MENSURATION-1

AREA

In lesson 2, you have learnt about close and open figures. In our daily life, you see many figures. Look at the given figures carefully.
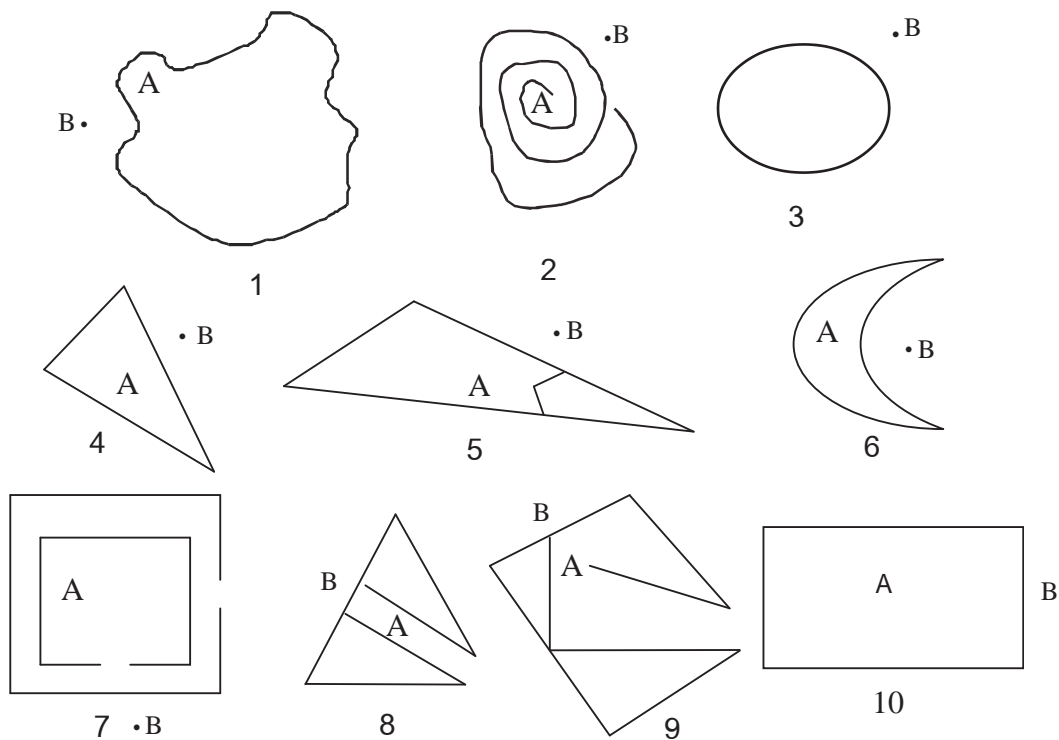

Fig. 1

In the figures given above can you start at point B and move around the figure to reach point A without crossing the outlines? If yes, then the figure in which you can do so, is an open figure and if not, it would be a closed figure.

So, now you must have recognised an open and a close figure. Can you say whether the given examples are open or closed in nature?

1. a kho-kho playground.
2. a football playground.
3. the ground on which we play 'gilli-danda'.
4. the kabaddi playground.
5. the place where we play 'billas'.

Area

Every close figure has some space within itself. Some points are outside it and we cannot reach the point inside without crossing the outline figure. The space inside a closed figure is its area. Some figures have more space inside. Those which have more space are bigger.
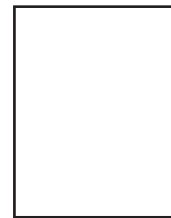
Area of a Rectangle

You have learnt about rectangles in Class V. It is a quadrilateral whose opposite sides are equal and every angle is a right angle.

ACTIVITY 2

1.   A rectangle has a length of 6cm and width of 3cm. Draw vertical and horizontal lines on both sides at a distance of 1cm each.

6cm

3cm
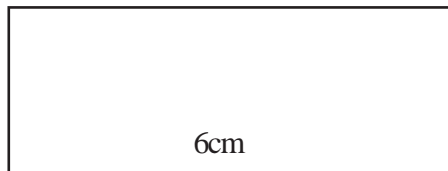
horizontal state of the rectangle   vertical state of the rectangle

Fig 4

2.   Divide the rectangle into 1cm × 1cm parts, like this
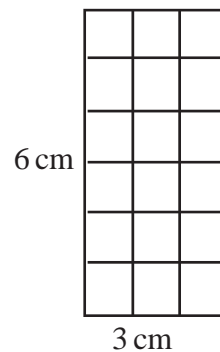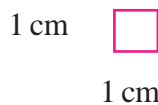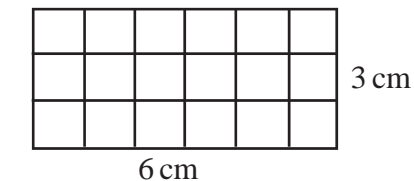
3 cm

6 cm

6 cm

3 cm

1 cm

1 cm

Fig 5

In the figure above each small square is 1cm × 1cm. Count there 1cm × 1cm small squares.

No. of squares   = 18

Area of 1 square   = 1 square cm.

18 square area   = 18 square cm.

Conclusion:

The larger the rectangle, the more will be the number of 1square cm squares.

Area = 18 square cm

    = $6cm \times 3cm$

or   = $3cm \times 6cm$

Area of a Rectangle = Length $\times$ breadth

Since the operation of multiplication follows the commutative law. Therefore we could also write Area of the Rectangle = Breadth $\times$ Length.

Practice

1. The place that your mathematics book covers on a surface.

2. The spaces covered by the blackboard.

3. You must be thinking that these covers larger spaces. How shall we measure them?

Area of a Square

A square is a special kind of rectangle whose sides are equal, that is the length and breadth of a square are equal.

If we divide a square of $4cm \times 4cm$ into unit squares of $1cm \times 1cm$.
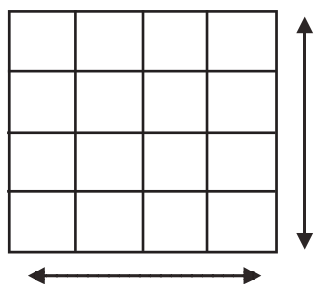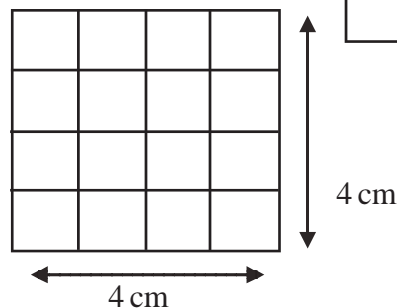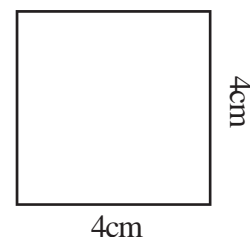
Fig 6

Fig 7   Fig 8

1 square cm = $1cm \times 1cm$

Area of the square = the number of unit squares

      = 16

Area of one unit square = 1 square cm

Area of 16 unit square = 16 square cm

Area of a square = 16 square cm

The area represented = $4cm \times 4cm$

Thus,
Area of a square	**=**	**Side × side**
or **Area of a square**	**=**	**(side)^2**

Example 1.

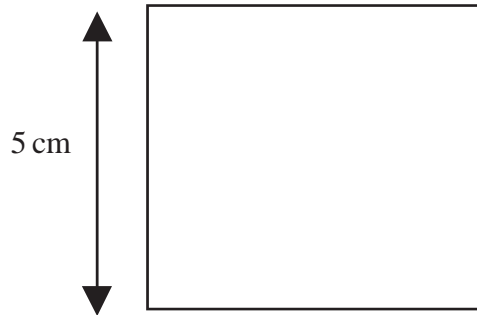If the side of a square is 5cm. What would be its area?

5 cm

Fig 9

In the figure, a square of 5cm has been shown. On each arm mark point at gaps of 1cm.
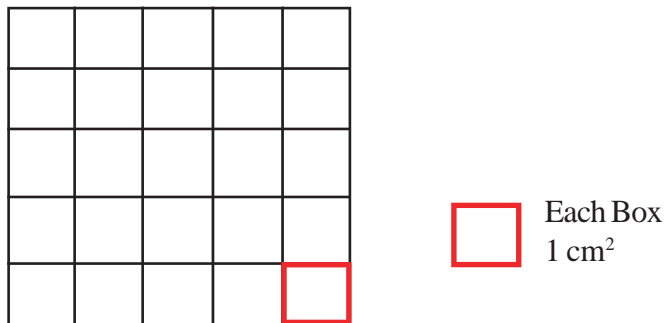

Each Box
1 cm^2

Fig 10

Now join the two marks with the help of horizontal and vertical lines. This will divide the bigger square into smaller squares. Now count the 1cm long and 1cm wide boxes inside the square.

Area of the square	=	No. of 1cm long and 1cm wide boxes inside the square.
	=	25
	=	$25 \times$ Area of 1 box
	=	25×1 square cm
	=	25 square cm
∴ The area of the square	=	side $\times$ side
	=	square of the side

Example 2.

A rectangle is 7cm long and 3cm wide. Find its area.

Solution:

Here length of the rectangle	=	7cm
breadth of the rectangle	=	3cm
Area of the rectangle	=	length $\times$ breadth
	=	7cm $\times$ 3cm
	=	21cm^2
	or	21 square cm.

Example 3.

Find the area of a square whose side is 8cm. long.

Solution:

Area of a square	=	side $\times$ side
	=	8cm $\times$ 8cm
	=	64 cm^2
	or	64 square cm.

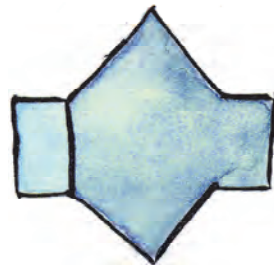## EXERCISE 16

1. Recognise the closed figures.

(i)

(ii)

(iii)

(iv)

(v)

(vi)

(vii)

(viii)

(ix)

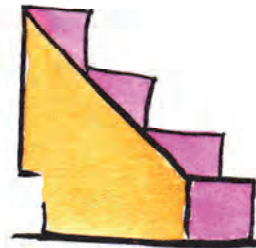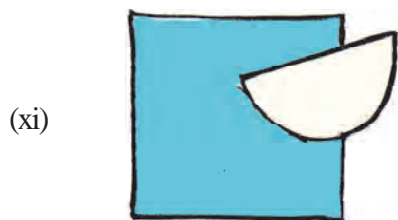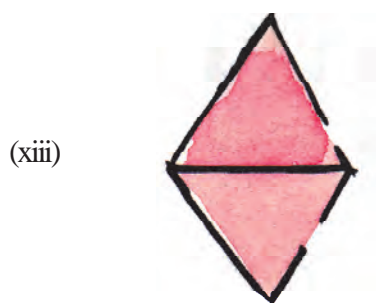(x)

(xi)

(xii)

(xiii)

(xiv)

(xv)

2. Find out the area of the rectangles whose length and breadth are as follows-

    (i)   length = 6 cm;   width = 2 cm

    (ii)   length = 10 cm;   width = 1cm

    (iii)   length = 12 cm;   width = 6 cm

    (iv)   length = 13.5 cm;   width = 10 cm

3. Find the areas of the squares whose sides are :

    (i) 6 cm   (ii) 12 cm   (iii) 13 cm   (iv) 3.5 cm

4. Draw lines at 1 cm distance horizontally and vertically inside the squares and find out the area of the square. Also veryify your answer with the formula.

    (i)   length = 5 cm;   width = 4 cm

    (ii) length = 12 cm;   width = 2 cm

5. The side of a square is 6cm. Draw lines at 1cm distance horizontally and vertically inside the square to find the area and verify your answer with Q3. (i).

What Have We Learnt ?

1. The area of an object is the space covered by it on a plane surface.

2. The area of a rectangle   = length × width

3. The area of a square   = side × side = (side)^2

4. The unit of area is square unit.