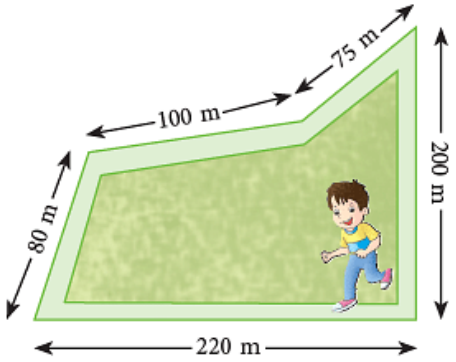
Perimeter and Area

Perimeter

Every morning, Sudhir goes for a jog to a park near his house which looks as shown in the given figure. The jogging track is along the boundary of the playground and the lengths of its various parts are as given.



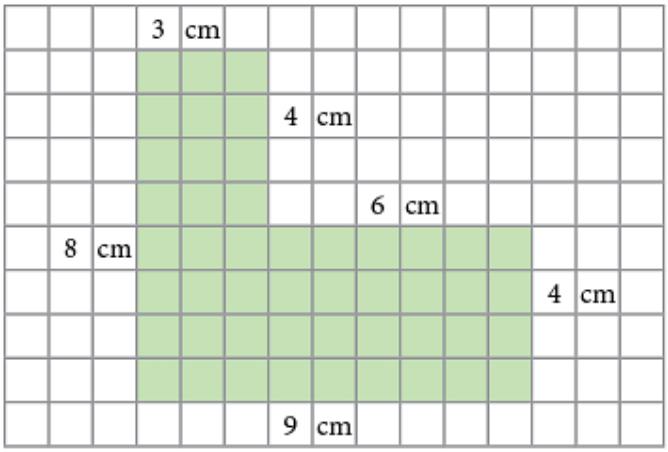
The society to which the park belongs, wants to fence the same with wire so that the intruders can be stopped.
What is the total distance around the park that requires fencing?
Total distance around the park that requires fencing
= 100 m + 75 m + 200 m + 220 m + 80 m = 675 m.

We call the distance around the park its **perimeter.**
Thus, the distance around a figure is called its perimeter.
It is found by adding the lengths of the sides of the figure.

Tips: Perimeter is a Greek word. **Peri** means around and **metrom** means measure.

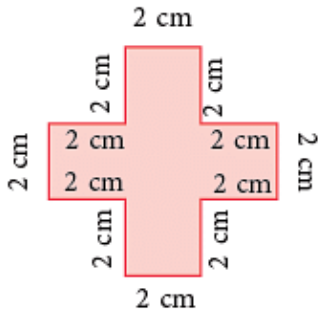
Finding the Perimeter of Figures

1. We can find the perimeter of a figure, such as given alongside, by counting the number of 1 cm squares along each side of the figure and then adding the lengths of all the sides.



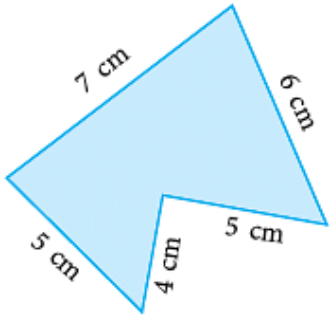
∴ Perimeter of the figure given alongside
= 3 cm + 8 cm + 9 cm + 4 cm + 6 cm + 4 cm
= 34 cm.

2. The perimeter of the figure shown alongside



= 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm
= (12 × 2) cm = 24 cm

3. The perimeter of the figure shown alongside

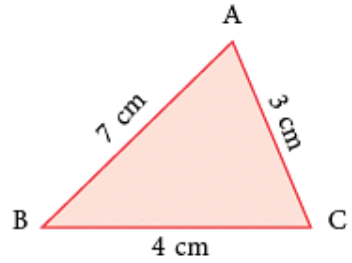


= 7 cm + 6 cm + 5 cm + 4 cm + 5 cm
= 27 cm

Perimeter of a Triangle

We learnt that the perimeter of a simple closed curve made up of the line segments is the sum of lengths of all the line segments. Let us now find the perimeter of a triangle.

In case of triangle ABC,



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

$= 7 \text{ cm} + 4 \text{ cm} + 3 \text{ cm} = 14 \text{ cm}$

Thus, perimeter of a triangle is the sum of the lengths of its sides.

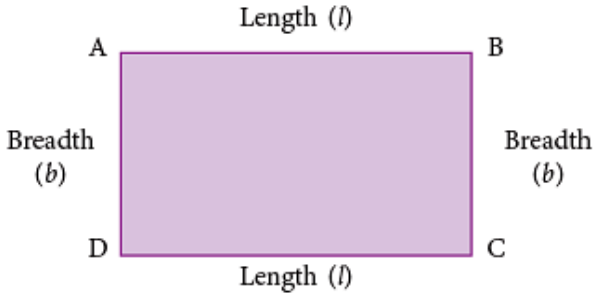
In an equilateral triangle, all the sides are of the same length.

So, perimeter of an equilateral triangle = side + side + side = 3 × side.

(By side we mean side length.)

Perimeter of a Rectangle

Look at the rectangle ABCD, shown below.



A rectangle has opposite sides of the same measure.

So, perimeter of a rectangle = Sum of the lengths of all line segments.

∴ Perimeter of the rectangle = AB + BC + CD + DA.

$= l + b + l + b = 2l + 2b = 2(l + b)$

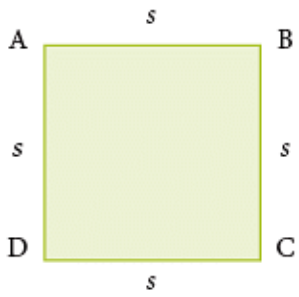
So, Perimeter of a rectangle = 2 (length + breadth).

Perimeter of a Square

In a square, all the sides are of equal length.

Look at the square ABCD, shown alongside.

So, perimeter of the square = Sum of the lengths of all line segments.



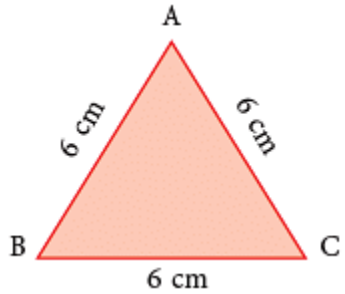
∴ Perimeter of the square ABCD = AB + BC + CD + DA

= s + s + s + s = 4s

So, Perimeter of a square = 4 × side.

Example 1: Triangle ABC is an equilateral triangle with all the sides measuring 6 cm each. Find its perimeter.

Perimeter of an equilateral triangle



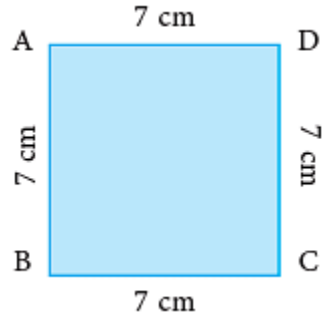
= 3 × length of one side

= 3 × 6 cm = 18 cm

Thus, the perimeter of the triangle ABC is **18 cm.**

Example 2: The measure of a side of a square is 7 cm. Find the perimeter of the square.

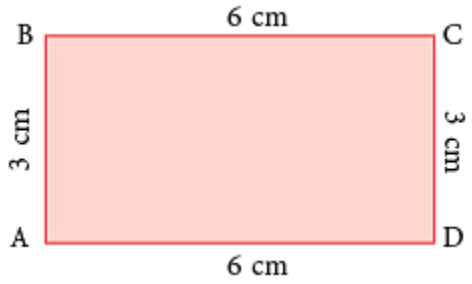
The perimeter of the square = 4 × length of one side



$= 4 \times 7$ cm $= 28$ cm
Thus, the perimeter of the square is **28 cm.**

Example 3: The length of the sides AB and CD of the rectangle ABCD are 3 cm each and the length of the sides BC and DA are 6 cm each. Find its perimeter.

Perimeter of rectangle ABCD,

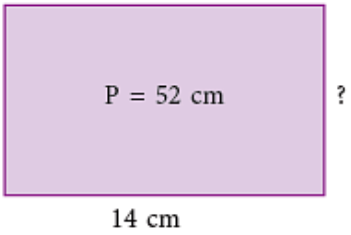


$= 3$ cm $+ 6$ cm $+ 3$ cm $+ 6$ cm $= 18$ cm
Using the formula,

Perimeter of the rectangle ABCD $= 2(l + b)$
$= 2 \times (6 + 3)$ cm
$= 2 \times 9$ cm $= 18$ cm
Thus, the perimeter of the rectangle ABCD is **18 cm.**

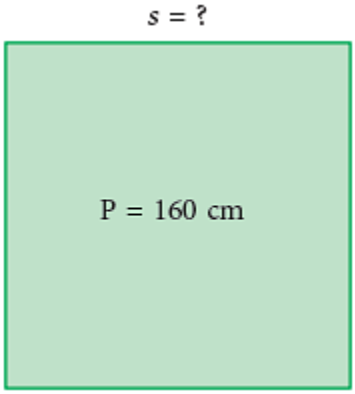
Example 4: The perimeter of a rectangle is 52 cm. The length of the rectangle is 14 cm. Find its breadth

Perimeter $= 52$ cm, Length $= 14$ cm



We know that,Perimeter of a rectangle $= 2(l + b)$
52 cm $= 2(14$ cm $+ b)$
$52 \div 2$ cm $= 14$ cm $+ b$
26 cm $= 14$ cm $+ b$
26 cm $- 14$ cm $= b$
$b = 12$ cm
Thus, breadth of the rectangle is **12 cm.**

Example 5: What is the length of the side of a square whose perimeter is 160 cm?
Given, perimeter = 160 cm.

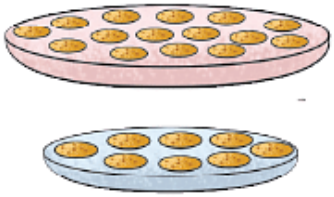


We know that,
Perimeter of a square = 4 × side 160 cm
= 4 × side 160 cm ÷ 4
= side 40 cm = side
Thus, measure of one side of the square is **40 cm.**

Area

Concept of Area

Take a plate and cover it with the cookies. How many cookies do you need to cover the plate? Now, take another plate of a different size. Which plate needs more cookies? Which plate has a larger surface?

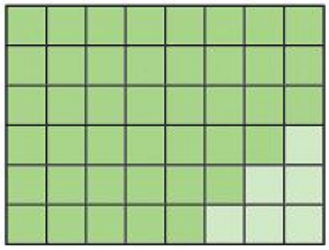


Rahul wrapped 2 gifts. He found that bigger gift required more wrapping paper, whereas the smaller gift required less wrapping paper. So, by area we mean, the flat surface which you cover or paint.

Thus, area is the measure of the region inside a plane figure.

Finding Area using Square Tiles

Ms Sharma wanted to know the area of her porch floor. She started, by putting square floor tiles on the floor.



Square unit

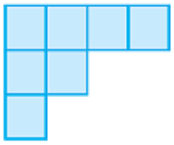
How many more tiles will it take to cover the floor?
Ans: 6

How many tiles will be used altogether?
Ans: 48

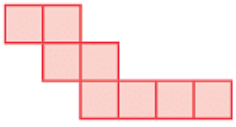
An object such as a square paper sheet or a square floor tile can be used to find the area. A square and its interior is called a square unit for finding area.
Thus, area of a region can be found by finding the number of square units needed to cover the interior of a figure.

Example 6: Find the area of each of the following regions by counting squares.

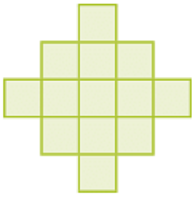
(a)

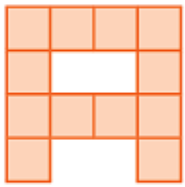


(b)



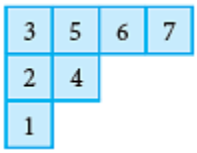
(c)



(d) 

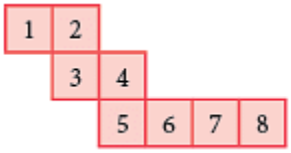
Mark the squares in the figures:

(a) Since there are 7 squares in the figure,



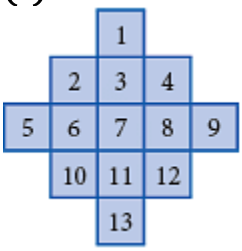
∴ Area of the given figure = **7 square units.**

(b) Since there are 8 squares in the figure,



∴ Area of the given figure = **8 square units.**

(c) Since there are 13 squares in the figure,



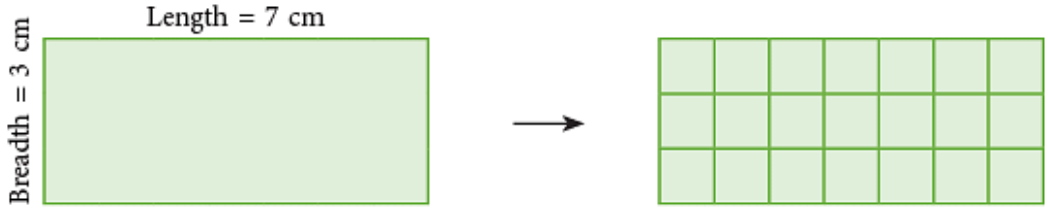
∴ Area of the given figure = **13 square units.**

(d) Since there are 12 squares in the given figure,

∴ Area of the given figure = **12 square units.**

Area of a Rectangle

Look at the following rectangle whose length is 7 cm and breadth is 3 cm.

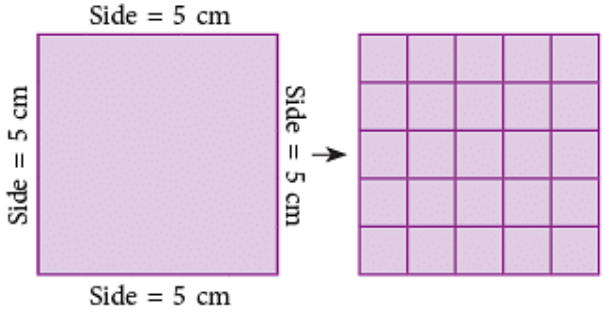


To find its area, we can divide it into 3 rows of 7 squares each or 7 columns of 3 squares each.

By counting the number of squares, we can find the area of the rectangle. Since the rectangle contains 21 squares, so its area = 21 square centimetre.
Note that, if we multiply the length (l) = 7 cm and breadth (b) = 3 cm, then we get the product as 21 square centimetre.
Therefore, Area of a rectangle = length × breadth = l × b.

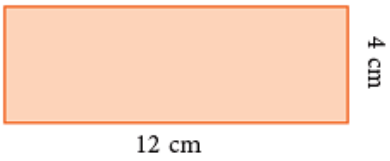
Area of a Square

If we divide a square of side 5 cm into small squares by dividing it into 5 rows and 5 columns, we get 25 small squares each of length 1 centimetre.



∴ Area of the square = 25 sq cm (by counting).
Also, on multiplying 5 cm by 5 cm, we get, 25 sq cm.
Therefore, Area of a square = side × side.

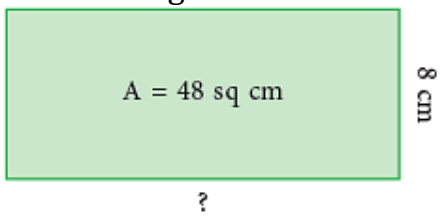
Example 7: Find the area of a rectangle with length 12 cm and breadth 4 cm.
Area of rectangle = l × b



$= 12 \text{ cm} \times 4 \text{ cm} =$ **48 sq cm.**

Example 8: Find the length of a rectangle whose area is 48 sq cm and breadth is 8 cm.

Area = Length × Breadth



$$\therefore \text{ Length } = \frac{\text{Area}}{\text{Breadth}} = \frac{48}{8} \text{ cm} = \textbf{6 cm.}$$

Example 9: Find the area of a square field of side length 70 m?
Area of square = Side × Side
$= 70 \text{ m} \times 70 \text{ m} =$ **4900 sq m.**