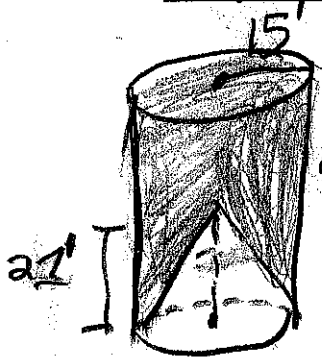


1. Find the volume and surface area of a cylinder with a height and diameter of 10ft.

2. Find the volume of a cone with a height of 12cm and a radius of 4cm.

3. A right cone is cut out of a cylinder as shown below. Find the Volume of what is left of the cylinder.



$$V_{\text{cylinder}} = \pi r^2 h_{\text{cyl}} = \pi (15)^2 (45) = 10,125\pi \text{ ft}^3$$

$$V_{\text{cone}} = \frac{1}{3} \pi r^2 h_{\text{cone}} = \frac{1}{3} \pi (15)^2 (21) = 1,575\pi \text{ ft}^3$$

$$V_{\text{shade}} = V_{\text{cylinder}} - V_{\text{cone}} = 10,125\pi - 1,575\pi = \boxed{8,550\pi \text{ ft}^3}$$

4. A cone has a circular base with a radius of 12cm. A cylinder has a radius of 10cm and a height of 13cm. If the cylinder has four times as much volume as the cone, what is the height of the cone?

$$r_{\text{cone}} = 12 \text{ cm} \quad r_{\text{cylinder}} = 10 \text{ cm} \quad h_{\text{cylinder}} = 13 \text{ cm}$$

$$V_{\text{cylinder}} = 4 V_{\text{cone}} \quad \pi r_{\text{cylinder}}^2 h_{\text{cylinder}} = 4 \left(\frac{1}{3} \pi r_{\text{cone}}^2 h_{\text{cone}} \right)$$

$$\frac{3 \pi r_{\text{cylinder}}^2 h_{\text{cylinder}}}{4 \pi r_{\text{cone}}^2} = h_{\text{cone}}$$

$$\frac{3 (10^2) (13)}{4 (12)^2} = h_{\text{cone}}$$

$$h_{\text{cone}} = \frac{3900}{576} = \sqrt{\frac{325}{48}} \text{ cm} \approx \boxed{6.77 \text{ cm}}$$