

Lab Manual: Surface Area of a Cone

Objective

To find the formula for the lateral surface area and total surface area of a right circular cone experimentally.

Prerequisite Knowledge

Area of circle = πr^2

Area of parallelogram = $b \times h$ (b = base, h = height).

Circumference of circle = $2\pi r$

Materials Required

A cone made of chart paper, a pair of scissors, geometry box, fevicol, cello tape.

Procedure

- Make a cone of pink chart paper having base radius r , slant height ' l ' and height h .
- Cut the cone along slant height as shown in fig (i) as per dotted line and unroll it to get a sector, as shown in fig. (ii). Name this sector OAB.
- Identify the arc length AB of the sector OAB = circumference of the base of the cone. radius of the sector OAB = slant height of the cone. As shown in the fig. (ii).
- Cut the sector OAB into 4 small equal sectors, along dotted lines as shown in fig. (ii) and fill red colour in two sectors as shown.
- Arrange these small sectors to get a parallelogram as shown in fig. (iii).

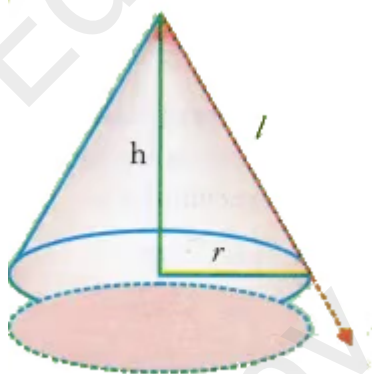


Fig. (i)

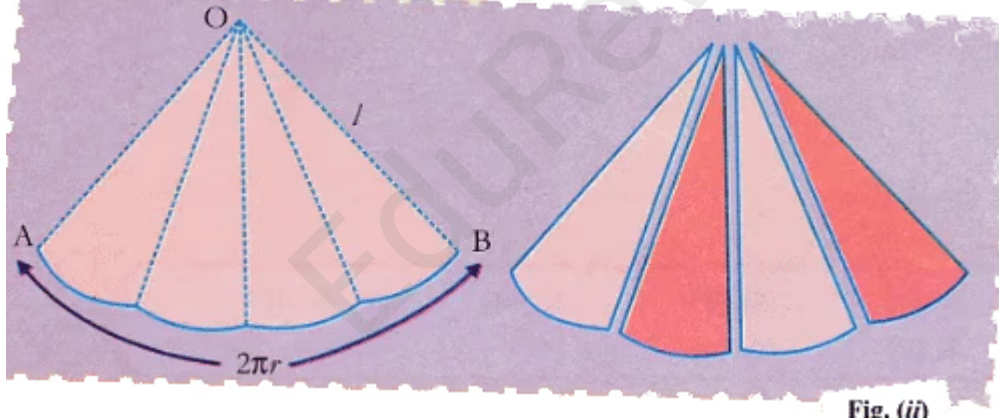


Fig. (ii)

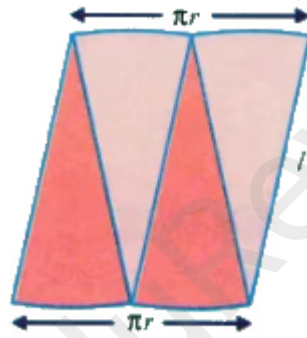


Fig. (iii)

Observation

- Base of parallelogram
 $= \frac{1}{2} \times \text{length of sector OAB} = \frac{1}{2} \times 2\pi r = \pi r$
- Altitude of parallelogram = slant height of cone = l
- Area of parallelogram = $\pi r \times l$ = Curved surface area of cone.
- Total surface area of cone = $\pi r l$ + area of circular base of cone.
 $= \pi r l + \pi r^2$
 $= \pi r(l+r)$

Learning Outcome

Students will learn the concept to differentiate between the curved surface area and total surface area of a cone.

Activity Time

- Find lateral surface area of a cone in figure given.
- Find total surface area of a cone in figure given.

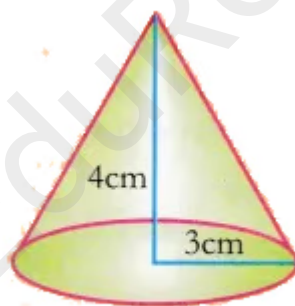


Fig. (iv)