

3. A sector of central angle 216° is cut out from a circle of radius 25 cm and is rolled up into a cone. What are the base radius and height of the cone? What is its volume?

216° is $\frac{3}{5}$ part of 360° .

So radius of cone is $\frac{3}{5}$ part of the large circle.

So radius of cone = $25 \times \frac{3}{5} = 15$ cm

Slant height = 25 cm

$$\begin{aligned}\therefore \text{Height of cone} &= \sqrt{25^2 - 15^2} = \sqrt{625 - 225} \\ &= \sqrt{400} = 20 \text{ cm}\end{aligned}$$

$$\text{Volume of cone} = \frac{1}{3} \pi \times 15^2 \times 20 = 1500 \pi \text{ cu. cm.}$$

4. The base radii of two cones are in the ratio 3 : 5 and their heights are in the ratio 2 : 3. What is the ratio of their volumes?

Let's consider the radii as 3r and 5r and the heights as 2h and 3h.

Ratio of the volumes

$$= \frac{1}{3} \times \pi \times 3r \times 3r \times 2h : \frac{1}{3} \times \pi \times 5r \times 5r \times 3h = 6:25$$

5. Two cones have the same volume and their base radii are in the ratio 4 : 5. What is the ratio of their heights?

Let the base radii be 4r and 5r.

Let the heights of the cones be x and y.

Volume of the first cone

$$= \frac{1}{3} \times \pi \times 4r \times 4r \times x = \frac{1}{3} \times 16r^2 \times x \pi$$

Volume of the second cone

$$= \frac{1}{3} \times \pi \times 5r \times 5r \times y = \frac{1}{3} \times 25r^2 \times y \pi$$

Since the volumes are equal,

$$\frac{1}{3} \times 16r^2 \times x \pi = \frac{1}{3} \times 25r^2 \times y \pi$$

$$16x = 25y$$

$$\therefore x : y = 25 : 16$$

Ratio of their heights = 25 : 16