Warm Up:

Algebra The volume of a cylinder is 600π cm^3. The radius of a base of the cylinder is 5 cm. What is the height of the cylinder?

Landscaping To landscape her 70 ft-by-60 ft rectangular backyard, your aunt is planning first to put down a 4-in. layer of topsoil. She can buy bags of topsoil at \$2.50 per 3-ft^3 bag, with free delivery. Or, she can buy bulk topsoil for \$22.00/yd^3, plus a \$20 delivery fee. Which option is less expensive? Explain.

1 yd^3 = 27 ft^3

Learning Goal: Today I will learn how to find the volume of a pyramid and cone.

Success Criteria: I am able to find the area of the base in order to calculate volume.

11-5 Volume of Pyramids and Cones

Given a cone with the same base area and height as a cylinder, what fraction is the cone's volume?

Given a pyramid with the same base area and height as a prism, what fraction is the pyramid's volume?

Burrito Books

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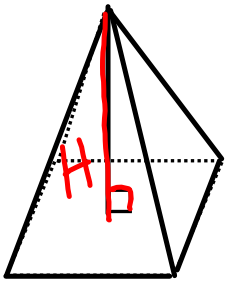
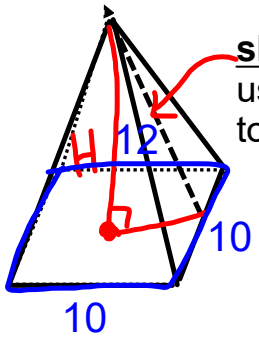
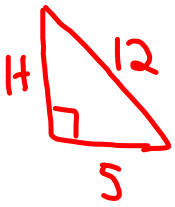




slant height:
use Pythagorean Thm to calculate Height



$H^2 + 5^2 = 12^2$

$H^2 + 25 = 144$

$-25 \quad -25$

$\sqrt{H^2} = \sqrt{119}$

$H = 10.9$

Volume of a Pyramid

- one base of any shape polygon
- triangular sides that meet in common vertex

Volume

$V = \frac{1}{3} B H$

B= area of base

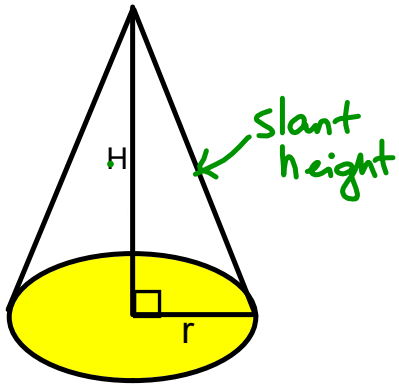
H = height of pyramid

(inside, perpendicular to base)

$V = \frac{1}{3} bh H$

$V = \frac{1}{3} \cdot 10 \cdot 10 \cdot 10.9$

$V = 363.3$



Volume of a Cone

- circle base (one) and a vertex not in the same plane

Volume

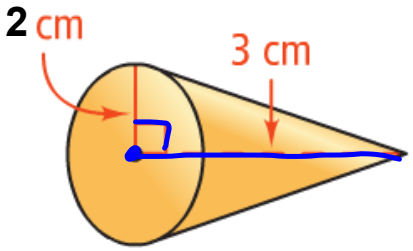
$V = \frac{1}{3}\pi r^2 H$

H = height of cone

(inside, perpendicular to base)

r = radius of base

Find the volume.



Basic Formula: $V = \frac{1}{3}BH$

Specific Formula:

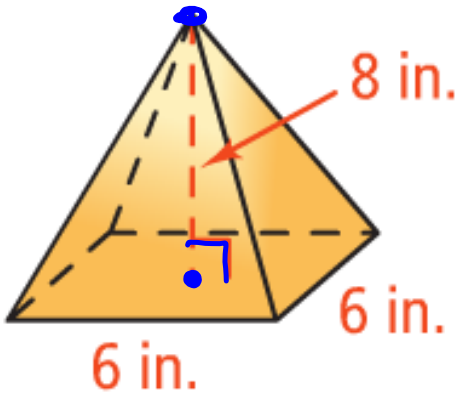
$$V = \frac{1}{3}\pi r^2 H$$

Numbers Substituted:

$$V = \frac{1}{3}(3.14)\cdot 2^2 \cdot 3$$

$$V = 12.56\,cm^3$$

Find the volume.



Basic Formula:

Specific Formula: $V = \frac{1}{3}bhH$

Numbers Substituted: $V = \frac{1}{3} \cdot 6 \cdot 6 \cdot 8$

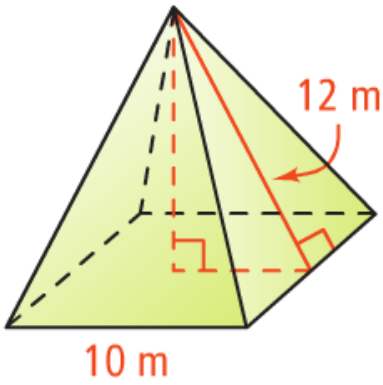
$96 in^3$

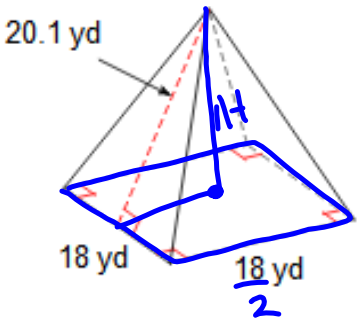
Find the volume.

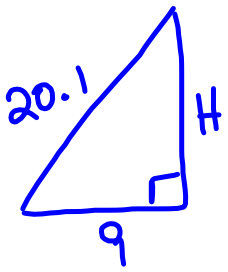
Basic Formula:

Specific Formula:

Numbers Substituted:







You Try!

$H^2 + 9^2 = 20.1^2$

$\vdots$

$H = 17.97$

or

$H = 18$

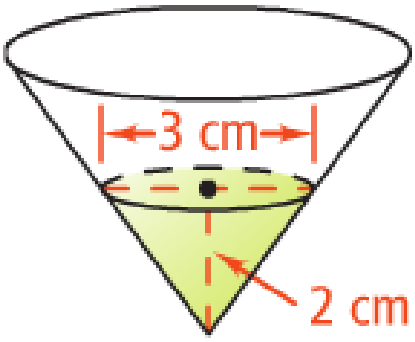
$V = \frac{1}{3}bhH$

$V = \frac{1}{3} \cdot 18 \cdot 18 \cdot 17.97$

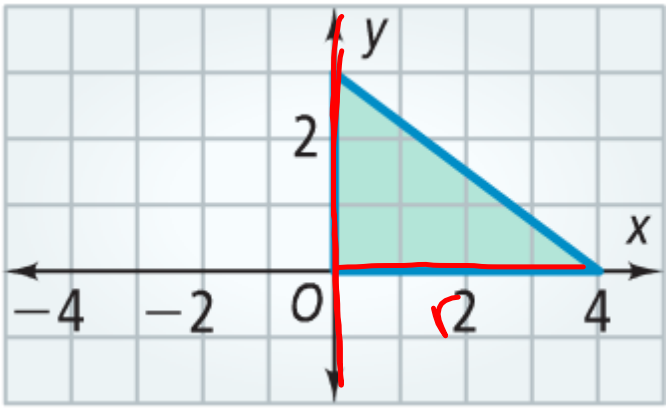
$V = 1940.76\ yd^3$

Your Turn!

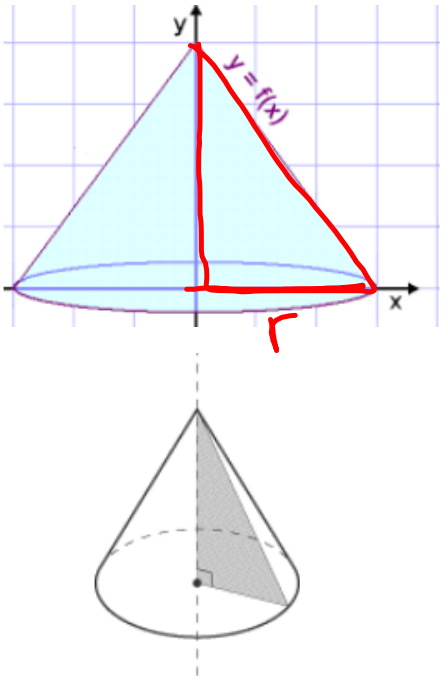
Chemistry This cone has a filter that was being used to remove impurities from a solution but became clogged and stopped draining. The remaining solution is represented by the shaded region. How many cubic centimeters of the solution remain in the cone?



If you rotate a triangle about the y axis, what shape is created? Cone



A Cone!



Find the volume:

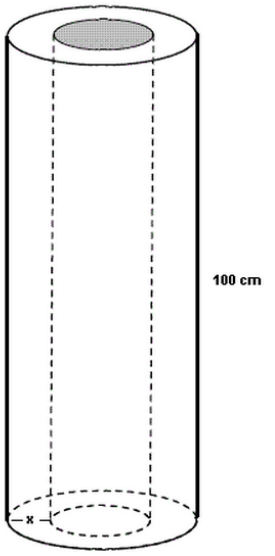
$V = \frac{1}{3}\pi r^2 H$

$V = \frac{1}{3}(3.14)(4)^2 3$

$V = 50.27$

Think About a Plan A cone with radius 1 fits snugly inside a square pyramid, which fits snugly inside a cube. What are the volumes of the three figures?

Find the thickness x of the hollow cylinder of height 100 cm if the volume between the inner and outer cylinders is equal to 1100π cm^3 and the outer diameter is 12 cm.



Closure: Today I learned how to use the base area and height to calculate volume.