2 Perimeter and Area

- **Let us remember :**

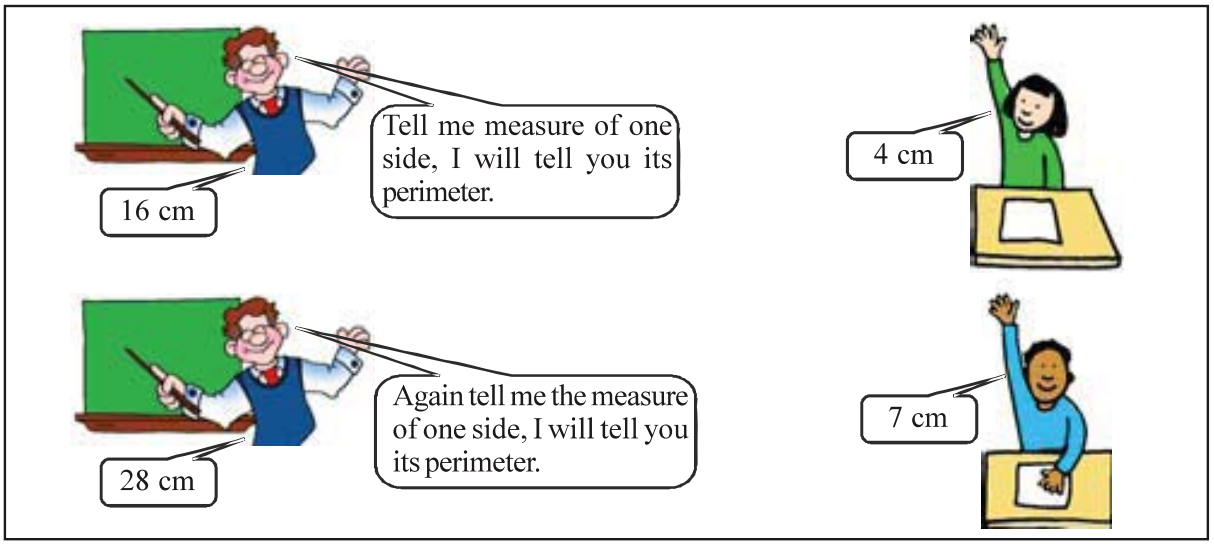
  Activity 1 :

  (1) Draw square and rectangle on graph paper and find its perimeter and area.

  (2) Draw a triangle and a circle on graph paper and find its area.

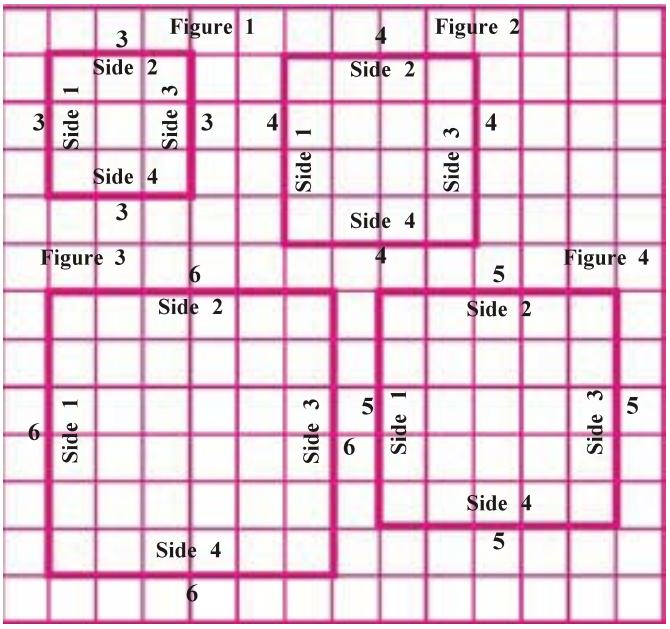
- **Let us learn new :**

  Magin game : Tell measure of any side of a square to your teacher, he will tell you the perimeter of a square.



- **Think :** How does teacher tell you the perimeter without measuring it ?

  Let us find answer, with the help of graph paper. To find answer, find perimeter of given diagram in graph paper-1 :

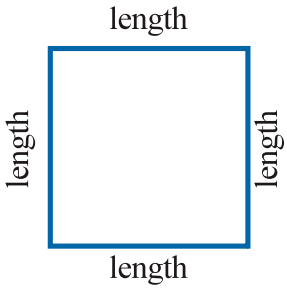


Graph paper 1

◆ **Fill up the table from graph paper-1 :**

No.	Subject	Side 1	Side 2	Side 3	Side 4	Sum of measure of four sides = Perimeter
1.	Figure 1					..... + ... + ... + ... = ... cm
2.	Figure 2					..... + ... + ... + ... = ... cm
3.	Figure 3					..... + ... + ... + ... = ... cm
4.	Figure 4					..... + ... + ... + ... = ... cm

◆ **Perimeter of Square :**



From the above table, which formula do you derive to find out perimeter of a square ?

Perimeter of square = Sum of measure of four sides

= length + length + length + length

= 4 × length

= 4 l

Length is denoted as 'l'.

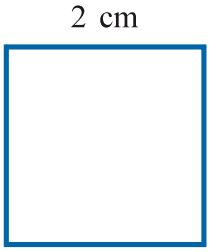
Measure of four sides in a square, remains same.

So, Perimeter of a square = **4** × length

= **4** l

◆ **Try to understand :**

Illustration 1 : What is the perimeter of a square, whose length is 2 cm ?



Measure of each side of a square is same.

Here, length of a side of the square is given 2 cm.

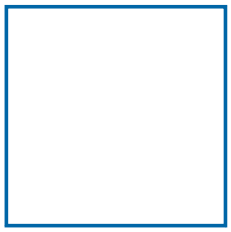
Perimeter of a square = 4 × length

= 4 × 2 cm

= 8 cm

∴ Perimeter of a square is 8 cm.

Illustration 2 : What is the perimeter of square handkerchief having length 15 cm ?



Perimeter of square = 4 × length
= 4 × 15 cm
= 60 cm

∴ Perimeter of square handkerchief is 60 cm.

Dear students, now you can easily understand the magic of your teacher !

◆ **Find perimeter :**

(1) A square drawing paper of 25 cm length
(2) A square of 14 cm length
(3) A square piece of cloth of length 8 meter
(4) A square plot of length 18 meter
(5) A square space of length 9 meter
(6) A square tile of length 10 cm

Perimeter of Rectangle :

Complete the table from the following figures :

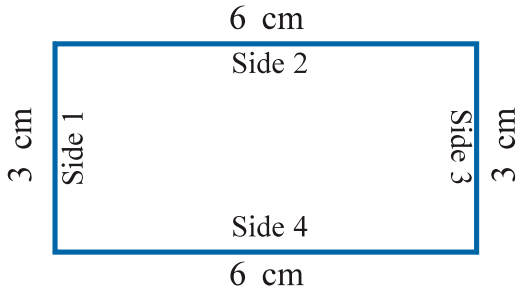


Figure 5

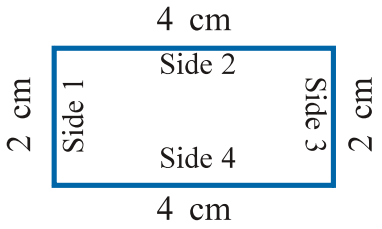


Figure 6

No.	Figure	Side 2	Side 4	Side 1	Side 3	Perimeter
1.	Figure 5					
2.	Figure 6					

Now, answer the following :

(1) Which two sides in a rectangle, having same measures ? .....

(2) In figure 5 measurement of which two sides are same ?

(i) ..... and ..... (ii) ..... and .....

(3) In figure 6 measurement of which two sides are same ?

(i) ..... and ..... (ii) ..... and .....

In a rectangle, the two sides having more measures is called length and the two sides having less measures is called breadth. Length is denoted as 'l' and breadth is denoted as 'b'.

Arrange the previous table in the following :

No.	Figure	l	l	Total length	b	b	Total breadth	Perimeter
1.	Figure 5	6 cm	6 cm	12 cm	3 cm	3 cm	6 cm	18 cm
2.	Figure 6							

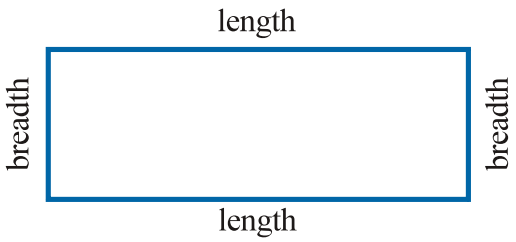
Opposite sides of a rectangle are same.

Perimeter of a rectangle

= length + breadth + length + breadth

= 2 length + 2 breadth

= 2(length + breadth)



Therefore, Perimeter of a rectangle = 2(length + breadth)

Perimeter of a rectangle = Total length + Total breadth

$= l + l + b + b$

$= 2l + 2b$

$= 2(l + b)$

= 2(length + breadth)

Illustration 3 : What is the perimeter in cm, of a rectangle whose length is 6 cm and breadth is 4 cm ?

Perimeter of a rectangle = 2(length + breadth)

= 2 × (6 cm + 4 cm)

= 2 × (10 cm)

= 20 cm

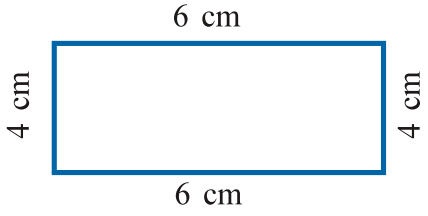


Illustration 4 : What is the perimeter of a rectangular ground, whose length is 50 m and breadth is 40 m ?

Perimeter of a rectangular ground = 2(length + breadth)
= 2 × (50 m + 40 m)
= 2 × (90 m) = 180 m

∴ Perimeter of the rectangular ground is 180 m.

Illustration 5 : Find the perimeter of a field whose length is 80 m and breadth is 70 m.

Perimeter of a rectangular field = 2(length + breadth)
= 2 × (80 m + 70 m)
= 2 × (150 m) = 300 m

∴ Perimeter of a rectangular field is 300 m.

Illustration 6 : Find the perimeter of a hall having 4 m length and 300 cm breadth.

Here, length = 4 meter and breadth = 300 cm

So, both measurement must keep in one unit.

∴ 100 cm = 1 meter

∴ 300 cm = 3 meter

∴ breadth = 3 meter

Perimeter of a rectangular hall = 2(length + breadth)
= 2 × (4 m + 3 m)
= 2 × (7 m) = 14 m

∴ Perimeter of a rectangular hall is 14 m.

1. Find perimeter :

(1) A rectangle having length 18 cm and breadth 16 cm, then find its perimeter.

(2) A rectangular wooden piece having length 40 cm and breadth 30 cm, then find its perimeter.

(3) A computer lab having length 15 m and breadth 13 m, then find its perimeter.

(4) A play ground having length 30 m and breadth 25 m, then find its perimeter.

(5) A field having length 45 m and breadth 35 m, then find its perimeter.

(6) A rectangular garden having length 20 m and breadth 1700 cm, then find its perimeter.

2. Complete the table from the following square or rectangular figures :

No.	Name of figure	Breadth	Length	Perimeter
(1)	Square	6 m	6 m	24 m
(2)	Rectangle	5 cm	7 cm	24 cm
(3)	Square	8 cm	.....	.....
(4)	.....	7 cm	8 cm	.....
(5)	Square	12 m	.....	.....
(6)	.....	14 m	16 m	.....
(7)	.....	15 cm	15 cm	.....
(8)	.....	13 cm	14 cm	.....
(9)	Square	17 m	.....	.....
(10)	.....	10 m	20 m	.....

◆ **Read and try to understand :**

Illustration 7 : Length of a square cloth is 3 meter. We want to knit their edges. What is the cost of knitting the edges at ₹ 6 per 1 meter ?

Here, first find out perimeter of a cloth.

Perimeter of a square cloth = 4 × length

= 4 × 3 m = 12 m

∴ Perimeter of a square cloth is 12 m.

Now, cost of knitting of 1 m cloth = ₹ 6

∴ Cost of knitting 12 m cloth = ₹ (12 × 6) = ₹ 72

∴ Total cost of knitting the edges of cloth is ₹ 72.

Illustration 8 : Length of a field is 80 m and breadth is 60 m. Find the cost of preparing fencing surround the field at the rate of ₹ 13 per 1 meter ?

Perimeter of a rectangular field = 2(length + breadth)

= 2(80 m + 60 m)

= 2(140 m) = 280 m

Cost of 1 meter wire fencing = ₹ 13

∴ Cost of 280 meter wire fencing = ₹ (280 × 13) = ₹ 3640

∴ Total cost of wire fencing is ₹ 3640.

Illustration 9 : Length of a showroom is 50 meter and breadth is 4000 cm. What is the cost to fix the coloured stripe on the edges of glass wall of this showroom at the rate of ₹ 50 per meter ?

Here, length of showroom is 50 m and breadth is 4000 cm. So we have to convert the measure of breadth into meter.

100 cm = 1 meter

∴ 4000 cm = 40 meter

Perimeter of a rectangular showroom = 2(length + breadth)
= 2(50 m + 40 m)
= 2(90 m) = 180 m

Cost to fix the coloured stripe on the edges of glass wall per meter = ₹ 50

Cost to fix the 180 meter coloured stripe on the edges of glass wall = ₹ (180 × 50)
= ₹ 9000

∴ Total cost to fix the coloured stripe on the edges of glass wall of showroom is ₹ 9000.

1. Length of a square garden is 35 meter. What is the cost of drawing stripes of lime surrounding the garden at the rate of ₹ 7 per 1 meter ?
2. Length of square classroom is 15 m. Find the cost of fixing coloured tiles on classroom at the rate of ₹ 20 per 1 meter ?
3. Length of rectangular plot is 40 m and breadth is 30 m. What is the cost of wire fencing surround the plot at the rate of ₹ 20 per 1 meter ?
4. A rectangular table having length 4 m and breadth 3 m. It is to be covered with a stripe. The cost to cover the table with stripe is ₹ 5 per 1 meter. Find the total cost.
5. Length and breadth of a prayer hall is 19 m and 17 m respectively. A carpet is fixed in it. A stripe is knitting surrounding the carpet. Find the cost at the rate of ₹ 30 per 1 meter.
6. A cloth is having 8 m length and 300 cm breadth. What is the cost of knitting a stripe surrounding the cloth at the rate of ₹ 30 per meter ?

Area :

(1) Area of Square :

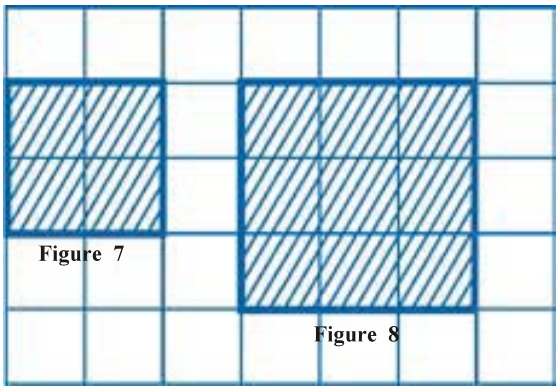


Figure 7

Figure 8

Complete the following table on the basis of figures 7 and 8 :

No.	Length	No. of square boxes covered by figures	Area Result 1	Other method of Area : Result 2
Figure 7	2 cm	4	4 sq cm	2 cm × 2 cm
Figure 8	3 cm	9	9 sq cm	3 cm × 3 cm
Dear friends, here some length of square figures are given, from these complete the table :				
(1)	4 cm		16 sq cm	
(2)	5 cm			
(3)	6 cm			

Can you say area of square from last two columns ? Which formula you use ? Think !

Here, answer of result 1 and result 2 are same.

i.e. no. of square boxes covered by figures = length × length, which gives area of figure.

Therefore, Area of square = length × length

$= l \times l$

Illustration 10 : Find area of square of length 8 cm.

Area of square = length × length

= 8 cm × 8 cm

= 64 sq cm

∴ Area of square = 64 sq cm

Illustration 11 : Length of a square sheet is 12 m, then find its area.

Area of square sheet = length × length

= 12 m × 12 m = 144 sq m

∴ Area of square sheet is 144 sq m.

◆ **Do the following sums :**

(1) What is the area of square of length 5 cm ?

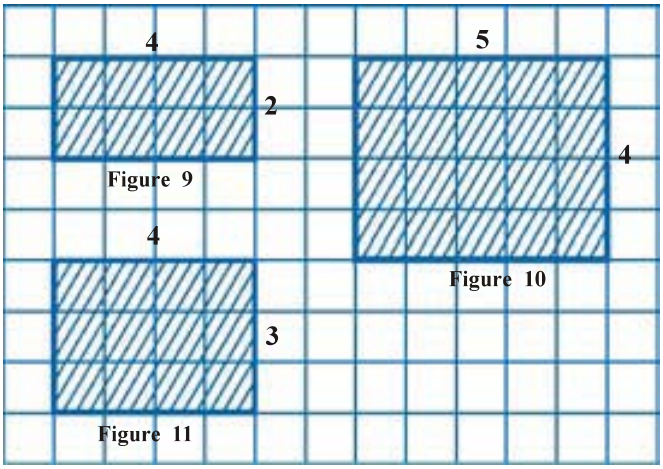
(2) What is the area of square ground of length 15 m ?

(3) What is the area of square piece of cloth of length 8 m ?

(4) What is the area of square plot of length 35 m ?

(5) What is the area of square handkerchief of length 20 cm ?

Area of Rectangle :



Complete the following table from above figures :

No.	Figure number	No. of boxes covered by figures Result 1	Length (cm)	Breadth (cm)	Length × Breadth	Area (sq cm) Result 2
1.	Figure 9	8	4 cm	2 cm	4 cm × 2 cm	8 sq cm
2.	Figure 10					
3.	Figure 11					

Here, answer of result 1 and result 2 are same.

i.e., Total no. of boxes covered by figures = length × breadth which shows area of figure.

Therefore, Area of rectangle = length × breadth
= $l \times b$

◆ **Read and understand :**

Illustration 12 : Find area of rectangle of length 8 cm and breadth 6 cm.

Area of rectangle = length × breadth
= 8 cm × 6 cm = 48 sq cm

∴ Area of rectangle is 48 sq cm.

Illustration 13 : What is the area of a rectangular piece of cloth having 5 m length and 4 m breadth ?

Area of rectangle cloth = length × breadth
= 5 m × 4 m = 20 sq m

∴ Area of rectangle cloth is 20 sq m.

1. Find area :

(1) Calculate the area of rectangle of length 19 cm length and breadth 17 cm ?
(2) What is the area of top of the table of length 90 cm and breadth 70 cm ?
(3) Find area of the ground having length 55 m and breadth 50 m.
(4) What is the area of the floor of library having length 10 m and breadth 4 m ?
(5) What is the area of classroom of length 12 m and breadth 8 m ?

2. Below the measure of square and rectangle is given. From these complete the following table :

No.	Name of figure	Length	Breadth	Area
(1)	Square	11 m	.....	.....
(2)	.....	14 m	12 m	.....
(3)	Square	15 m	.....	.....
(4)	.....	26 cm	24 cm	.....
(5)	.....	12 m	12 m	.....
(6)	.....	17 m	16 m	.....
(7)	Square	13 cm	.....	.....
(8)	.....	21 cm	19 cm	.....

Mutual relation of units of area :

1 sq m = 1 m × 1 m

= 100 cm × 100 cm

1 sq m = 10,000 sq cm

◆ **Read and understand :**

Illustration 14 : How many square cm equal to 3 sq m ?

1 sq m = 10,000 sq cm

3 sq m = 3 × 10,000 sq cm

= 30,000 sq cm

∴ 3 sq m = 30,000 sq cm

Illustration 15 : How many sq m equals to 50,000 sq cm ?

10,000 sq cm = 1 sq m

50,000 sq cm = $\frac{50,000}{10,000}$ × 1

= 5 sq m

∴ 50,000 sq cm = 5 sq m

1. Do it yourself :

(1) Convert into sq cm : (i) 5 sq m (ii) 20 sq m (iii) 30 sq m

(2) Convert into sq m : (i) 10,000 sq cm (ii) 80,000 sq cm (iii) 6,00,000 sq cm

◆ **Read and understand :**

Illustration 16 : Length of the prayer room is 20 m and breadth is 18 m. Find the cost to fix tiles on the floor at the rate of ₹ 7 per sq m.

Here, final area of rectangle floor...

Area of rectangular floor = Length × Breadth

= 20 m × 18 m

= 360 sq m

∴ Area of rectangular floor is 360 sq m.

Now, cost to fix tiles in 1 sq m space = ₹ 7

∴ Cost to fix tiles in 360 sq m = 360 × 7 = ₹ 2520

∴ Cost to fix tiles on the floor is ₹ 2520.

Illustration 17 : Length of a square garden is 70 m. Find the cost of spreading soil in the garden at the rate of ₹ 5 per sq m.

Here, first find out area of garden.

Area of square garden = length × length

= 70 m × 70 m

= 4900 sq m

∴ Area of square garden = 4900 sq m

Now, cost of spreading soil in the garden per sq m = ₹ 5

∴ Cost of spreading soil in 4900 sq m = 4900 × 5

= ₹ 24,500

∴ Cost of spreading soil in the garden is ₹ 24,500.

Illustration 18 : How many square pieces of length 40 cm is prepared from the cloth of 10 m length and 2 m breadth ?

Area of rectangular cloth = length × breadth

= 10 m × 2 m

= 20 sq m

Area of a square piece = length × length

= 40 × 40

= 1600 sq cm

Area of rectangular cloth is in sq m, whereas area of square piece is in sq cm.

Therefore, convert area of rectangular cloth in sq cm,

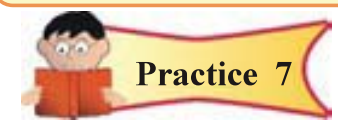
20 sq m = 20 × 10,000 sq cm

= 2,00,000 sq cm

Now, number of square pieces = $\frac{200000}{1600}$

= 125

∴ 125 square pieces are formed.



Practice 7

Do it yourself :

1. Length of the school ground is 25 m and breadth is 20 m. What is the cost of levelling the ground at the rate of ₹ 9 per sq m ?
2. In a mess, length of a square dining table is 4 m. What is the cost to prepare the dining cloth on the table at the rate of ₹ 30 per sq m ?
3. A rectangular swimming pool having length 16 m and breadth 4 m. Find the cost to fix tiles at floor of the pool at the rate of ₹ 22 per sq m.
4. Length of coloured card paper is 60 cm and breadth is 40 cm. How many square boxes can be formed in this card paper of length 5 cm ?
5. In a school, length of the prayer hall is 14 m and breadth is 11 m. Square tiles are to be fixed of length 50 cm on its floor, then how many tiles are needed ?

Exercise

1. **Fill in the blanks with proper method :**
   (1) 1 sq m = _____ sq cm (2) 40,000 sq cm = _____ sq m
   (3) Perimeter of the square of length 4 cm = _____ cm
   (4) Perimeter of the rectangle of length 3 m and breadth 2 m = _____ m
2. **Do the following sums :**
   (1) In a field, length is 45 m and breadth is 4000 cm, then find the cost of tilling the field at the rate of ₹ 12 per sq m.
   (2) On the wall of science exhibition room, square part of length 12 m is to be painted. What is the cost of painting the wall, with labour at the rate of ₹ 10 per 1 sq m ?
   (3) Card paper of length 80 cm and 40 cm breadth, then how many squares are made from card paper of length 10 cm ?
   (4) Length of the dining hall is 15 m and breadth is 12 m. Square tiles are to be fixed of length 30 cm in the floor of the hall, then how many tiles are needed ?
   (5) How many square pieces are formed of length 20 cm, from the cloth of 8 m length and 6 m breadth ?

Answers

Practice 1

(1) 100 cm (2) 56 cm (3) 32 m (4) 72 m (5) 36 m (6) 40 cm

Practice 2

1. (1) 68 cm (2) 140 cm (3) 56 m (4) 110 m (5) 160 m (6) 74 m

2. (3) 8 cm, 32 cm (4) rectangle, 30 cm (5) 12 m, 48 m
(6) rectangle, 60 m (7) square, 60 cm (8) rectangle, 54 cm
(9) 17 m, 68 m (10) rectangle, 60 m

Practice 3

1. ₹ 980 **2.** ₹ 1320 **3.** ₹ 2800 **4.** ₹ 70 **5.** ₹ 2160 **6.** ₹ 660

Practice 4

1. 25 sq cm (2) 225 sq m (3) 64 sq m (4) 1225 sq m (5) 400 sq cm

Practice 5

1. (1) 323 sq cm (2) 6300 sq cm (3) 2750 sq m (4) 40 sq m (5) 96 sq m

2. (1) 11 m, 121 sq m (2) rectangle, 168 sq m (3) 15 m 225 sq m
(4) rectangle, 624 sq cm (5) square, 144 sq m (6) rectangle, 272 sq m
(7) 13 cm, 169 sq cm (8) rectangle, 399 sq cm

Practice 6

1. (1) 50,000 sq cm (2) 2,00,000 sq cm (3) 3,00,000 sq cm

2. (1) 1 sq m (2) 8 sq m (3) 60 sq m

Practice 7

1. ₹ 4500 **2.** ₹ 480 **3.** ₹ 1408 **4.** 96 **5.** 616 tiles

Exercise

1. (1) 10,000 (2) 4 (3) 16 (4) 10

2. (1) ₹ 21,600 (2) ₹ 1,440 (3) 32 boxes (4) 2000 tiles (5) 1200 pieces

Activity :

Measure length and breadth of the rectangle things that you find surrounding and calculate their perimeter and area and show to your teacher.