$5(x - y)$ $\sqrt{64}$ $x°$ $1\frac{7}{10}$ $(-1)^3$

② # Perimeter

By studying this lesson you will be able to,

- calculate the perimeters of composite rectilinear plane figures composed of two similar or different types of plane figures from equilateral triangles, isosceles triangles, squares and rectangles, and
- solve problems involving the perimeters of composite rectilinear plane figures.

2.1   Perimeter

Suppose we need to find the length around a rectangular plot of land. For this we need to obtain the sum of the lengths of all four sides of the plot.

The measurement that is thus obtained is said to be the perimeter of the plot of land.

You have learnt earlier that, the sum of the lengths of all the sides of a closed rectilinear plane figure is called its **perimeter**.

Now let us recall some of the formulae you learnt in Grades 6 and 7 that can be used to find the perimeter of certain plane figures.

- If the perimeter of a square of side length l units is p units, then
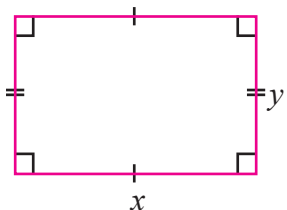
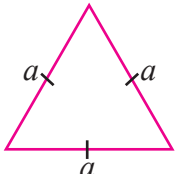$$p = l + l + l + l$$
$$p = 4l$$

l
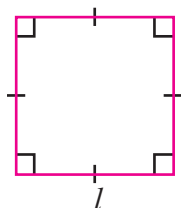
- If the perimeter of a rectangle of length x units and breadth y units is p units, then
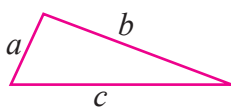
$$p = x + y + x + y$$
$$p = 2x + 2y$$

- If the perimeter of an equilateral triangle of side length a units is p units, then

$$p = a + a + a$$
$$p = 3a$$

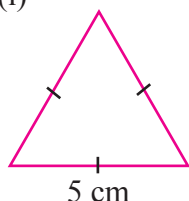- If the perimeter of a triangle with side lengths a, b and c units is p units, then

$$p = a + b + c$$

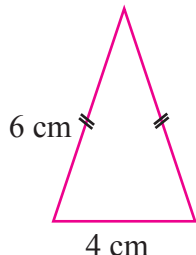Do the following review exercise to revise what you have learnt.

Review Exercise
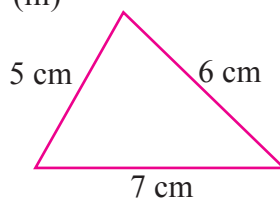
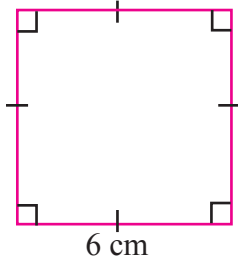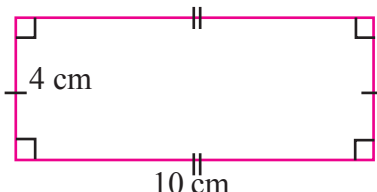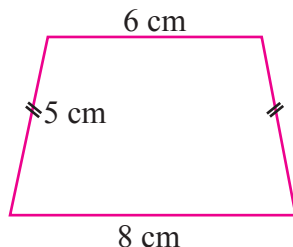(1) Find the perimeter of each of the figures given below.

(i)

5 cm

(ii)

6 cm

4 cm

(iii)

5 cm   6 cm

7 cm

(iv)

6 cm

(v)

4 cm

10 cm

(vi)

6 cm

5 cm

8 cm

(2) The perimeter of a square shaped wall tile is 160 cm. How many such tiles are needed for one lengthwise row of a wall of length 4 m, if the tiles are to be fixed without any gaps between them?

(3) If the perimeter of a rectangular shaped paddy field of length 40 m is 130 m, find its breadth.

(4) The length of a rectangular shaped wall tile is greater than its breadth by 10 cm. If the breadth of the tile is 15 cm, find its perimeter.

(5) There are two pieces of wire of length 60 cm each. Amali makes an equilateral triangle by bending one of these pieces of wire. Sandamini makes a square with the other piece of wire.
   (i) Find the length of a side of the equilateral triangle made by Amali.
   (ii) Find the length of a side of the square made by Sandamini.

(6) The length and breadth of a rectangular shaped flower bed are 7 m and 3 m respectively. How many square shaped bricks of length 25 cm each are needed to place one row of bricks around the flower bed without any space left between the bricks?

(7) The length of a rectangular shaped playground is twice its breadth. If the perimeter of the playground is 360 m, find its length and its breadth.

2.2   Perimeter of a composite rectilinear plane figure

You have learnt that a plane figure which is composed of several plane figures is called a composite plane figure. Now let us learn how to find the perimeter of a composite plane figure which is composed of two plane figures.

Two rectangular shaped pieces of paper which are 5 cm in length and 2 cm in breadth are given below.

2 cm   2 cm

5 cm   5 cm

For Free Distribution
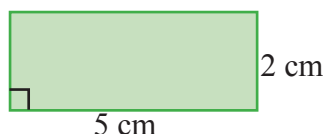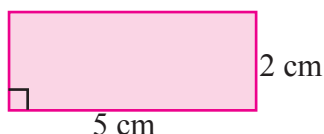
The perimeter of one rectangular shaped piece of paper = 5 cm + 2 cm + 5 cm + 2 cm
= 14 cm

The sum of the perimeters of the two rectangular shaped pieces of paper = 14 cm + 14 cm
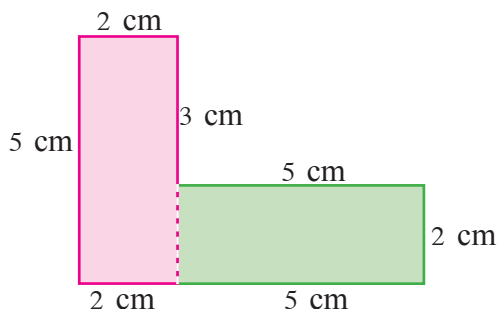= 28 cm

Let us find the perimeter of several composite plane figures formed with these two rectangular shaped pieces of paper.

(i)
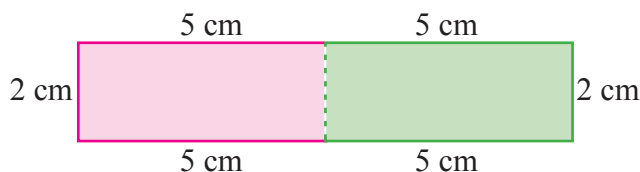
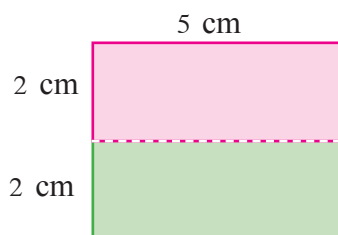The perimeter of the figure = 5 cm + 5 cm + 2 cm + 5 cm + 5 cm + 2 cm
= 24 cm

(ii)

The perimeter of the figure = 5 cm + 2 cm + 3 cm + 5 cm + 2 cm + 5 cm + 2 cm
= 24 cm

(iii)

The perimeter of the figure = 5 cm + 2 cm + 2 cm + 5 cm + 2 cm + 2 cm
= 18 cm

It must be clear to you through these examples, that the perimeter of each of the composite plane figures formed is less than the sum of the perimeters of the two rectangles.

Hence, when calculating the perimeter of a composite rectilinear plane figure, only the lengths of all the straight line segments by which the figure is bounded should be added.
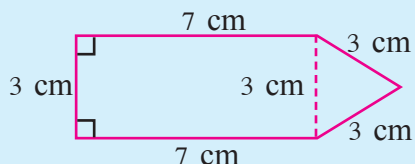
Note :

The perimeter of a composite plane figure cannot be obtained by adding together all the perimeters of the plane figures which the composite figure is composed of.
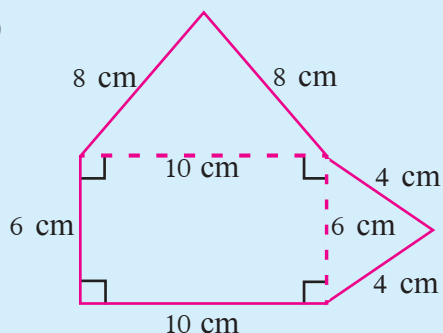
Example 1

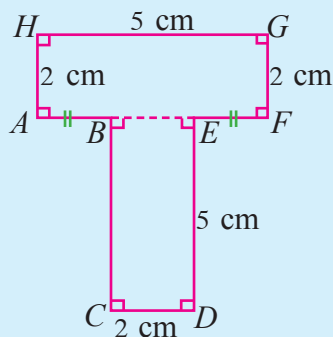Calculate the perimeter of each of the figures given below.

(i)

Perimeter = 7 cm + 3 cm + 3 cm + 7 cm + 3 cm
= 23 cm

(ii)

Perimeter = 8 cm + 4 cm + 4 cm + 10 cm + 6 cm + 8 cm
= 40 cm

(iii)

$GH = 5$ cm
$AB = EF$
2 $AB = 5$ cm − 2 cm = 3 cm
∴ $AB = 1.5$ cm

Perimeter of the figure = 5 cm + 2 cm + 1.5 cm + 5 cm + 2 cm + 5 cm + 1.5 cm + 2 cm
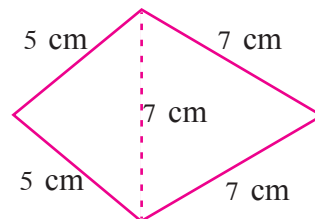= 24 cm

Exercise 2.1

(1) Calculate the perimeter of each of the figures given below.

(i)
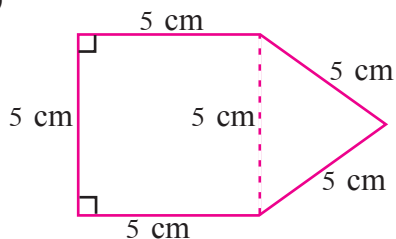
(ii)

(iii)
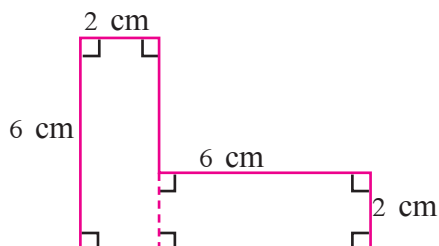
(iv)
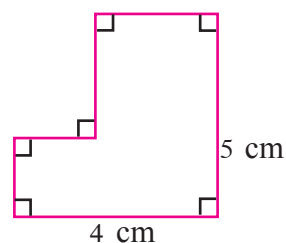
(v)

(vi)

(vii)
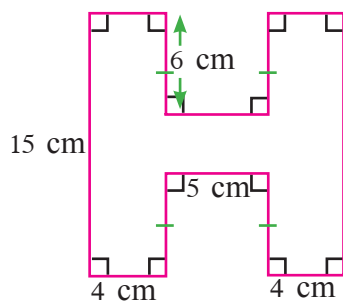
(viii)
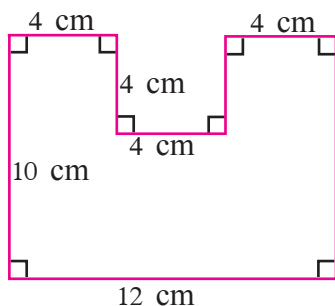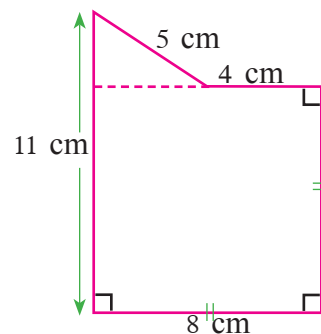
(2) A figure of a gate with two panels is given here. Calculate the perimeter of the gate.

3 m

4 m

2.5 m   2.5 m

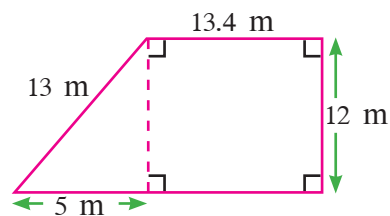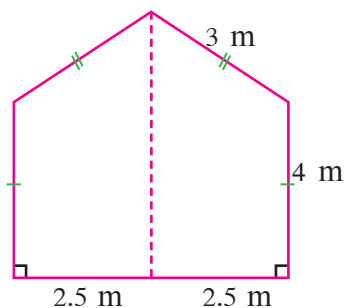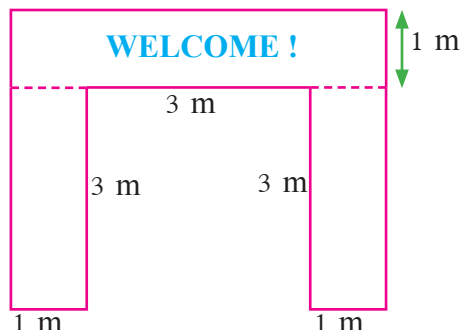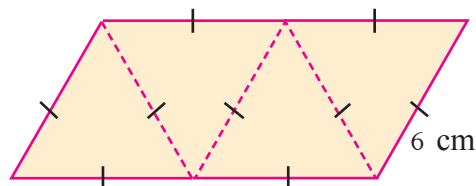(3) A figure of an entrance structure constructed to welcome the students of grade 1 to a school is given with its measurements. Find the minimum length of the ribbon required to fix around the entrance structure.

WELCOME !

1 m

3 m

3 m   3 m

1 m   1 m

(4) A figure of a net used to construct a solid is shown here. Calculate its perimeter.

6 cm

(5) A section of a courtyard constructed with square shaped floor tiles of length 40 cm each is shown in the figure. Find the perimeter of this section?
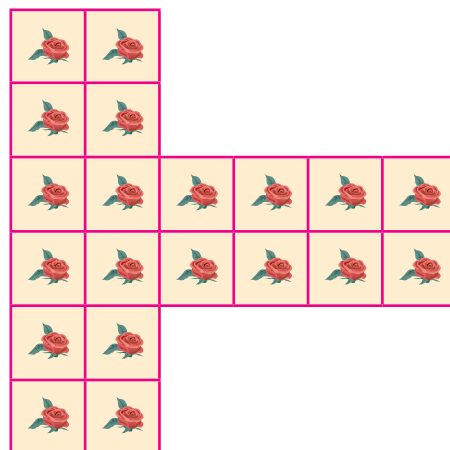
(6) If the perimeter of a wall hanging composed of a square shaped wooden lamina and an equilateral triangular shaped wooden lamina with base equal to a side of the square is 160 cm,

  (i) calculate the length of a side of the square shaped wooden lamina.
 (ii) calculate the perimeter of the equilateral triangular shaped wooden lamina.

(7) What is the least of the perimeters of the composite plane figures that can be made with two rectangles of length 6 cm and breadth 4 cm each?

(8) A composite figure formed with four rectangles of length 8 cm and breadth 4 cm each and a square of side length 4 cm is shown here. Calculate the perimeter of the figure.

4 cm

←8 cm→
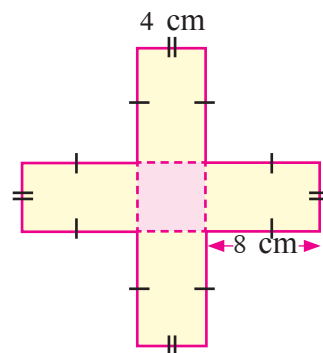
(9) Every morning Binuli walks twice around the park shown in the figure. Find the total distance she walks around the park each day.

475 m

705 m
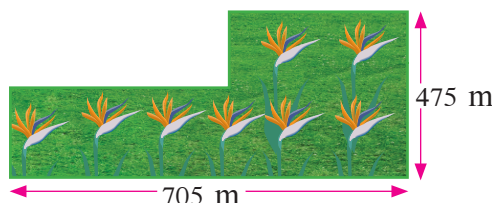
Summary

📖 The perimeter of a composite plane figure which is composed of several plane figures is not equal to the sum of the perimeters of the plane figures of which it is composed.

📖 When calculating the perimeter of a composite rectilinear plane figure, only the lengths of the straight line segments by which it is bounded should be added.