

**Topic : GEOMETRY**  
**THEME : SQUARE ROOTS OF NATURAL NUMBERS**

**Aim of the Activity**

To make a square root spiral of natural numbers by paper folding.

**Pre-requisite Knowledge**

1. Concept of getting the perpendicular to a line segment at a given point on it.
2. Concept of Pythagoras theorem.



**Materials Required**

- Sheet of paper
- Geometry box
- Set of sketch pens

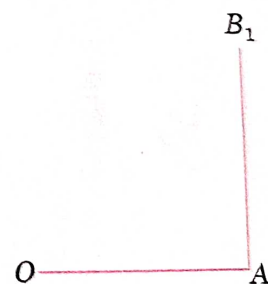
**Procedure**

1. Take a point  $O$  on a sheet of paper and draw  $OA = 1$  unit with the help of scale and draw it with red sketch pen.



**Fig. 1.1**

2. Fold the paper along the line  $OA$  and press the two parts together so that the crease  $OA$  is formed. At point  $A$  form another crease perpendicular to  $OA$ .



**Fig. 1.2**

3. Unfold the paper and draw  $AB_1 = 1$  unit by using scale and green sketch pen. Join  $OB_1$  with the help of blue sketch pen.

We observe that  $OAB_1$ , is a right angled triangle at A.

By Pythagoras theorem, we get

$$\begin{aligned} OB_1^2 &= OA^2 + AB_1^2 \\ &= (1)^2 + (1)^2 \\ &= 1 + 1 = 2 \end{aligned}$$

$$OB_1 = \sqrt{2} \text{ units.}$$

4. Fold the paper along the line  $OB_1$  and press the two parts together so that the crease  $OB_1$  is formed. Now make another crease perpendicular to  $OB_1$  at point  $B_1$ .

5. Unfold the paper and draw  $B_1B_2 = 1$  unit with the help of scale and a red sketch pen. Join  $OB_2$  by Blue pen.

Now we observe that triangle  $OB_1B_2$  is again a right angle triangle right angled at  $B_1$ .

In  $\Delta OB_1B_2$  using Pythagoras theorem, we get,

$$\begin{aligned} (OB_2)^2 &= (OB_1)^2 + (B_1B_2)^2 \\ &= (\sqrt{2})^2 + (1)^2 \\ &= 2 + 1 = 3 \end{aligned}$$

$$OB_2 = \sqrt{3}$$

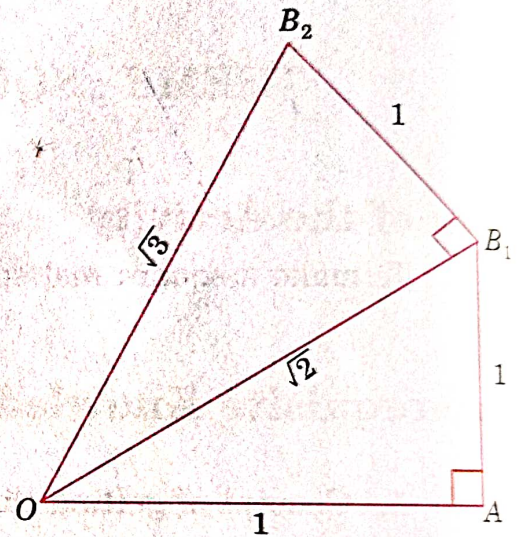


Fig. 1.3

6. In the same way keep on doing [Repeat steps (4) and (5)] till we get  $\sqrt{17}$

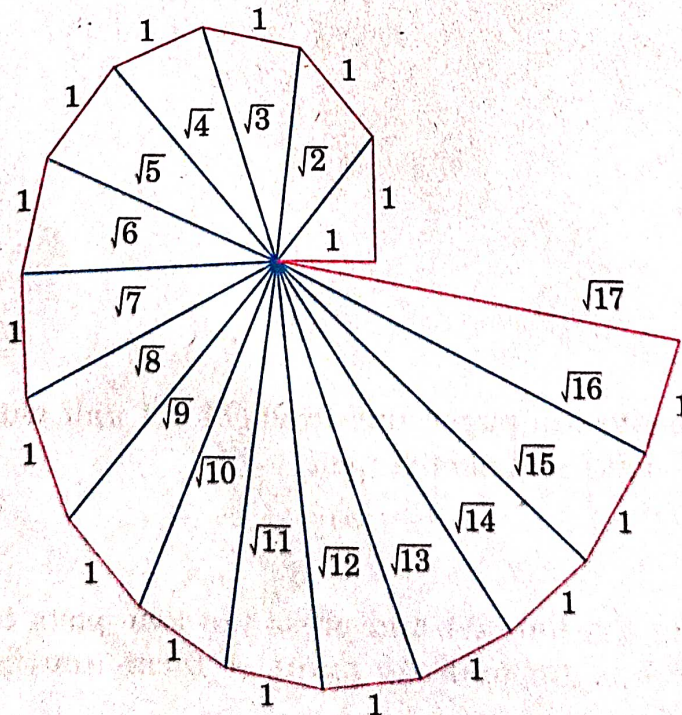


Fig. 1.4. Square Root Spiral

**Topic : COORDINATE GEOMETRY**  
**THEME : MIRROR IMAGE ON X-AXIS AND Y-AXIS**

**Aim of the Activity**

To obtain mirror image of figures with respect to a given line.

**Pre-requisite Knowledge**

1. The distance of an image formed in the mirror is same as the distance of object from the mirror.
2. Two perpendicular lines, one horizontal line ( $x$ -axis) and other vertical line ( $y$ -axis) are called axes. These are four quadrants formed, as shown in Fig. 5.1 on next page.



**Materials Required**

- Graph papers
- A Ruler
- A pencil
- Sketch pens



## Procedure

1. Draw two perpendicular lines on graph paper, as shown in Fig. 5.1.
2. Take three points  $A(3, 4)$ ,  $B(-3, 1)$  and  $C(7, 1)$  as shown in Fig. 5.2 and join.
3. Plot the mirror images of the points of  $A$ ,  $B$  and  $C$  with respect to  $x$ -axis, as shown in Fig. 5.2 and join.

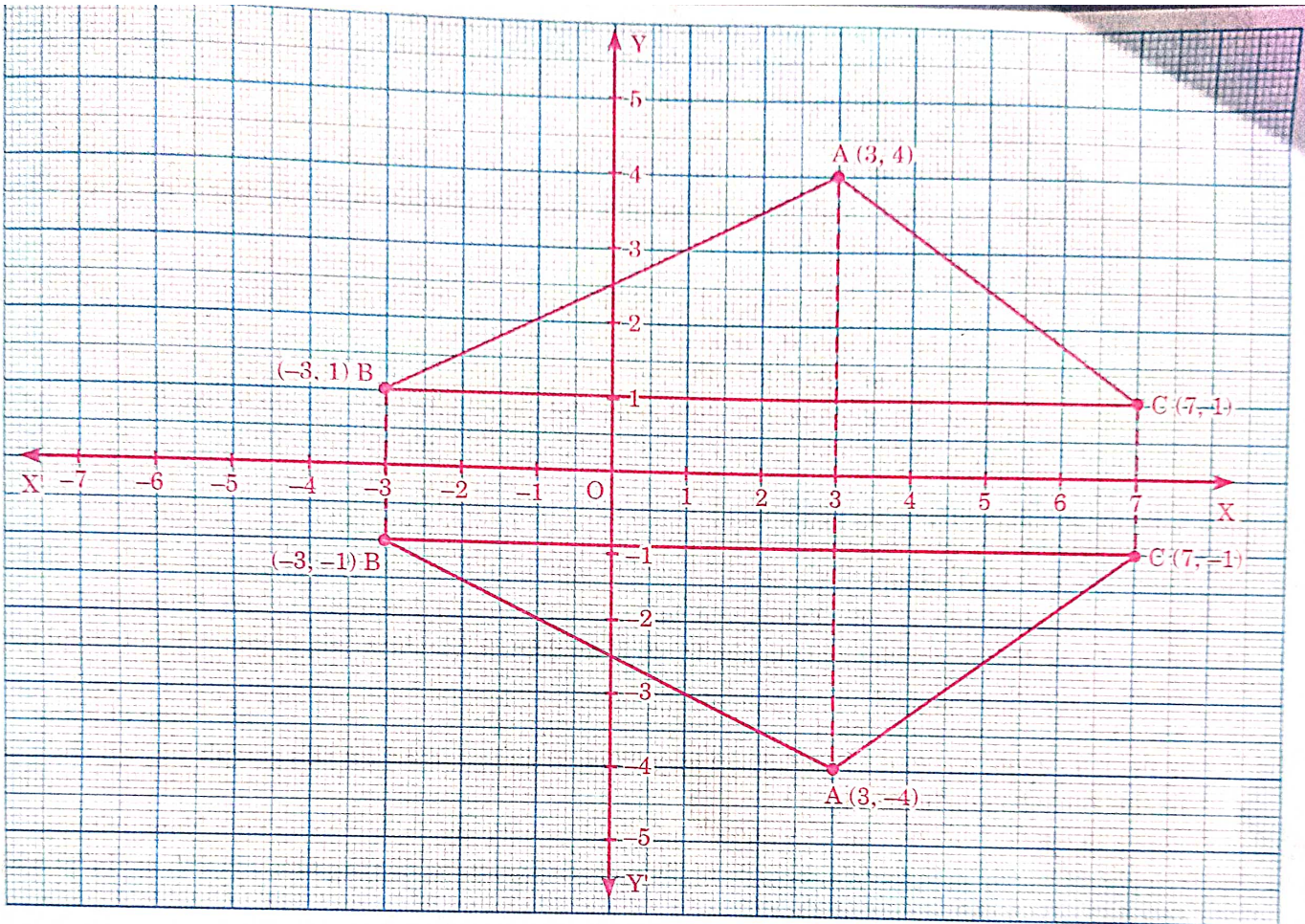


Fig. 5.2

### Inference/Conclusion

When the mirror image of a figure is obtained with respect to the x-axis, the x-coordinate is same whereas the sign of y-coordinate is changed.

**Topic : GEOMETRY**  
**THEME : LINES & ANGLES**

**Aim of the Activity**

To prove if a transversal intersects two parallel lines then each pair of corresponding angles are equal.

**Pre-requisite Knowledge**

1. Each pair of alternate angles are equal.
2. The sum of interior angles on same side of transversals is  $180^\circ$  and they are supplement.



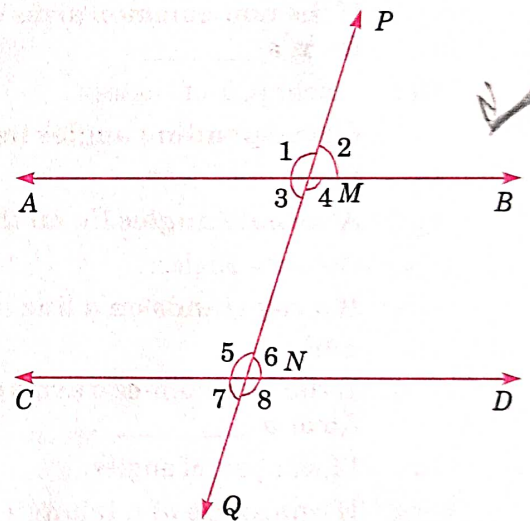
**Materials Required**

1. Geometry box (consisting—protector, pencil, eraser, sharpener and ruler etc.)
2. 3 thermocol strips
3. Wooden board
4. Pasting material (glue and fevistick)
5. Sketch pens etc.



**Procedure**

1. Firstly, take 3 strips and paste them on wooden board according to Fig. 8.1.  $AB$  is parallel to  $CD$  and  $PQ$  is transversal line which intersects  $AB$  and  $CD$  with points  $M$  and  $N$  respectively.



**Fig. 8.1**

2. Now, we got angles. We will give them identify by naming from 1st to 8th. It is shown in Fig. 8.2.
3. Measure all angles with the help of protector.

Fig. 8.2

### Observations

1. It is observed that  $\angle 1$  superimposes on  $\angle 3$  in a perfect manner.
2. Hence,  $\angle 1 = \angle 3$  (alternate interior angles). If two parallel lines are cut by transversal, then each pair of alternate interior angles is equal.



## EXPERIMENT - 4

### BAR GRAPH USING THE HEIGHTS OF FAMILY MEMBERS

#### OBJECTIVE :

- > To draw a bar graph using the heights collected from 5 members of family.

#### MATERIALS REQUIRED :

- \* Graph paper.
- \* Geometry paper.
- \* colour pencils.
- \* Scissors
- \* adhesive
- \* White sheet of paper.

#### PROCEDURE :

- Collect data from day to day life such as heights of some 5 family members.

- Tabulate the retrieved data :

MEMBERS	1	2	3	4	5
HEIGHTS	132	154	151	145	161

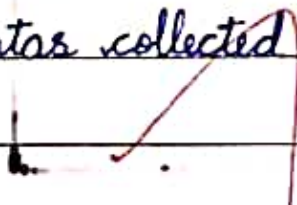
- Take a graph paper and paste it on a white sheet of paper.
- Draw two  $\perp$  axes  $x'Ox$  and  $y'Oy$  on the graph paper.
- Mark the members on  $x$ -axis and heights on  $y$ -axis.
- Draw rectangular bars corresponding to the heights of the members and colour it.

## OBSERVATION :

- 1) The person with the most height in my family is my father with 161 cm height.
- 2) The person with the least height in my family is my sister with 132 cm height.

## RESULT :

➤ Hence, a bar graph was drawn using the data collected.



SCALE

In y-axis 50 cm = 1 unit

