

Activity 1

OBJECTIVE

To construct a square-root spiral.

MATERIAL REQUIRED

Coloured threads, adhesive, drawing pins, nails, geometry box, sketch pens, marker, a piece of plywood.

METHOD OF CONSTRUCTION

1. Take a piece of plywood with dimensions 30 cm \times 30 cm.
2. Taking 2 cm = 1 unit, draw a line segment AB of length one unit.
3. Construct a perpendicular BX at the line segment AB using set squares (or compasses).
4. From BX, cut off BC = 1 unit. Join AC.
5. Using blue coloured thread (of length equal to AC) and adhesive, fix the thread along AC.
6. With AC as base and using set squares (or compasses), draw CY perpendicular to AC.
7. From CY, cut-off CD = 1 unit and join AD.

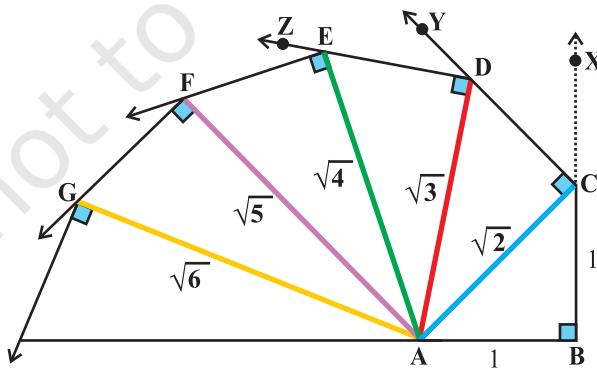


Fig. 1

8. Fix orange coloured thread (of length equal to AD) along AD with adhesive.
9. With AD as base and using set squares (or compasses), draw DZ perpendicular to AD.
10. From DZ, cut off DE = 1 unit and join AE.
11. Fix green coloured thread (of length equal to AE) along AE with adhesive [see Fig. 1].

Repeat the above process for a sufficient number of times. This is called “a square root spiral”.

DEMONSTRATION

1. From the figure, $AC^2 = AB^2 + BC^2 = 12 + 12 = 24$ or $AC = \sqrt{24}$.

$$AD^2 = AC^2 + CD^2 = 24 + 12 = 36 \text{ or } AD = \sqrt{36}.$$

2. Similarly, we get the other lengths AE, AF, AG, ... as $\sqrt{48}$ or $4\sqrt{3}$, $\sqrt{60}$, $\sqrt{72}$

OBSERVATION

On actual measurement

$$AC = \dots, \quad AD = \dots, \quad AE = \dots, \quad AF = \dots, \quad AG = \dots$$

$$\sqrt{24} = AC = \dots \text{ (approx.)},$$

$$\sqrt{36} = AD = \dots \text{ (approx.)},$$

$$\sqrt{48} = AE = \dots \text{ (approx.)},$$

$$\sqrt{60} = AF = \dots \text{ (approx.)}$$

APPLICATION

Through this activity, existence of irrational numbers can be illustrated.