

**Volume of Cylinders and Cones**

1. Find the volume of the cylinder.

need a  $\perp$  height

$$V = \pi (6)^2 (10)$$

$$V = 360\pi \text{ ft}^3$$

2. Find the volume of the cylinder.

$$V = \pi (11)^2 (30)$$

$$V = 363\pi \text{ yd}^3$$

3. Find the volume of a cylinder with base area  $25\pi \text{ cm}^2$  and height 3 cm more than the radius.

$$V = \pi r^2 h$$

$$\sqrt{25} = \sqrt{r^2}$$

$$5 = r$$

$$3 + 5 = 8$$

$$V = 25\pi (8)$$

$$V = 200\pi \text{ cm}^3$$

4. Find the diameter of the base of a cylinder with a volume of  $400 \text{ in}^3$  and a height of 10 in.

$$\frac{400}{10} = \frac{\pi r^2 (10)}{10}$$

$$40 = \frac{\pi r^2}{\pi}$$

$$\sqrt{12.73} = \sqrt{r^2}$$

$$r = 3.57 \text{ in}$$

$$\text{diameter} = 2(3.57) = 7.14 \text{ in}$$

5. Find the volume of the cone.

$$V = \frac{\pi (9)^2 (14)}{3} = \frac{1134\pi}{3}$$

$$V = 378\pi \text{ cm}^3$$

6. The volume of the ice cream cone is  $3.6 \text{ in}^3$  find the height.

$$3 \cdot 3.6 = \frac{\pi (1.8)^2 h}{3}$$

$$\frac{10.8}{3.24} = \frac{3.24\pi h}{3.24}$$

$$\frac{3.33}{\pi} = \frac{\pi h}{\pi}$$

$$h = 1.06 \text{ in}$$

GSE Geometry

Circles and Volume

Practice

7. Find the volume of a right cone with a diameter of 5 cm and a height of 2 cm.

$$r = 2.5$$

$$V = \frac{\pi (2.5)^2 (2)}{3} = \boxed{\frac{25\pi \text{ cm}^3}{6}}$$

8. Find the height of a cone with a volume of 686 mm<sup>3</sup> and a radius of 14 mm.

$$3 \cdot 686 = \pi (14)^2 h$$

$$\frac{2058}{196} = \frac{196\pi h}{196}$$

$$\frac{10.5}{\pi} = \frac{\pi h}{\pi}$$

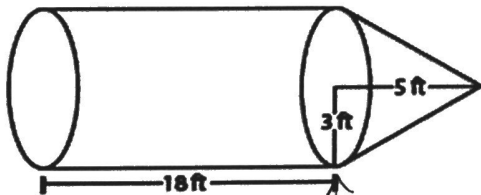
$$\boxed{h = 3.34 \text{ mm}}$$

9. A cone just fits inside a cylinder with a volume of 870 in<sup>3</sup>. What is the volume of the cone?

Cone =  $\frac{1}{3}$  of a Cylinder

$$\text{Cylinder} = \frac{870}{3} = \boxed{290 \text{ in}^3 = \text{Cone Volume}}$$

10. The science club has designed a model rocket as shown in the diagram below. What is the volume of the rocket?



notice they share the same circular base.

$$\text{Cylinder} = \pi (3)^2 (18) = 162\pi$$

$$\text{Cone} = \frac{\pi (3)^2 (5)}{3} = 15\pi$$

$$\text{Add together } \underline{162\pi} + \underline{15\pi} = \boxed{177\pi \text{ ft}^3}$$

**CHALLENGE:** Determine the volume of the following.

$$V \text{ of Whole Cylinder} = \pi (6)^2 (20)$$

$$V = 720\pi$$

But we are only looking at  $\frac{3}{4}$  of a circular base  $\left(\frac{270}{360}\right)^\circ = \frac{3}{4}$

$$\frac{3}{4}(720\pi) = \boxed{540\pi \text{ m}^3}$$

