Name: _____ Date:_____

Ms. Streffacio Class: _____

I can:

Do Now (3 minutes to complete):

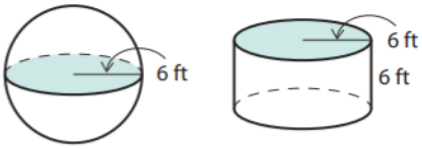
1. What is the volume of a cylinder?

2. What is the height of the cylinder?

3. If $\text{volume(sphere)} = \frac{2}{3}\text{volume(cylinder with same diameter and height)}$, what is the formula for the volume of a sphere?

Teacher Model (10 minutes) You Watch, Listen, Copy:

The sphere and cylinder at the right have the same radius. Complete the equations to find the volumes of the sphere and the cylinder in terms of π. Then compare the volumes.



Volume of Sphere	**Volume of Cylinder**
$V = \frac{4}{3}\pi r^3$	$V = \pi r^2 h$
$V = \frac{4}{3}\pi \cdot$ _____	$V = \pi \cdot$ _____ $\cdot$ _____
$V = \frac{4}{3}\pi \cdot$ _____	$V = \pi \cdot$ _____ $\cdot$ _____
$V =$ _____ cubic feet	$V =$ _____ cubic feet

$$\frac{\text{Volume of the sphere}}{\text{Volume of cylinder}} = \frac{\square}{\square} = \frac{\square}{\square}$$

The volume of the sphere is _____ times the volume of the cylinder.

Consider the cylinder in problem 4. If you double the length of the radius, what do you think will happen to the volume? Find the new volume in terms of π to check your prediction.

_____

_____

_____

Check for Understanding- Did you understand the Model? (2 minutes) Teacher will check!

A sphere and a cone have the same volume, and each has a radius of 6 centimeters. What is the height of the cone?

Show your work.

We Do Together (10 minutes):

A florist offers vases in three different sizes. Which vase holds the most water?

Height: 20 cm
Diameter: 10 cm

Height: 30 cm
Diameter: 10 cm

Diameter: 10 cm

How much water does the vase in the shape of a cylinder hold? _____

How much water does the vase in the shape of a cone hold? _____

How much water does the vase in the shape of a sphere hold? _____

Which vase holds the most water?

_____

The florist buys new vases from a different supplier. The vases are the same shapes and have the same heights, but the diameter of each vase is 1 cm less than the original vases. Find the volume of water each of the new vases will hold.

cylinder = _____ cone = _____ sphere = _____

By what percent did the volume of each shape decrease? Round to the nearest whole percent.

cylinder = _____ cone = _____ sphere = _____

Look at the exponent of r in each of the three volume formulas. Explain why the sphere had the largest percent change in volume.

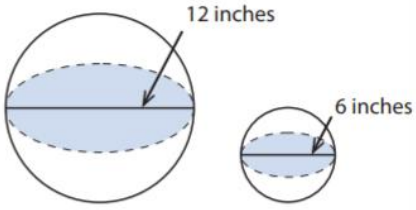
_____

_____

_____

Final Check for Understanding before I send you to Independent Practice! Teacher will Check (4 minutes):

Try It **Use what you just learned about volume to solve this problem. Round to the nearest whole number. Show your work on a separate sheet of paper.**



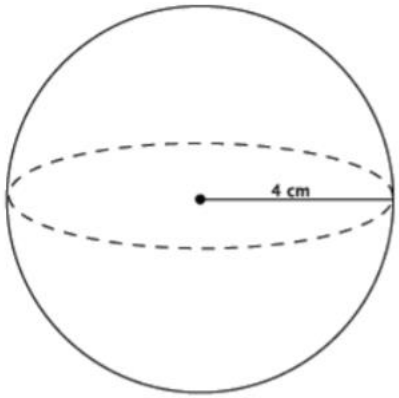
17 Find the volume of the beach ball and the volume of the toy ball. How many times greater is the volume of the beach ball than the volume of the toy ball?

_____

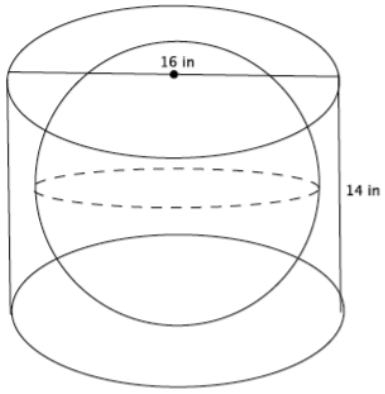
_____

Independent Practice (In designated groups or on your own):

Compute the exact volume for the sphere shown below.



A cylinder has a diameter of 16 inches and a height of 14 inches. What is the volume of the largest sphere that will fit into the cylinder?



What is the value of the expression $\frac{3^{-3}\times3^{8}}{3^{6}}$?

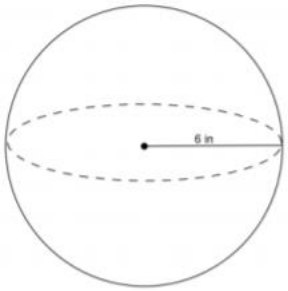
A. $\frac{1}{81}$

B. $\frac{1}{3}$

C. 3

D. 81

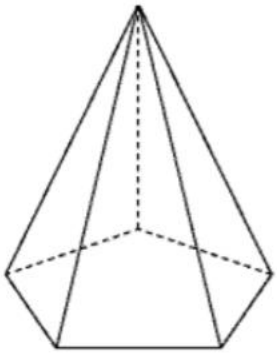
Use the diagram and the general formula to find the volume of the sphere.

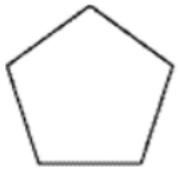


The average basketball has a diameter of 9.5 inches. What is the volume of an average basketball? Round your answer to the tenths place.

A spherical fish tank has a radius of 8 inches. Assuming the entire tank could be filled with water, what would the volume of the tank be? Round your answer to the tenths place.

Which figure results from slicing the pyramid below with a plane through the vertex that is perpendicular to the base?



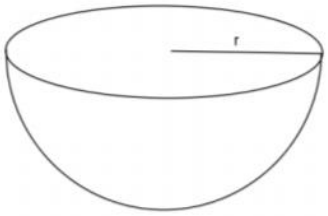
A. 

C.

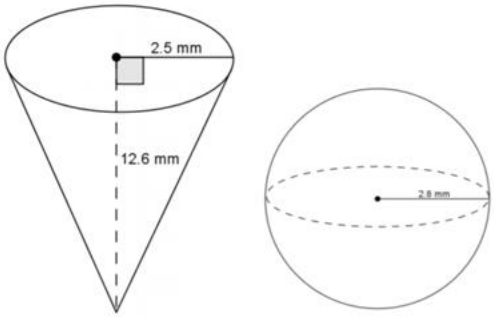
B.

D.

One of two half spheres formed by a plane through the sphere's center is called a hemisphere. What is the formula for the volume of a hemisphere?



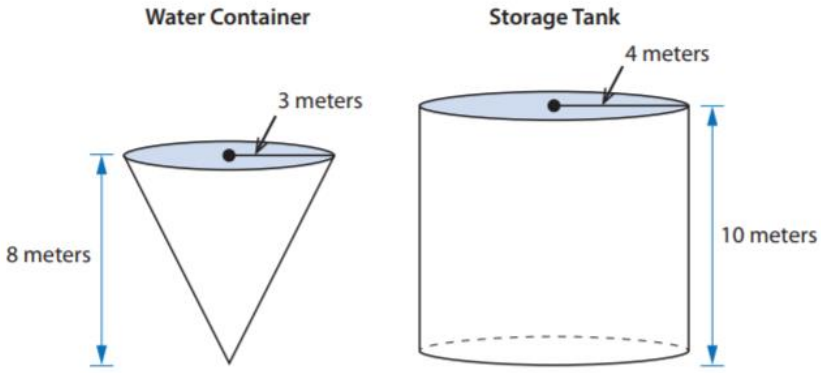
Use the diagram to answer the questions.



a. Predict which of the figures shown above has the greater volume. Explain.

b. Use the diagram to find the volume of each, and determine which has the greater volume.

At a construction site, a crane is lifting water in cone-shaped container and transferring the water to a cylindrical storage tank.



What is the maximum number of full containers of water that can be transferred into the storage tank without the water overflowing the tank?

Show your work.

Kendall transformed the equation $\frac{1}{3}(5x - 15 + 4x) = 1 + 3x + 4$ into a simpler form as shown.

$$\frac{1}{3}(5x - 15 + 4x) = 1 + 3x + 4$$

$$\frac{1}{3}(9x + 15) = 3x + 5$$

$$3x - 5 = 3x + 5$$

$$3x - 3x = -5 + 5$$

$$0 = 0$$

Which statement is correct?

A. Kendall made a mistake; the equation has no solution.

B. Kendall did everything correctly; the equation has no solution.

C. Kendall made a mistake; the equation has an infinite number of solutions.

D. Kendall did everything correctly; the equation has an infinite number of solutions.

Closure – What did we do today?

How do we find the volume of a sphere?

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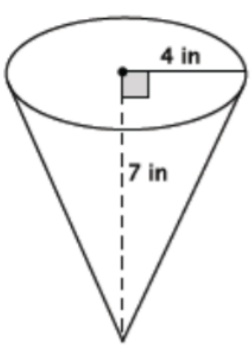
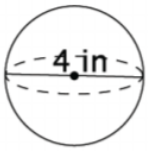
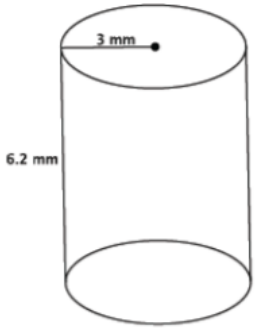
Exit Ticket

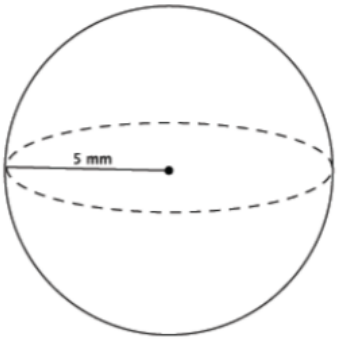
Which of the two figures below has the lesser volume?





Which of the two figures below has the greater volume?





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Exit Ticket

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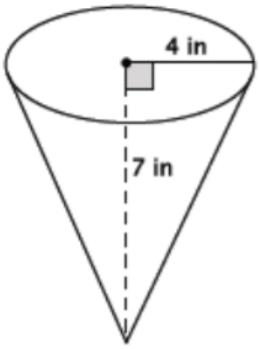

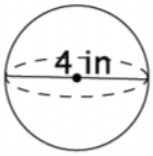
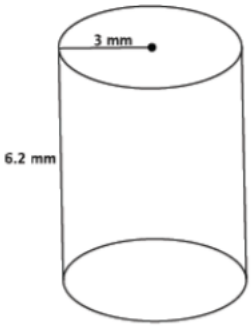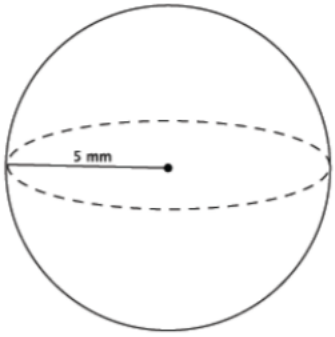
Which of the two figures below has the greater volume?