sq. units

Making it 'More' or 'Less' (Page No. 145)

Using 9 unit squares, solve the following.

Question 1. What is the smallest perimeter possible?

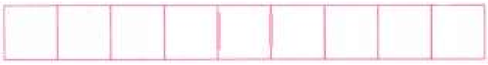
Solution: The smallest perimeter is achieved by forming a 3 × 3 square:



Perimeter = 3 + 3 + 3 + 3 = 12 units.

Question 2. What is the largest perimeter possible?

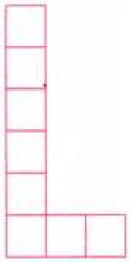
Solution: The largest perimeter is achieved by arranging the squares in a straight line:



Perimeter = 1 + 9 + 1 + 9 = 20 units.

Question 3. Make a figure with a perimeter of 18 units.

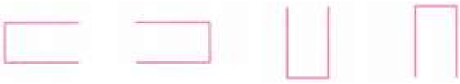
Solution: One possible figure is an L-shaped arrangement:
Arrange 6 squares in a vertical line and 3 squares in a horizontal line at the bottom.



Perimeter = 6 + 3 + 1 + 1 + 1 + 1 + 1 + 1 + 3 = 18 units.

Question 4. Can you make other shaped figures for each of the above three perimeters, or is there only one shape with that perimeter? What is your reasoning?

Solution: Smallest Perimeter (12 units): Only the 3 × 3 square achieves this.
Largest Perimeter (20 units): Only the straight line achieves this or any pattern made by folding two straight lines.



Perimeter of 18 units: Multiple shapes can achieve this. For example, a T-shaped figure or other L-shaped configurations.

The reasoning is based on the arrangement of the unit squares and the number of exposed edges. The more compact the shape, the smaller the perimeter; the more elongated, the larger the perimeter. For intermediate perimeters like 18 units, various configurations can be created by adjusting the arrangement of the squares.