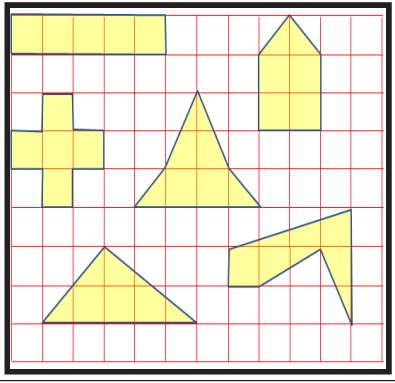


## 21. AREA



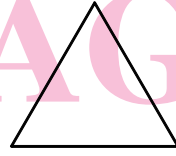
### Syllabus -

- ↻ Vocabulary
- ↻ Region and area
- ↻ Area of an irregular figure
- ↻ Area of a rectangle and Square
- ↻ Exercise
- ↻ Problem for Practice

### VOCABULARY:-

- 1) area - एअरिअ - क्षेत्रफळ
- 2) region - रिजन - भूभाग, प्रदेश
- 3) trinagle - ट्राइअँगल - त्रिकोण
- 4) shaded - शेडेड - छायांकित
- 5) circle - सर्कल - वर्तुळ
- 6) hexagon - हेक्सगन - षटकोन
- 7) to occupy - टू ऑक्युपाई - व्यापणे, ताब्यात ठेवणे
- 8) flat - फ्लॅट - सपाट
- 9) surface - सर्फिस - पृष्ठभाग
- 10) difficult - डिफीकल्ट - कठीण
- 11) to tell - टू टेल - सांगणे
- 12) to decide - टू डिसाईड - ठरवणे
- 13) rectangular - रेक्टॅंग्युलर - आयाताकृती
- 14) square - स्क्वेअर - चौकोन, चौरस
- 15) unit - युनीट - एकक
- 16) convenient - कन्विनिअंट - सोयीचे, सोयीस्कर
- 17) graph paper - ग्राफ पेपर - आलेख कागद
- 18) irregular - इरेग्युलर - अनियमित
- 19) approximate - अप्रॉक्सिमिट - अंदाजे
- 20) border - बॉर्डर - कडा (edge)
- 21) incomplete - इनकम्प्लीट - अपूर्ण
- 22) length - लेन्थ - लांबी
- 23) breadth - ब्रेड्थ - रुंदी
- 24) formula - फॉर्म्युला - सूत्र
- 25) substitution - सबस्टिट्युशन - च्याऐवजी ठेवणे, बदली

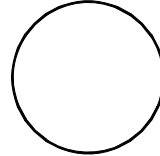
### Region and area -



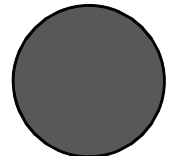
This is a triagngle.



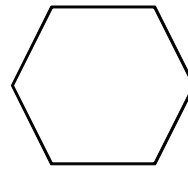
This shaded is a triangular region.



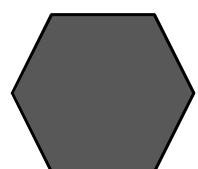
This is a circle.



The shaded part is a circular region.

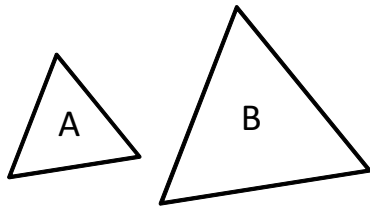


This is a hexagon.

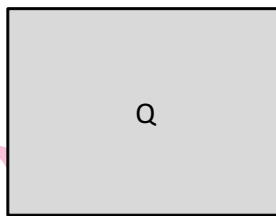
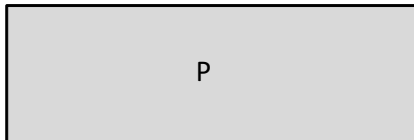


The shaded part is a hexagonal region.

**The place occupied by a figure on a flat surface is called the region of that figure.**



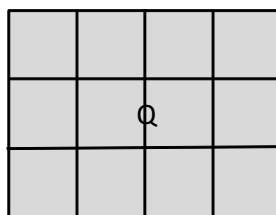
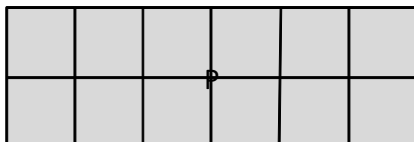
Which of the trigular regions A or B is greater? We can tell that region B is greater, by observing the two.



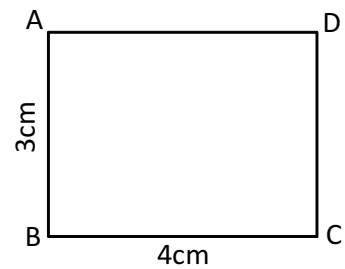
It is difficult to tell merely by observing P and Q which of the two regions is greater. To decide this, we must measure each of the two rectangular regions.

**The measure of a region is called the area of that region.**

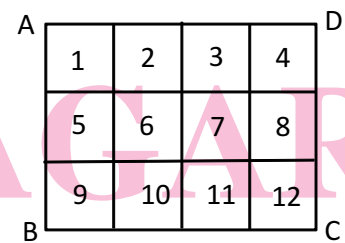
To measure the rectangular region P and Q, let us make use of square pieces as shown in the figure.



**Unit of area :**



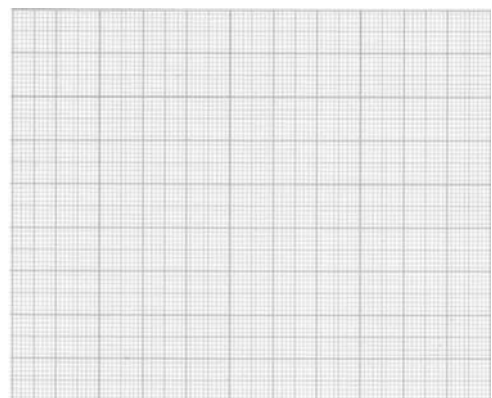
The length of the rectangle ABCD is 4 cm and its breadth is 3 cm. To find out area of the rectangle ABCD, let us mark off distances of 1 cm along each side.



In the figure, there are 12 square parts, each of side 1 cm.

The area of a square of side 1 cm, is called 1 square centimetre. This 1 square cm is the unit of area. It is written in short as 1 sqcm.

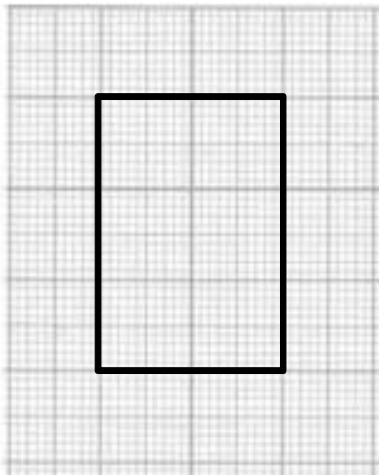
**Graph paper:**



This is a graph paper. Squares of side 1 cm as well as of side 1 mm are shown on it. A graph paper can be used to find the area of regular as well as irregular figures.



**Activity :**

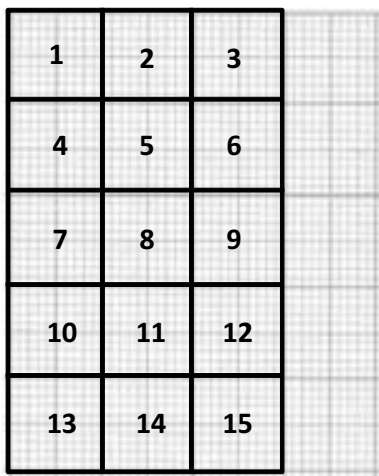


Place a matchbox on a graph paper and draw its border as shown in the figure. The number of squares occupied by the figure on the paper is the matchbox. The number of squares in the figure is a 6. Therefore the area of the base of the matchbox is 6 sqcm.

**EXCERCISE - 81**

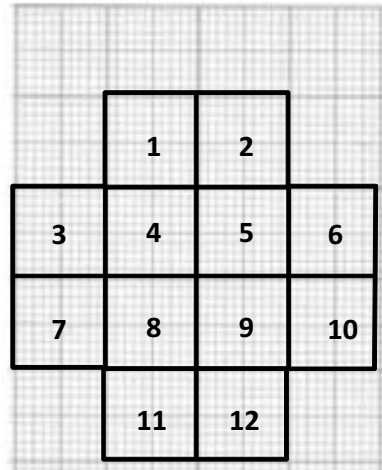
**Q.1 Find the area of the given figures by counting the number of unit squares.**

1)



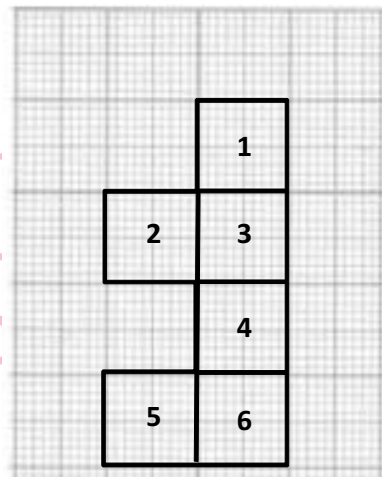
**Ans:** Area = 15 sq. cm

2)



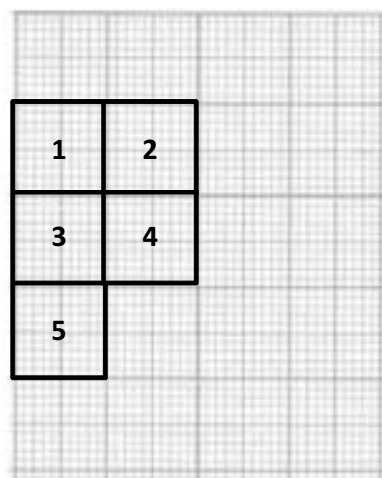
**Ans:** Area = 12 sq.cm

3)

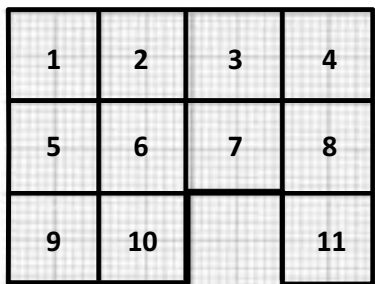


**Ans:** Area = 6 sq.cm

4)

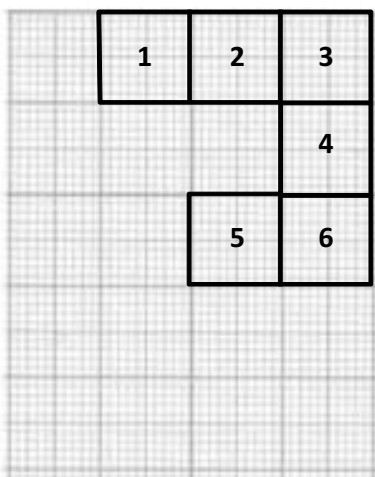


**Ans:** Area = 5 sq.cm



5)

Ans: Area = 11 sq.cm



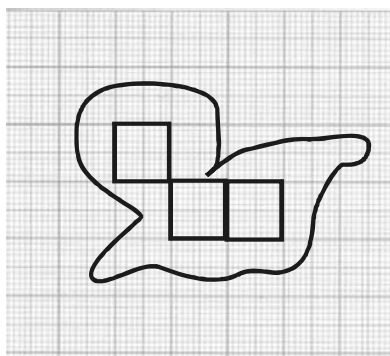
6)

Ans: Area = 6 sq.cm



**Area of an irregular figure:**

Let us see how to find the area of an irregular figure using graph paper. By this method, we can get only an approximate area of a figure.



**Activity -**

- Let us place the given irregular figure on a graph paper, draw its border and remove the given figure.
- Let us measure the number of complete squares within the region occupied by the figure. They are 3
- Let us measure the number of incomplete squares within the region occupied by the figure. They are 16.
- The area of the given figure is equal to the sum of the number of complete squares and half the number of incomplete squares
 
$$= 3 + \frac{16}{2}$$

$$= 3 + 8$$

$$= 11$$

∴ the area of the irregular figure = 11 sqcm

**EXERCISE - 82**

**Q.1** Fill in the information in the chart using graph paper, and then find the area of each given figure.

(1)

(2)

(3)

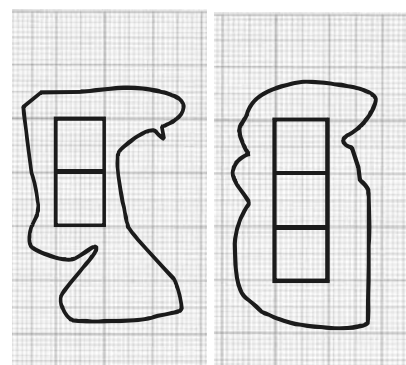
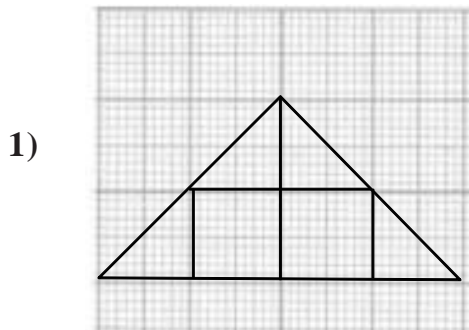


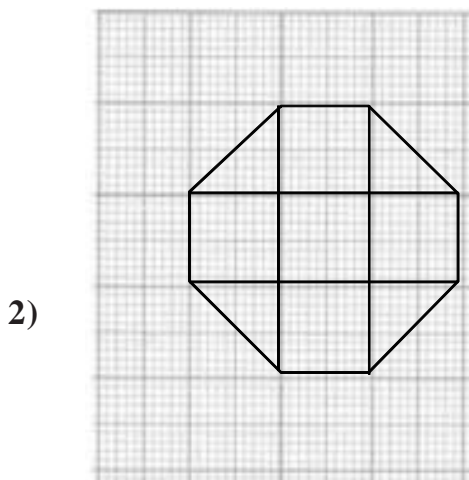
Figure No.	The number of squares occupied:		Number of complete squares + [No. of incomplete squares ÷ 2]	Area of the figure
	Complete squares	Incomplete squares		
1	8	16	$8 + \frac{16}{2} = 8 + 8$	16
2	2	16	$2 + \frac{16}{2} = 2 + 8$	10
3	3	12	$3 + \frac{12}{2} = 3 + 6$	9

**Q.2 Find the area of each figure.**



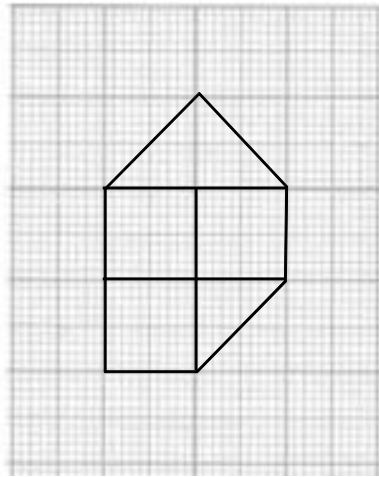
**Solution :**

$$\begin{aligned} \text{Area} &= \text{Number of complete squares} + \frac{\text{No. of incomplete squares}}{2} \\ &= 2 + \left(\frac{4}{2}\right) \\ &= 2 + 2 \\ &= 4 \text{ sq cm} \end{aligned}$$



**Solution :**

$$\begin{aligned} \text{Area} &= \text{Number of complete squares} + \frac{\text{No. of incomplete squares}}{2} \\ &= 2 + \left(\frac{10}{2}\right) \\ &= 2 + 5 \\ &= 7 \text{ sq cm} \end{aligned}$$



**Solution :**

$$\begin{aligned} \text{Area} &= \text{Number of complete squares} + \frac{\text{No. of incomplete squares}}{2} \\ &= 3 + \left(\frac{3}{2}\right) \\ &= 3 + 1.5 \\ &= 4.5 \text{ sq cm} \end{aligned}$$

**Area of a rectangle**

Observe the rectangles drawn on the graph paper. Fill the related information in the following table.

A	D	E	H	I	L
1	2	1	2	3	4
3	4	5	6	7	8
5	6	9	10	11	12
B	C	F	G	J	K

Figure No.	Name of the rectangle	No. of complete squares	Area of rectangle	Length (cm)	Breadth (cm)
1	ABCD	6	6 sq cm	3 cm	2cm
2	EFGH	12	12 sq cm	3 cm	4cm
3	IJKL	6	6 sq cm	2 cm	3cm

We observe that the area of each rectangle is equal to the product of its length and breadth.

**✍️ Area of a rectangle = length x breadth**

**Ex.** The length and breadth of a rectangle are 12 cm and 8.5cm respectively. Find the area of the rectangle.

**Ans: Given :** length of the rectangle = 12cm,  
breadth of the rectangle = 8.5cm

**To find :** Area of the rectangle

$$\begin{aligned} \text{Area of a rectangle} &= \text{length} \times \text{breadth} \\ &= 12 \times 8.5 \\ &= 102 \text{ sq.cm} \end{aligned}$$

**Area of the rectangle is 102 sqcm.**

## EXERCISE - 83

**Q.1** The length and breadth of some rectangles have been given. Find the areas.

1) Length = 6cm, bradth = 4cm

$$\begin{aligned} \text{Ans: Area of a rectangle} &= \text{length} \times \text{breadth} \\ &= 6 \times 4 \\ &= 24\text{sq cm} \end{aligned}$$

2) Length = 8m, breadth = 2.5m

$$\begin{aligned} \text{Ans: Area of a rectangle} &= \text{length} \times \text{breadth} \\ &= 8 \times 2.5 \\ &= 20 \text{ sq cm} \end{aligned}$$

**Q.2** The length of a rectangular plot is 24 m and breadth is 13m. Find the area of the plot.

**Ans: Given :** length = 24m, breadth = 13m

**To find:** Area of the rectangular plot.

$$\begin{aligned} \text{Area of a rectangle} &= \text{length} \times \text{breadth} \\ &= 24 \times 13 \\ &= 312 \text{ sq m} \end{aligned}$$

**(Area of a rectangle=312sq m.)**

**Q.3** The length of a sheet used to make a notebook is 20 cm and its breadth is 16 cm.

**Find the area of the sheet of paper.**

**Ans: Given:** length = 20cm, breadth = 16cm

**To find:** Area of the sheet of paper

$$\begin{aligned} \text{Area of a rectangle} &= \text{length} \times \text{breadth} \\ &= 20 \times 16 \\ &= 320 \text{ sq cm} \end{aligned}$$

**(Area of the sheet of paper=320 sqcm)**

**✍️ Area of a square**

Observe the following figures and fill in the table.

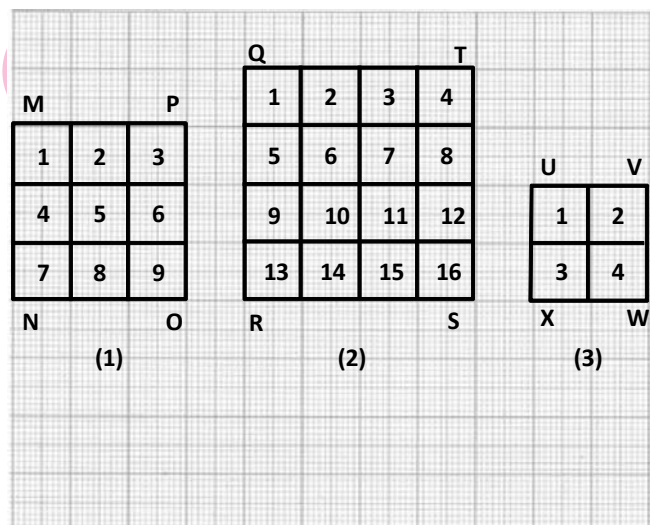


Figure No.	Square	Number of complete squares in the figure	Area	Side of the square
1	MNOP	9	9 sq cm	3 cm
2	QRST	16	16 sq cm	4 cm
3	UVXS	4	4 sq.cm	2 cm

Observe the shaded columns in the table. We see from the table that area of every square is equal to the product side x side.

**Area of a square = side x side**

Ex. The side of square is 7 cm. Find the area of the square.

Ans: Given: Side of the square = 7cm,

To find : Area of the square

Area of a square = side x side

$$= 7 \times 7$$

$$= 49 \text{ sqcm.}$$

(Area of a square = 49 cm)

## EXERCISE - 84

**Q.1 One side of some squares is given find the area of each.**

1) side=12cm

Ans: Area of a square = side x side

$$= 12 \times 12$$

$$= 144 \text{ sq cm}$$

(Area of a square= 144 sq cm)

2) side=7.5 cm

Ans: Area of a square = side x side

$$= 7.5 \times 7.5$$

$$= 56.25 \text{ sq cm}$$

(Area of a square=56.25)

**Q.2 The side of a square sheet of paper is 22 cm. What is its area ?**

Ans: Given: side of a sheet of paper=22cm

To find: Area of the square

Area of a square = side x side

$$= 22 \times 22$$

$$= 484 \text{ sq cm}$$

(Area of a square sheet paper = 484 sq cm)

**Q.3 What is the area of a square plot with side 8m ? It is tiled with square tiles with side 50 cm, how many tiles will be needed ?**

Ans: Given: Side of the square plot = 8m

To find: Area of a square plot and tiled needed.

Area of a square = side x side

$$= 8 \times 8$$

$$= 64 \text{ sq cm}$$

Area of the square tile = 50 cm=0.5m

Area of a square = side x side

$$= 0.5 \times 0.5$$

$$= 0.25\text{m}$$

$$\text{Number of tiles needed} = \frac{\text{Area of the plot}}{\text{Area of the tile}}$$

$$= \frac{8 \times 8}{0.5 \times 0.5}$$

=

$$= 16 \times 16$$

$$= 256 \text{ titles}$$

(256 titles will be needed).

## PROBLEMS FOR PRACTICE

**Q1. The length and breadth of some rectangles have been given. Find the areas.**

1) length 5 cm, breadth 3 cm

2) length 6 cm, breadth 4 cm

3) length 7 cm, breadth 2 cm

**Q2 One side of some squares is given find the area of each.**

1) 6cm 2) 3cm 3) 7cm

**Q.3.** The length of a sheet used to make a note book is 10 cm and its breadth is 6 cm. Find the area of the sheet of paper.

**Q.4** The side of a square sheet of paper is 24 cm. What is its area ?

