11 Perimeter and Area

We'll cover the following key points:

→ Meaning of Perimeter
→ Finding Area
→ Area

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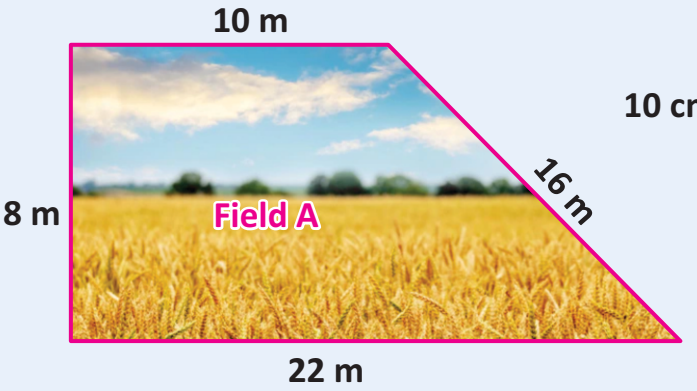
Learning Outcomes

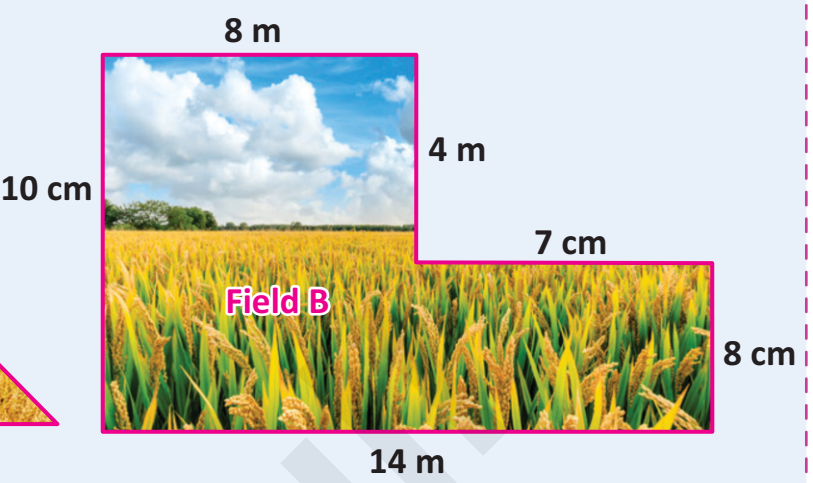
By the end of this chapter, students will be able to:

- Identify and name 2D shapes such as squares, rectangles, and triangles.
- Understand and describe the properties of 2D shapes (e.g., opposite sides of a rectangle are equal).
- Recognize the concept of perimeter as the total length of the boundary of a 2D shape.
- Recognize the concept of area as the amount of space covered by a 2D shape.
- Measure the sides of 2D shapes using rulers or measuring tapes in standard units (e.g., cm, m).
- Calculate the perimeter of squares, rectangles, and triangles by adding the lengths of their sides.
- Calculate the area of squares and rectangles using the formula (length × breadth).
- Solve simple word problems related to the perimeter of gardens, rooms, or other objects.
- Solve practical problems involving the area, such as finding the amount of space required to cover a floor.
- Identify real-life applications of perimeter and area, such as fencing, tiling, or creating designs.
- Compare and contrast shapes based on their perimeter and area.

Which has a longer boundary— Field A or Field B ?

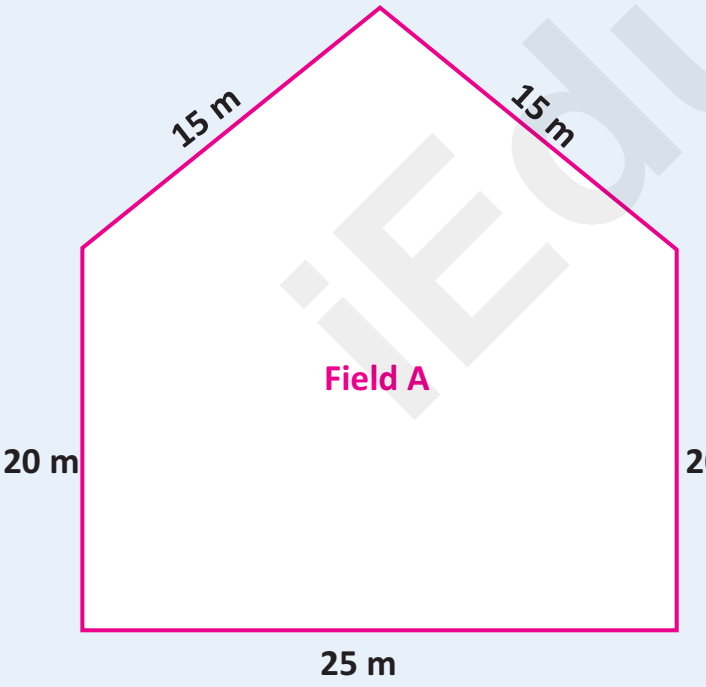


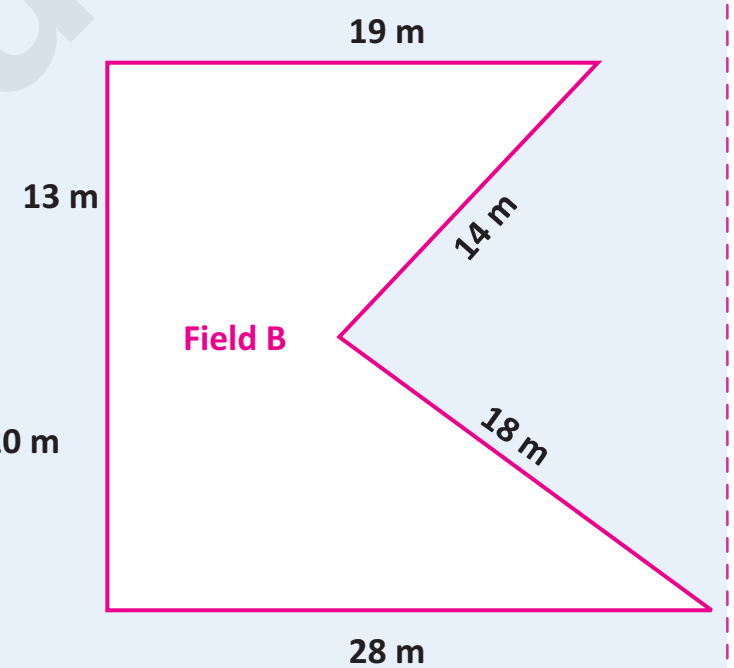
Wheat field



Rice field

Which has a smaller boundary— Field A or Field B ?





Meaning of Perimeter

Take a Task

Watch Remedial

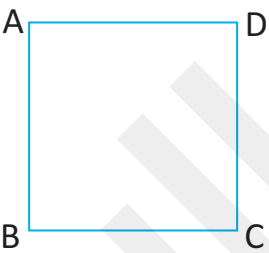
A figure bounded by line segments is called a **rectilinear** figure. Triangle, square, quadrilateral are some examples of rectilinear figures. But **circle** is not a rectilinear figure.

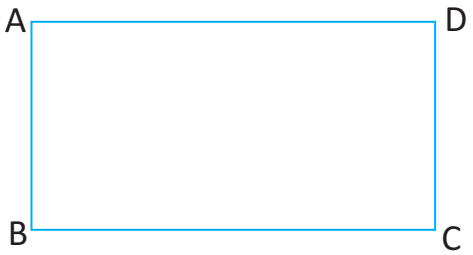
The length of the total boundary of a figure is called its **perimeter**.

We can also say that perimeter is the sum of the length of the sides of a figure.

To find the perimeter of a rectilinear figure, we add the lengths of all the sides of that figure.

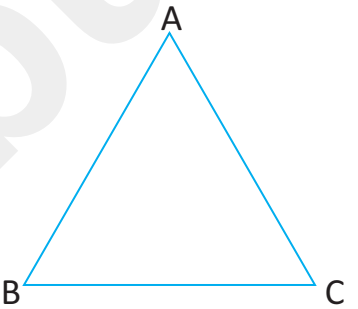
Perimeter of square ABCD = AB + BC + CD+ DA

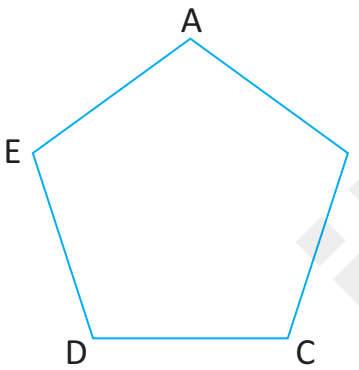




Perimeter of rectangle ABCD = AB + BC + CD + DA

Perimeter of Triangle ABC = AB + BC + CA

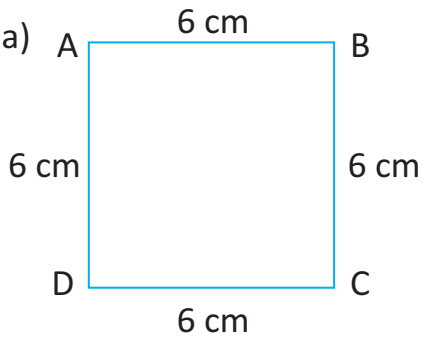




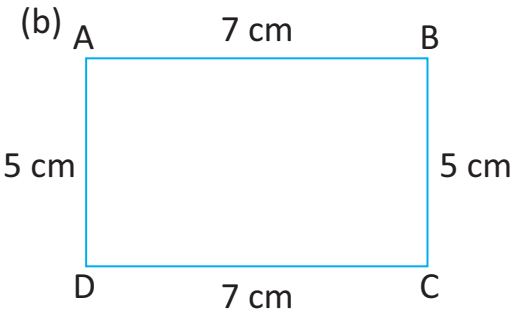
Perimeter of pentagon ABCDE = AB + BC + CD + DE + EA

Example 1: Find the perimeter of the following shapes.

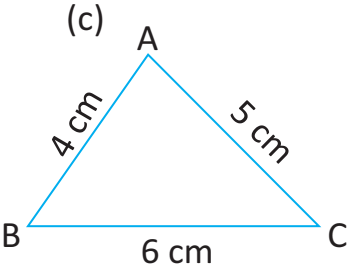
(a)



(b)



(c)



Solution: (a) Perimeter of square ABCD = AB + BC + CD + DA

= 6 cm + 6 cm + 6 cm + 6 cm = 24 cm

(b) Perimeter of rectangle ABCD = AB + BC + CD + DA

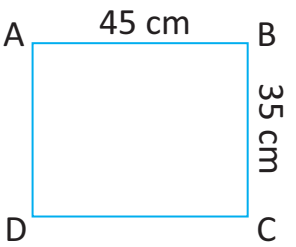
= 7 cm + 5 cm + 7 cm + 5cm = 24 cm

(c) Perimeter of triangle ABC = AB + BC + CA

= 4 cm + 6 cm + 5 cm = 15 cm

Example 2: The sides of a rectangle are 45 cm and 35 cm. Find its perimeter.

Solution: It is given that, length = 45 cm and breadth = 35 cm.



Perimeter of the rectangle = 2 × (length + breadth)

= 2 × (45 + 35) cm

= 2 × 80 cm = 160 cm.

Example 3: The perimeter of a square is 68m. Find the side of this square.

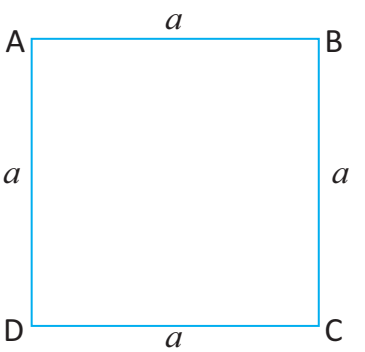
Solution: The perimeter of the square = 68 m.

The side of the square = $\frac{68}{4}$ m = 17 m.

∴ As 4 × side = perimeter of the square.

∴ Side = $\frac{\text{perimeter of the square}}{4}$

Thus, the side of the square = 17 m.



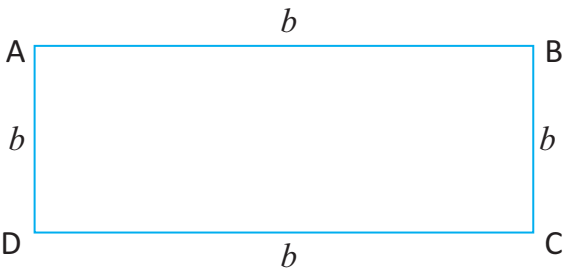
Formula for Perimeter of a Square

Here perimeter of square ABCD = AB + BC+ CD + DA

= a + a + a + a = 4a

= 4 × side

Thus, perimeter of a square = 4 × side



Formula for Perimeter of a Rectangle

Here perimeter of rectangle ABCD = AB + BC+ CD+ DA

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

Thus, **perimeter of a rectangle** = 2 (l + b)

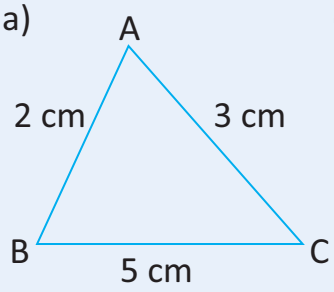
where l is the value of the **length** and b is the value of the **breadth**.

Exercise 11.1

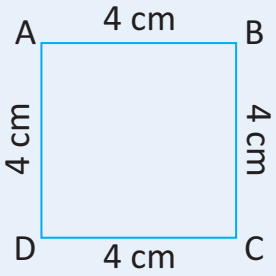
Knowledge Application

1. Find the perimeter of the following shapes :

(a)



(b)



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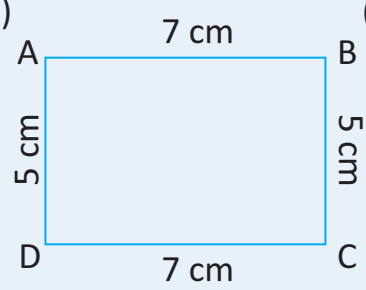
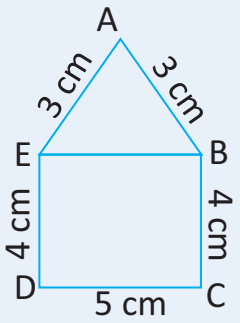
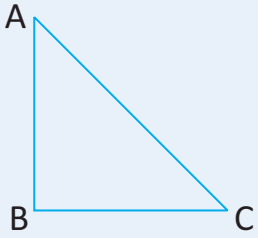


(d)



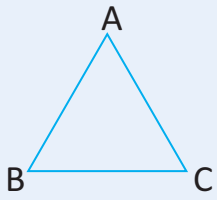
2. Measure the sides of the following figures and find their perimeters :

(a)



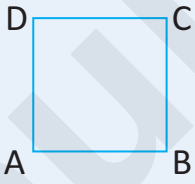
P = _____

(b)



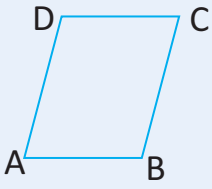
P = _____

(c)



P = _____

(d)



P = _____

3. Find the perimeter. One has been done for you.

	l	*b*	*2 × (l + b)*
	8	*4*	*2 × (8 + 4) = 24 units*
a.	*7*	*3*	
b.	*5*	*2*	
c.	*12*	*8*	
d.	*14*	*8*	
e.	*11*	*7*	

We can find the perimeter of a rectangle quickly by using the formula. Try filling in the table.

4. Find the perimeter of the following squares :

(a)

P = _____

(b)

P = _____

(c)

P = _____

Area

Take a Task

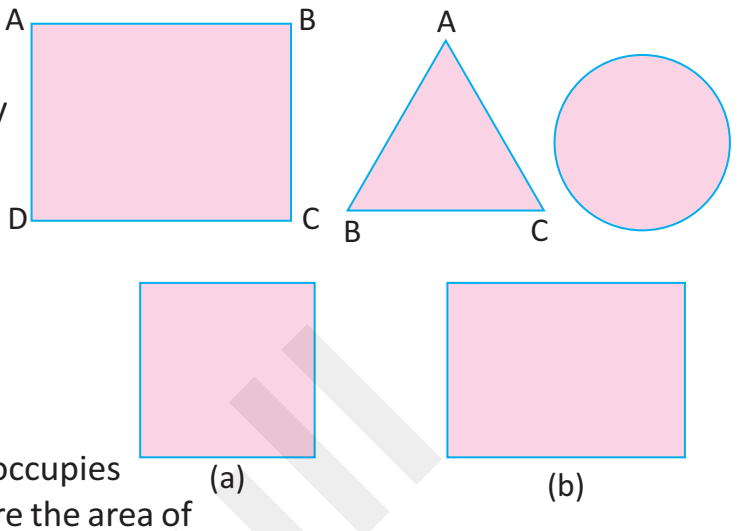
Watch Remedial

The amount of surface covered by an object is called its area. The area of the shapes given alongside are indicated by the **shaded parts**.

Comparison of Area by Observation

We can compare the area of two surface by observing them.

For example, in the given figures, area or square (a) is less than the area of square (b).



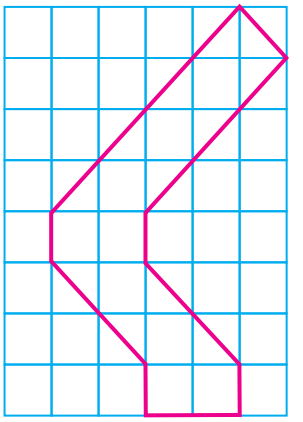
Finding Area

Area of Regular Shapes

How to find the area of a regular shape, which occupies not only full squares but half squares also, where the area of each square is 1 sq. cm.

To find the area, follow these rules :

- Consider the area of a full square as 1 sq.cm.
- Consider the area of a half sqaure as $\frac{1}{2}$ sq. cm.



Example : Find the area of the figure given alongside.

Count the number of full squares occupied by this figure.

The number of full squares is 9.

Count the number of half squares.

The number of half squares is 12.

Area of 9 full squares = 9 sq.cm

Area of 12 half squares = $12 \times \frac{1}{2}$ sq. cm = 6 sq. cm

Total area covered by 9 full squares and 12 half sqaures is 15 sq. cm.

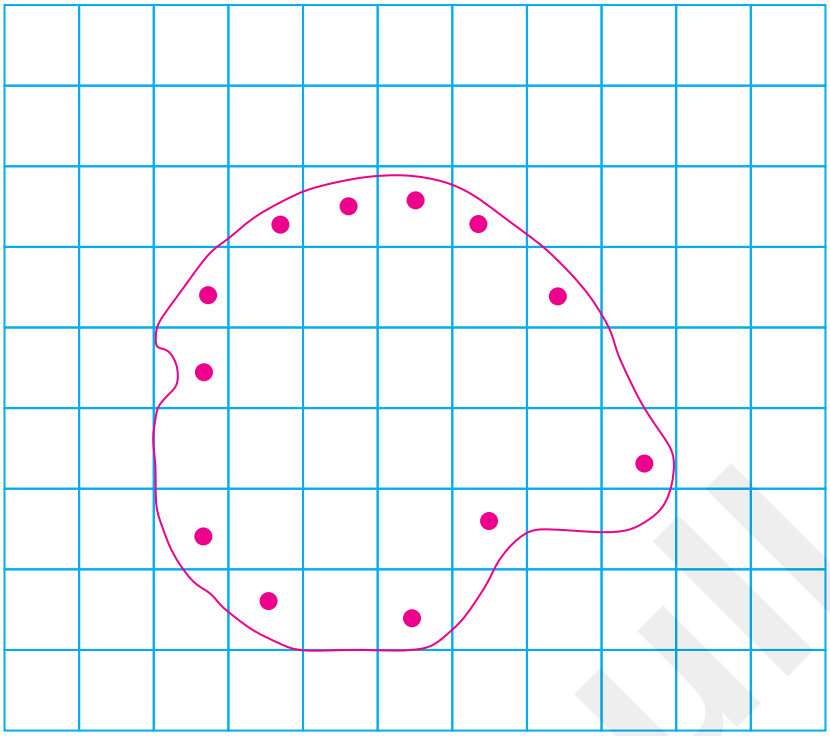
Thus, the area of the given figure is 15 sq. cm.

Area of Irregular Shapes

To find the area of irregular shapes, follow the given rules :

- Area of a full square is to be taken as $1\frac{1}{2}$ sq. cm.
- Area of a small square, which is half or more than half, is to be taken as 1 sq. cm.
- Area of a small square, which is less than half, is not to be condsidered.

Example : Find the area of the shape, if the area of each small square is 1 sq. cm.



Count the number of full squares covered by the shape. The number of full squares are 19.

Count the number of full squares which are covered half or more than half (.) . The number of such squares is 12.

Total area = 19 +12 = 31 sq. cm approximately. Ignore the squares which are covered by less than half.

Thus, the area of the shape is 31 sq. cm approximately.

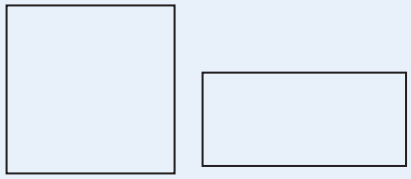
REMEMBER

Area is written in square units. The units of area are sq. cm or cm^2 and sq. m or m^2

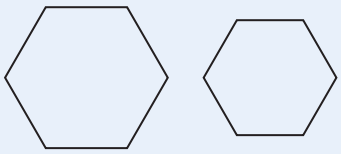
Exercise 11.2

1. Colour the shape with the bigger surface area in yellow and the smaller in green.

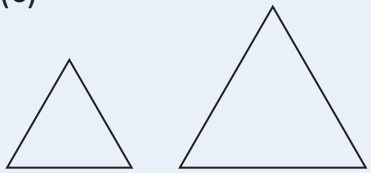
(a)



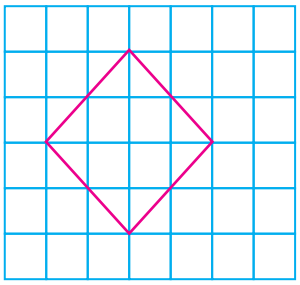
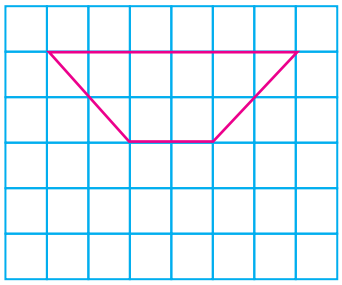
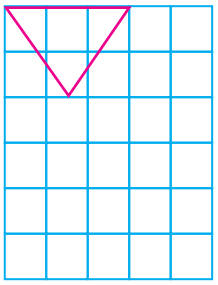
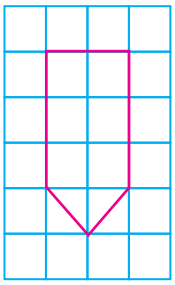
(b)



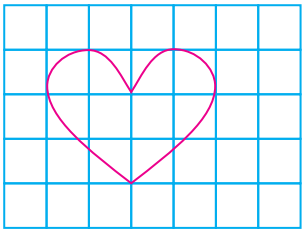
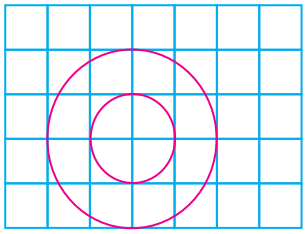
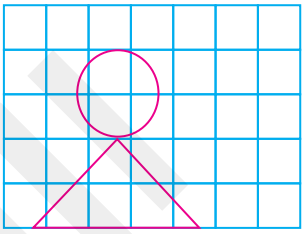
(c)



2. Find the area of the following regular shapes. (Hint: Each small square is of 1 sq.cm area.)

(a)  (b)  (c)  (d) 

3. Find the approximate area of the following shapes. Take the area of each small square to be 1 sq. cm.

(a)  (b)  (c) 

Word Problem on Finding Perimeter and Area

Example 1: A rectangular carpet is 5 m long and 2 m wide. Find its area and perimeter.

Solution: Area = $l \times b = 5 \times 2 = 10\ m^2$

Perimeter = $2\ (l + b) = 2\ (5 + 2) = 2\ (7) = 14$ m

Example 2: A school flag is in rectangular shape of length 3 m and breadth 2 m. Find the area and perimeter of the flag.

Solution: Area = $l \times b = 3 \times 2 = 6m^2$

Perimeter = $2\ (l + b) = 2\ (3 + 2) = 2\ (5) = 10$ m

Exercise 11.3

Answer the following question :

1. Salman was planning a new library. The room would be 34 m long and 28 m broad. Find its area and perimeter.
2. Pushpa wanted to make her swimming pool with dimensions 10 m by 6 m. Find the area and perimeter of the pool.
3. The playing field in front of a school was 28 m long and 15 m broad. Find the area and perimeter of the field.
4. Shivani wanted to make a lawn of 13 m in length and 6 m in breadth. What will be the area and perimeter of the lawn?
5. Jugal bought a carpet which is 6 m long and 5 m broad. Find the area and perimeter of the carpet.

Think Tank

Gap Analyzer™

1. Tick (✓) the correct answer:

(a) The unit of perimeter is same as its _____ of the polygon.

(i) area ☐ (ii) volume ☐ (iii) side ☐ (iv) None of these ☐

(b) The unit of area is _____ .

(i) square unit ☐ (ii) cm^5 ☐ (iii) cm^3 ☐ (iv) cm^4 ☐

(c) A hexagon has _____ sides.

(i) 5 ☐ (ii) 4 ☐ (iii) 6 ☐ (iv) 7 ☐

(d) Area of a square whose side is 5 cm is _____ .

(i) 20 cm^2 ☐ (ii) 20 cm ☐ (iii) 25 cm ☐ (iv) 25 cm^2 ☐

2. Fill in the blanks:

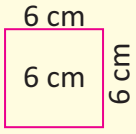
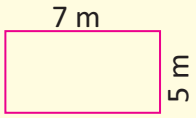
(a) The length of the total boundary of a figure is called _____.

(b) Perimeter of a square is equal to _____ into side.

(c) The amount of surface covered by an object is called _____.

(d) Circle is not a _____ figure.

3. Match the following:

(a)	Perimeter of a Rectangle	(i)	24 cm
(b)	Perimeter of a Square	(ii)	15 cm
(c)		(iii)	4 × side
(d)		(iv)	2 (*l* + b)
(e)		(v)	24 m

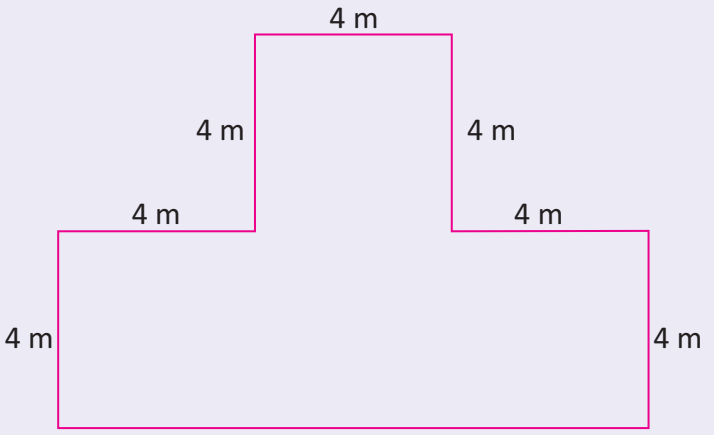
Custom Learning Path

Scan to Create Your Own Learning Path

Puzzle

Experiential Learning

Find the perimeter of the following shapes :



_____

Maths Lab Activity

Collaboration

Objective : To find the perimeters of irregular shapes.

Material required: Threads, a ruler, a shoe, a bangle, etc.

Procedure:

1. Find the perimeter of irregular shapes.

(a)

(b)

With the help of thread, measure the boundary of closed curves drawn above and record their length.

2. Take some objects, commonly seen in a household and measure the perimeter.

Examples: a shoe, a bangle, etc.

Mental Math

Critical Thinking

Find the perimeter of the following figures: