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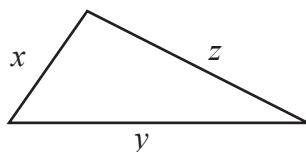
Perimeter

After studying this lesson, you can get a good understanding of

- ★ finding the perimeter of a composite plane figure
- ★ solving problems involving perimeter

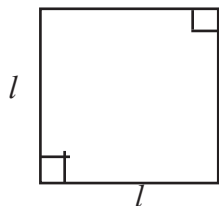
2.1 In grade 7 you gained a fair knowledge of what is given below when you were studying about perimeter.

- ★ If the perimeter of a triangle of sides x , y and z is P ,



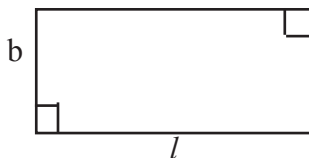
$$P = x + y + z$$

- ★ If the perimeter of a square of side l is P then,



$$P = 4l$$

- ★ If the perimeter of a rectangle of length l and breadth b is P



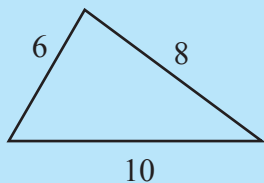
$$P = 2l + 2b$$

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

By using the knowledge you have already gained do the following exercise.

Exercise 2.1

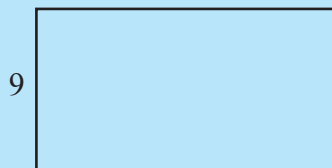
- (1) Find the perimeter of each of the figures given below. Measurements are given in centimeters.



(i)



(ii)



(iii)

- (2) (i) If a side of an equilateral triangle is 8 cm, find its perimeter.
(ii) Find the length of a side of a square having the same perimeter as that of the triangle mentioned above.
- (3) The perimeter of a square is 36 cm.
(i) Find the length of a side of the square
(ii) Find the length of a side of an equilateral triangle having the same perimeter, as that of the square
(iii) Suggest three suitable lengths for the sides of an isosceles triangle having the same perimeter as that of the square.
(iv) Suggest two suitable values for the length and breadth of a rectangle having the same perimeter, as that of the square.
- (4) The length of a rectangular volleyball court is twice its breadth.
(i) If the breadth is x , what is its length?
(ii) Find an expression in terms of x for the perimeter of the court.
(iii) If the perimeter of the court is 60 m, find the value of x and write down the length and breadth of the volleyball court.
- (5) The length of a rectangle is 5 cm more than its breadth.
(i) If the breadth of the rectangle is a cm what is its length?
(ii) Find an expression in terms of a for the perimeter of the rectangle
(iii) If the perimeter is 38 cm find the value of " a " and hence find the length of the rectangle.

2.2 Perimeter of a composite plane figure

So far we have learned how to find the perimeter of several plane figures. Now we will learn how to find the perimeter of composite plane figures formed by two plane figures.

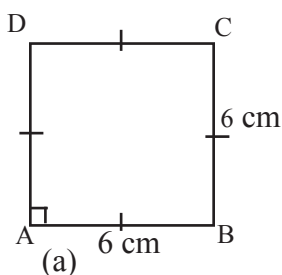


Figure (a) shows a square.
Its perimeter = 4×6 cm
= 24 cm

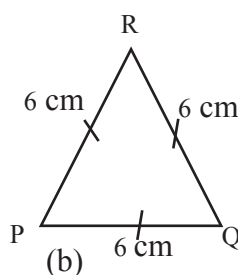


Figure (b) shows an equilateral triangle.
Its perimeter = 3×6 cm
= 18 cm

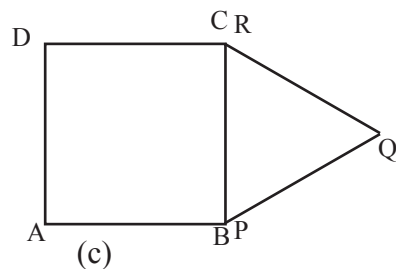


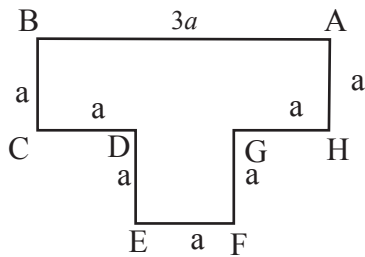
Figure (c) shows a composite plane figure formed by combining (a) and (b).

$$\begin{aligned} \text{Its perimeter} &= (AB + PQ + QR + CD + DA) \\ &= (6 + 6 + 6 + 6 + 6) \text{ cm} \\ &= \underline{\underline{30 \text{ cm}}} \end{aligned}$$

You can see that the perimeter of the composite figure is not the sum of the perimeter of (a) and (b).

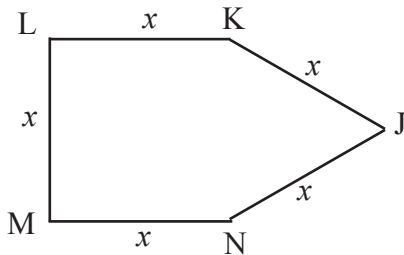
As the side BC of the square and the side PR of the triangle are internal sides of the composite figure (c) they are not added when finding the perimeter, as perimeter gives only the outside length of a figure.

Therefore when you have to find the perimeter of a composite figure you must pay special attention on the lengths that you should add to find the perimeter.



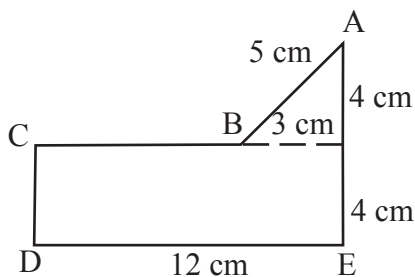
If the perimeter of the figure **ABCDEFGH** is P, to find the value of P, add the lengths of all the sides starting from A in an order till you come back to A again.

$$\begin{aligned} P &= AB + BC + CD + DE + EF + FG + GH + HA \\ P &= 3a + a + a + a + a + a + a + a \\ P &= \underline{\underline{10a}} \end{aligned}$$



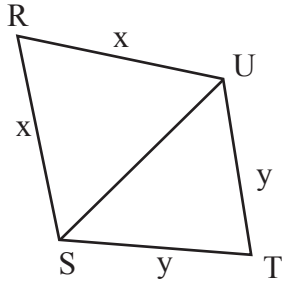
If the perimeter of the figure **JKLMN** is P then

$$\begin{aligned} P &= JK + KL + LM + MN + NJ \\ P &= x + x + x + x + x \\ P &= \underline{\underline{5x}} \end{aligned}$$



If the perimeter of the figure **ABCDE** is P then

$$\begin{aligned} P &= AB + BC + CD + DE + EA \\ P &= (5 + 9 + 4 + 12 + 8) \text{ cm} \\ P &= \underline{\underline{38 \text{ cm}}} \end{aligned}$$



If the perimeter of the figure RSTU is P then

$$P = RS + ST + TU + UR$$

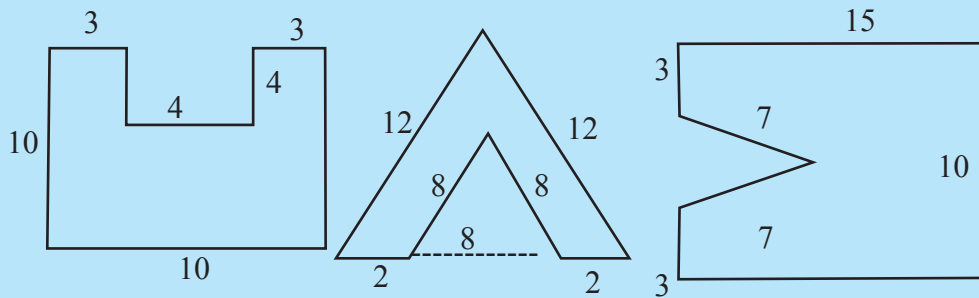
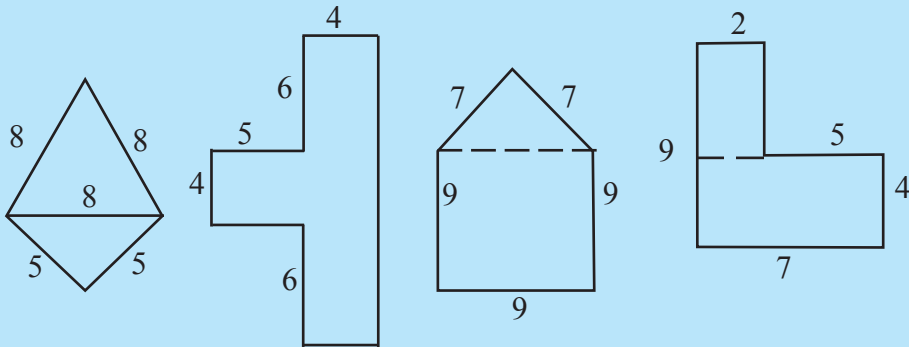
$$P = x + y + y + x$$

$$P = 2x + 2y$$

$$\underline{\underline{P = 2(x + y)}}$$

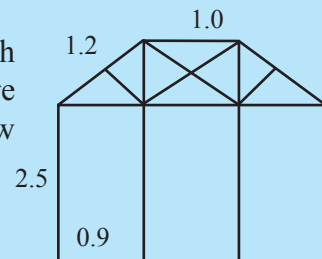
Exercise 2.2

(1) Calculate the perimeter of the following figures. Measurements are given in centimetres.

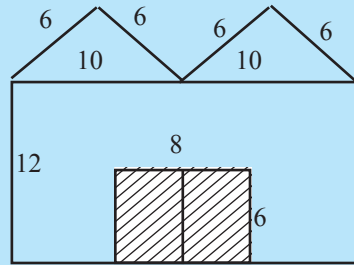



(2) An equilateral triangle is drawn on one side of a square. The perimeter of the whole diagram is 60 cm. Find the length of the side of the square.

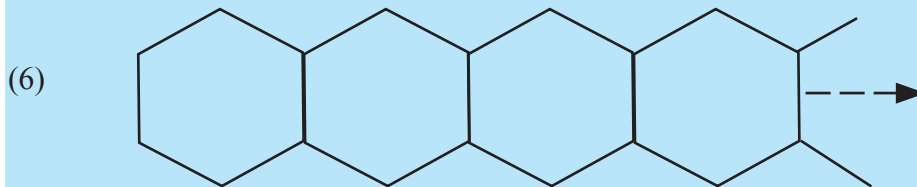
(3) The diagram shows a wooden window frame which is symmetrical in shape. The measurements are given in metres. Find the perimeter of the window frame.



- (4) A cross-section of a side wall of a building which is used as a store room is shown in the diagram. The shaded part is a door made of metal. Measurements are given in metres. Find the perimeter of the shape of the section made of cement.



- (5) A figure of the shape  is obtained by connecting 5 squares which are congruent to each other. Taking the length of a side of each square as x units,
- write the perimeter of the composite figure in terms of x .
 - calculate the perimeter of one square if the perimeter of the composite figure is 90 cm.



The figure shows a plan of a footpath made by using 17 congruent hexagonal cement blocks. If the length of the side of a hexagon is 24 cm find the perimeter of the path in metres.

Summary

- ★ When calculating the perimeter of a composite figure the lengths surrounding the figure should be added.
- ★ When solving problems involving perimeter, you should understand the problem well before attempting to solve it.