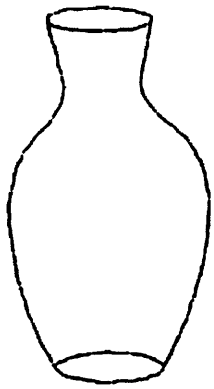
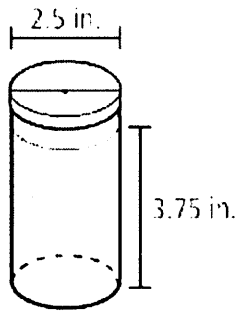
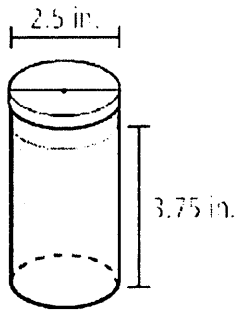
I can find a solution to a real-world problem by using the concepts associated with Volume

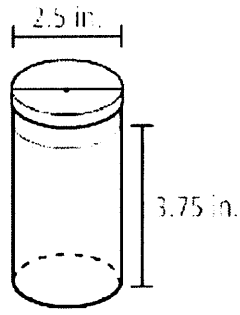
Volume Application

For an art project, you plan to pour different colored sand into a vase with a volume of 47.5 cubic inches. You have three cylindrical bottles of sand. Do you have enough sand to fill the vase? Explain.

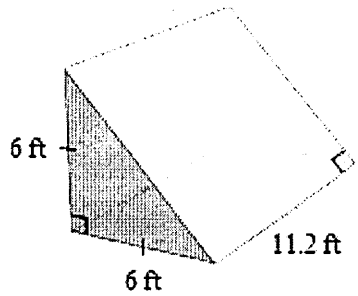




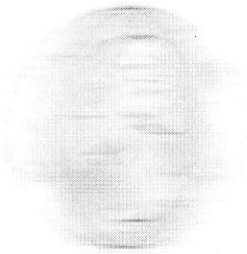




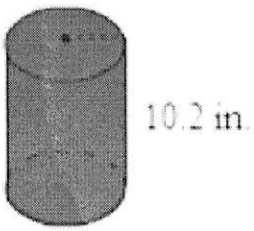
Construction This section of a concrete skateboard ramp has the shape of a triangular prism. Find the volume of the triangular prism. Find the value of the concrete used in the ramp if the cost of concrete is $4.00 per cubic foot.



When it spins, a quarter forms what appears to be a sphere. To the nearest hundredth of a cubic inch, how much space does the spinning quarter occupy?



You are building a sand castle and want to use a bucket that holds a volume of 845 cubic inches and has a height of 10.2 in. What is the radius of the bucket?

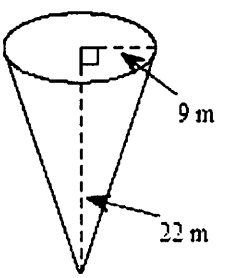


An artist creates a cone-shaped sculpture for an art exhibit. If the sculpture is 13 feet tall and has a total volume of 204.1 cubic feet, what is the radius of the sculpture?

A cylinder with a radius of 5 cm and a height of 12 cm has its radius tripled. How many times greater is the volume of the larger cylinder than the smaller cylinder?

A cereal company is deciding which shape container to use for their cereal. The two choices are the cylinder and rectangular prism shown below. The company wants to go with the container that can fit the most cereal. What is the difference in volume and what container should they go with.

Water Tank A water tank is shaped like the cone shown here. How much water can the tank hold? Use 3.14 for π. If water is drained from the tank to fill smaller tanks that each hold 200 m^3 of water, how many smaller tanks can be filled?



(The figure is not to scale.)

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Volume Application

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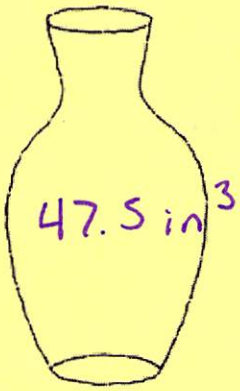
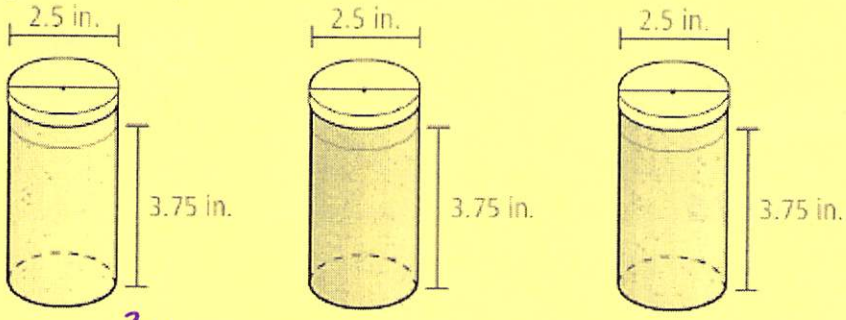


$d = 2.5$ in

$r = 1.25$ in



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

$V = \pi \cdot (1.25)^2 \cdot 3.75$

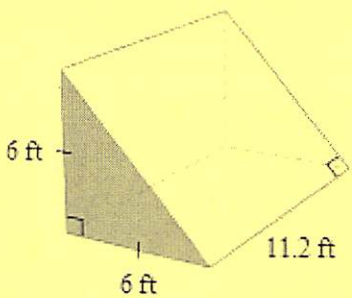
$V = 18.4 \text{ in}^3$

$\times 3$

Total Volume of Sand $= 55.2 \text{ in}^3$

YES we have more sand than the necessary 47.5 in³

Construction This section of a concrete skateboard ramp has the shape of a triangular prism. Find the volume of the triangular prism. Find the value of the concrete used in the ramp if the cost of concrete is $4.00 per cubic foot.



$V = \frac{L \times W \times H}{2}$

$V = \frac{6 \cdot 6 \cdot 11.2}{2}$

$V = 201.6 \text{ ft}^3$

$\times \$4 = \$806.40$ for the ramp

When it spins, a quarter forms what appears to be a sphere. To the nearest hundredth of a cubic inch, how much space does the spinning quarter occupy?

|←0.995 in.→|

$d = 0.995$

$r = 0.4975$

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

$V = \frac{4}{3} \cdot \pi \cdot (0.4975)^3$

$V = 0.52 \text{ in}^3$

You are building a sand castle and want to use a bucket that holds a volume of 845 cubic inches and has a height of 10.2 in. What is the radius of the bucket?

Cylinder

10.2 in.

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

$V = 845 \text{ in}^3$

$H = 10.2 \text{ in}$

$r = ?$

$\frac{845}{\pi} = \frac{\pi \cdot r^2 \cdot 10.2}{\pi}$

$\frac{268.97}{10.2} = \frac{r^2 \cdot 10.2}{10.2}$

$\sqrt{26.4} = \sqrt{r^2}$

$5.1 = r$

5.1 in

An artist creates a cone-shaped sculpture for an art exhibit. If the sculpture is 13 feet tall and has a total volume of 204.1 cubic feet, what is the radius of the sculpture?

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

$h = 13 \text{ ft}$

$V = 204.1 \text{ ft}^3$

$r = ?$

$204.1 = \frac{1}{3} \cdot \pi \cdot r^2 \cdot 13$

$204.1 = \frac{1}{3} \cdot \pi \cdot 13 \cdot r^2$

$\frac{204.1}{13.613} = \frac{13.613 \cdot r^2}{13.613}$

$\sqrt{14.99} = \sqrt{r^2}$

$\longrightarrow r = 3.9 \text{ ft}$

A cylinder with a radius of 5 cm and a height of 12 cm has its radius tripled. How many times greater is the volume of the larger cylinder than the smaller cylinder?

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

Before

$V = \pi \cdot 5^2 \cdot 12$

$V = 300\pi$

$\times 9$

After x 3

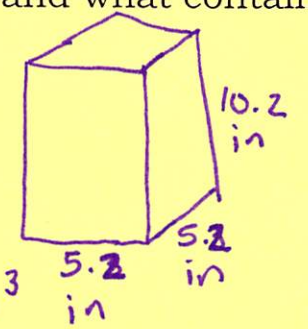
$V = \pi \cdot 15^2 \cdot 12$

$V = 2700\pi$

B	A
$r = 5$cm	$r = 15$cm
$h = 12$	$h = 12$

9 Times Bigger

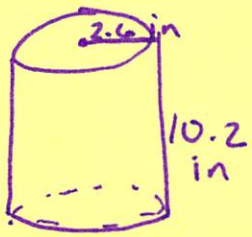
A cereal company is deciding which shape container to use for their cereal. The two choices are the cylinder and rectangular prism shown below. The company wants to go with the container that can fit the most cereal. What is the difference in volume and what container should they go with.



$V = L \cdot W \cdot H$

$V = 5.2 \cdot 5.2 \cdot 10.2$

$V = 275.808\ in^3$



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

$V = \pi \cdot (2.6)^2 \cdot 10.2$

$V = 216.619\ in^3$

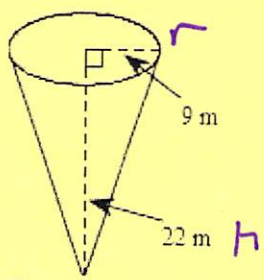
Fits the most!

Difference

$275.808\ in^3 - 216.619\ in^3$

$59.2\ in^3$ →

Water Tank A water tank is shaped like the cone shown here. How much water can the tank hold? Use 3.14 for π. If water is drained from the tank to fill smaller tanks that each hold 200 m^3 of water, how many smaller tanks can be filled?



(The figure is not to scale.)

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

$V = \frac{1}{3} \cdot \pi \cdot 9^2 \cdot 22$

$V = 594\pi$

$V = 1866\ m^3$

$V = \frac{1866\ m^3}{200}$

The water will fill 9 smaller tanks