

A cylinder is

a three dimensional solid with identical parallel circular bases. The lateral surface is curved and extends from one base to the other base.

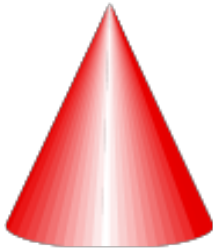
The volume of a cylinder is the same as a prism:

$$V = A_{\text{base}} \times \text{height}$$

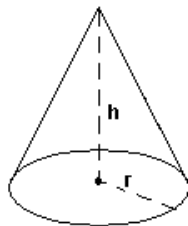
or $V = \pi r^2 h$

Similar to the relationship between the pyramid and the prism, the volume of a cone is one third the volume of a cylinder with the same radius and height.

$$\begin{aligned} \text{Volume of a cone} &= A_{\text{base}} \times \text{height} \\ &= \frac{\pi r^2 h}{3} \text{ or } \frac{1}{3} \pi r^2 h \end{aligned}$$



Example 1: Calculate the volume of a cone with radius 3 mm and height 7 mm.



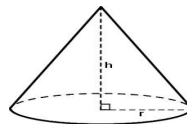
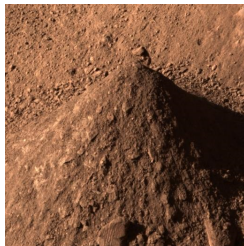
Example 2:

- If the height of a cone is tripled, does this triple the volume? Explain.
- If the radius of a cone is tripled, does this triple the volume? Explain.

Example 3: A grain bin has a radius of 12 ft and a height of 48 ft. How much grain will the farmer need to order to fill the bin? (Note: 1 kg of feed fills 1 ft^3 of space. Also, assume grain (oats) is ordered in tonnes (1 metric ton = 1000kg) .)
(Note: the height of the cone portion is 18 ft.)



Example 4: A conical pile of sand has a base diameter of 10 m and a slant height of 8 m. Determine the volume of the sand in the pile, to the nearest cubic metre.



Example 5: A fountain firework is packaged in a conical container. Its volume is 210 cm^3 . Its diameter is 8 cm. What is the height of the fountain firework, to the nearest tenth of a centimeter?

