

Finding Height

Solving for Height of Cylinders and Cones

To solve for height, use ESA to substitute and solve for h .

Model Problems:

- 1) Find the height of a cylinder that has a volume of $1,357.17 \text{ cm}^3$ and a radius of 6 cm . (round to the nearest tenth of a centimeter)

$$\begin{aligned} V &= \pi r^2 h \\ 1357.17 &= \pi \cdot 6^2 \cdot h \\ \frac{1357.17}{113.0973} &= \frac{113.0973 h}{113.0973} \\ h &\approx 12.0 \text{ cm} \end{aligned}$$

Formulas

Rectangular

Prism:

$$V = lwh$$

Cylinder:

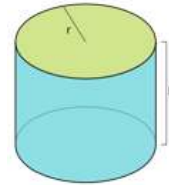
$$V = \pi r^2 h$$

Cone:

$$V = \frac{1}{3} \pi r^2 h$$

Sphere:

$$V = \frac{4}{3} \pi r^3$$



- 2) Reese would like to purchase snow cone containers that hold approximately 12.8 in³. If the diameter of the containers should be 3.5 inches, how tall will they be? (round to the nearest tenth of an inch)

$$V = \frac{1}{3} \pi r^2 h$$

$$12.8 = \frac{1}{3} \cdot \pi \cdot 1.75^2 \cdot h$$

$$\frac{12.8}{3.2070} = \frac{3.2070h}{3.2070}$$

$$h \approx 3.99$$

$$h \approx 4.0 \text{ in}$$

$$d = 3.5$$

$$3.5 \div 2$$

$$r = 1.75$$



- 3) In Disney's *Cars* movie, the Cozy Cone motel has cone shaped rooms. What is the approximate height if the diameter of each cone is 20 feet and a volume of 5,864 ft³? (round to the nearest tenth of a foot)

$$V = \frac{1}{3} \pi r^2 h$$

$$5864 = \frac{1}{3} \cdot \pi \cdot 10^2 h$$

$$\frac{5864}{104.7197} = \frac{104.7197h}{104.7197}$$

$$h \approx 55.99$$

$$h \approx 56.0 \text{ ft}$$

$$d = 20$$

$$20 \div 2$$

$$r = 10$$



- 4) If the volume of a cone is 528π cm³ and the radius is 12 cm, what is the height of the cone?

$$V = \frac{1}{3}\pi r^2 h$$
$$\frac{528\pi}{\pi} = \frac{\frac{1}{3} \cdot \pi \cdot 12^2 \cdot h}{\pi}$$
$$\frac{528}{144} = \frac{\frac{1}{3} \cdot 144 \cdot h}{144}$$
$$3 \cdot \frac{11}{3} = \frac{1}{3} h \cdot 3$$
$$h = 11 \text{ cm}$$
$$528\pi = \frac{1}{3}\pi \cdot 12^2 \cdot h$$
$$\frac{528\pi}{48\pi} = \frac{48\pi h}{48\pi}$$
$$h = 11 \text{ cm}$$

$h = 11 \text{ cm}$

- 5) A cylinder has a diameter of 12 inches and a volume of 180π . What is the height?

$$V = \pi r^2 h$$
$$180\pi = \pi \cdot 6^2 \cdot h$$
$$\frac{180\pi}{36\pi} = \frac{36\pi \cdot h}{36\pi}$$
$$h = 5 \text{ in}$$
$$d = 12$$
$$12 \div 2$$
$$r = 6$$

$h = 5 \text{ in}$

Independent Practice - do the practice questions on the homework page

40 min