




Lesson Title	Volume of a sphere
Subject	Mathematics
Strand & Grade	Geometry - High School
Objectives	Find the volume of a sphere.

HINT Use pull handles to drag content onto the screen, e.g. hints and answers.

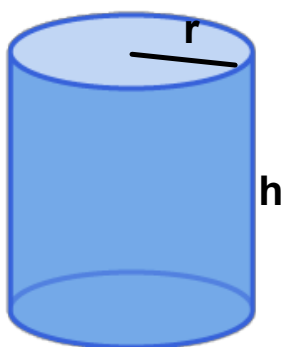
CLONE  An arrow indicates content nearby which can be dragged or which will clone.

CLICK  Click on icons with a solid circle to animate content, e.g. to reveal answers.

 Click here to access printable teacher notes for this lesson.

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Who knows the formula for the volume of a cylinder?



ANSWER $V = \pi r^2 h$

$$\pi r^2 h$$

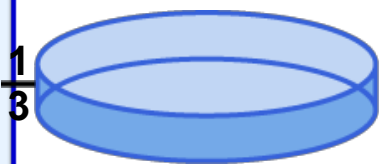
$$r^2 h$$

$$2\pi r h$$

$$\pi r^2$$

Take a hemisphere and a cylinder with an equal base and height

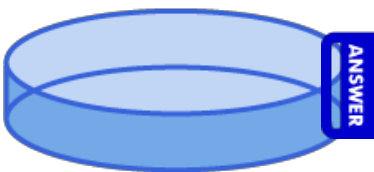
Fill the hemisphere with water, and then pour the water into the cylinder, how far up the cylinder will the water reach?



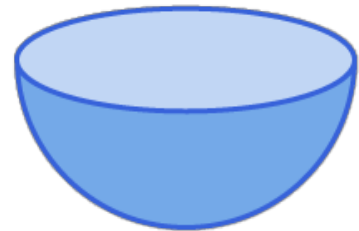
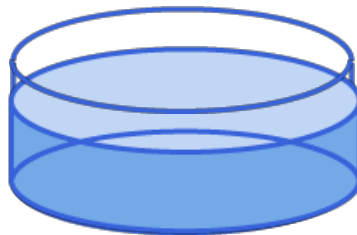
$$V = \pi r^2 \cdot h$$

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

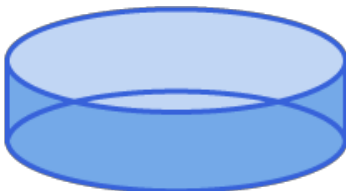
ANSWER



$\frac{2}{3}$

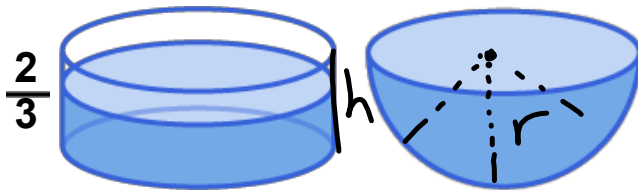


$\frac{2}{3}$



Hemisphere and cylinder of equal radius

Volume of the hemisphere



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

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

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

Volume of a sphere



$$= 2 \cdot \left(\frac{2}{3} \pi r^3 \right)$$

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

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

Find the volume of these spheres

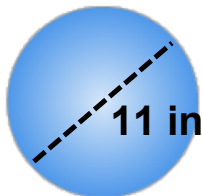


$$V = \frac{4}{3} \pi 5^3$$

$$\frac{500}{3} \pi \text{ in}^3$$

HINT

ANSWER



$$V = \frac{4}{3} \pi (5.5)^3$$

$$V = \frac{4}{3} \pi 5.5^3$$

$$V = 696.6 \text{ in}^3$$

HINT

ANSWER

Use $\pi = 3.14$ and round answers to the nearest tenth.

Sam pumped up a beach ball to double its radius.
Find the volume of both balls in terms of pi.

$2r, 2r, 2r$

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

radius = 3 in



$V = \frac{4}{3}\pi (2r)^3$
 $= \frac{4}{3}\pi (8r^3)$

radius = ~~3~~ in



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

$V = 36\pi \text{ in}^3$

$V = \frac{72\pi}{324\pi} \text{ in}^3$

288π

ANSWER

ANSWER

ANSWER

By what factor has the volume increased?

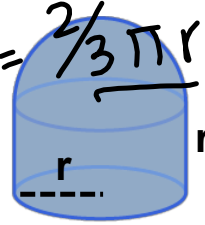
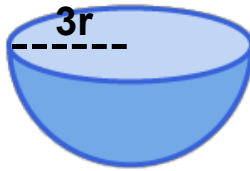
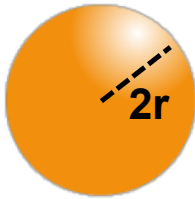
Match the volume to the picture

HINT

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

$$\text{Cyl} = \pi r^2 \cdot r = \pi r^3$$

$$\text{Hem} = \frac{2}{3} \pi r^3$$

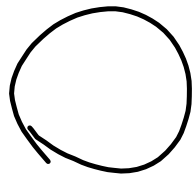


V =

V =

$V = \frac{5}{3} \pi r^3$

DRAG



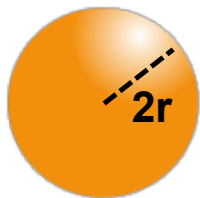
$$\frac{32}{3} \pi r^3 \quad 18\pi r^3$$

ANSWER

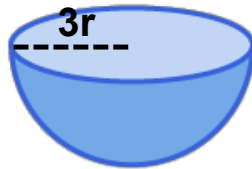
ANSWER

ANSWER

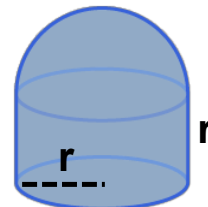
Order these solids by volume



$$V = \frac{32}{3} \pi r^3$$



$$V = 18\pi r^3$$



$$V = \frac{5}{3} \pi r^3$$

ANSWER



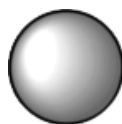
Least



Greatest

Formulas

$$V(\text{Sphere}) = \frac{4}{3} \pi r^3$$



$$V(\text{Hemisphere}) = \frac{2}{3} \pi r^3$$



Yes - this is an index card!!!

Cross-Sections

Example 1

Describe three different cross-sections you can find for the rectangular prism below



Solution



Cross Sections

Example 2

The cylinder below sits on a horizontal base. Draw and describe the cross-section formed when the cylinder is cut by a plane that is tilted away from its base.

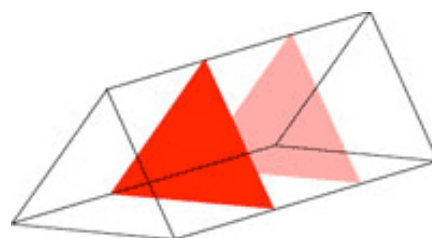
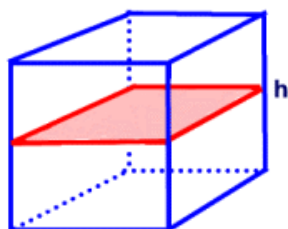
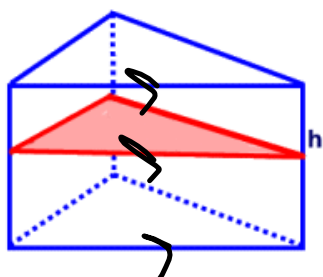
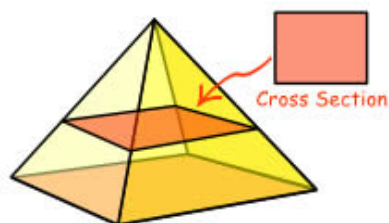
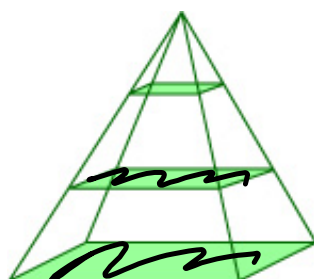
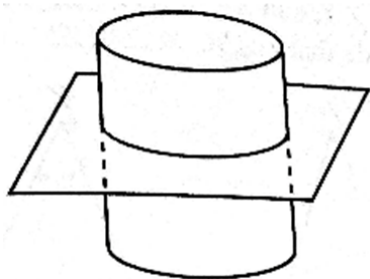


Solution

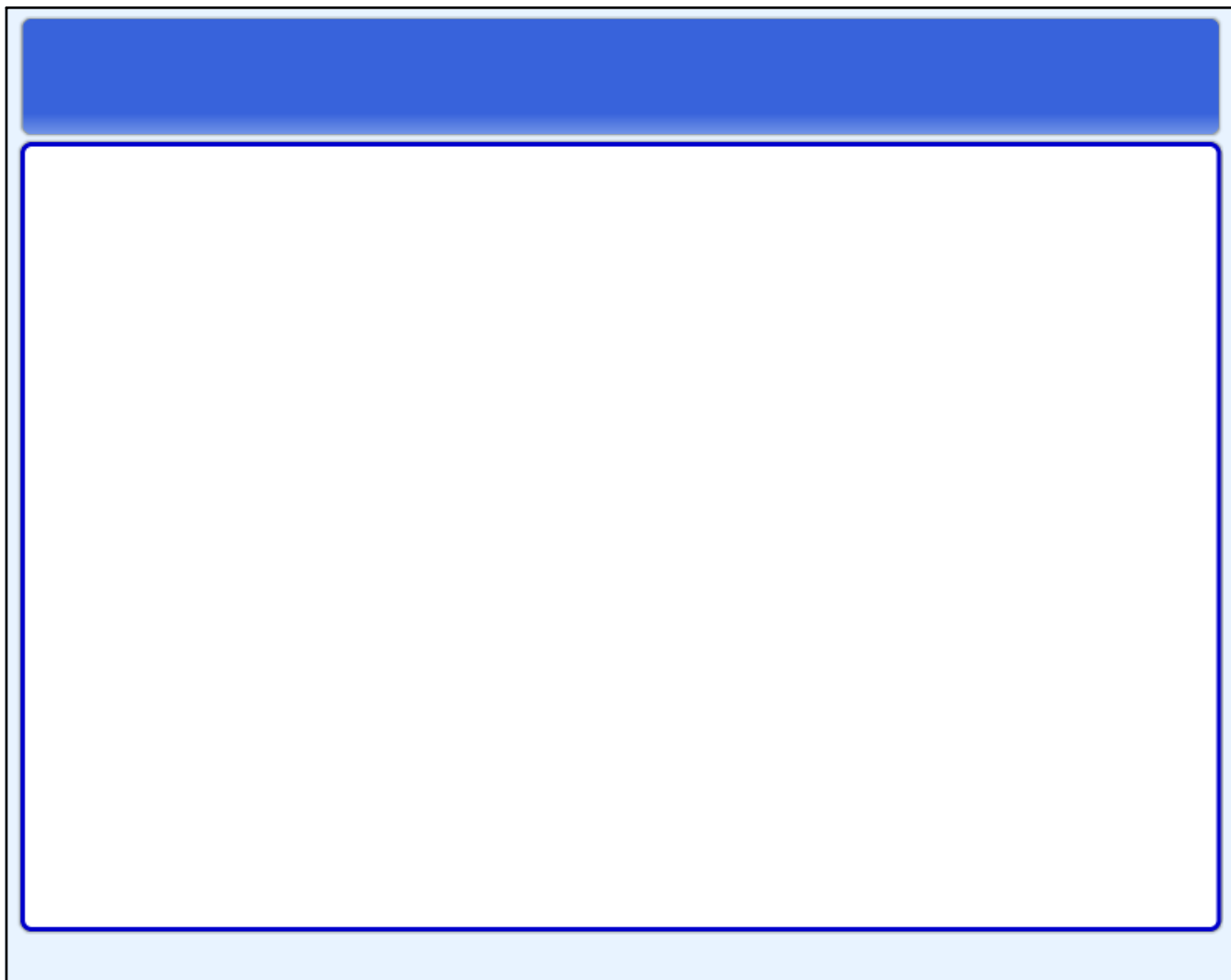
- The cross-section is shaped like an oval. In mathematics, this shape is called an ellipse.



Cross Sections



All the cross-sections are the same, so this is a prism



Classwork

**1) Work with a partner to complete
12.6 Practice Worksheet #1 - 18****

**** #16 - 18 just find volume**

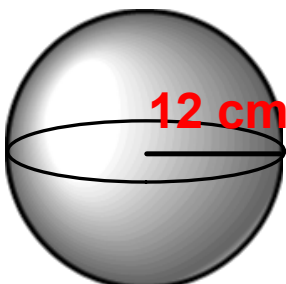
**2) Glasses - Pre-Test
for Formative Assessment Lesson**

3) p. 589 #1, 3 - 6, 8a, 10a

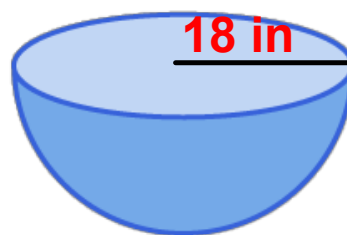
Exit Slip

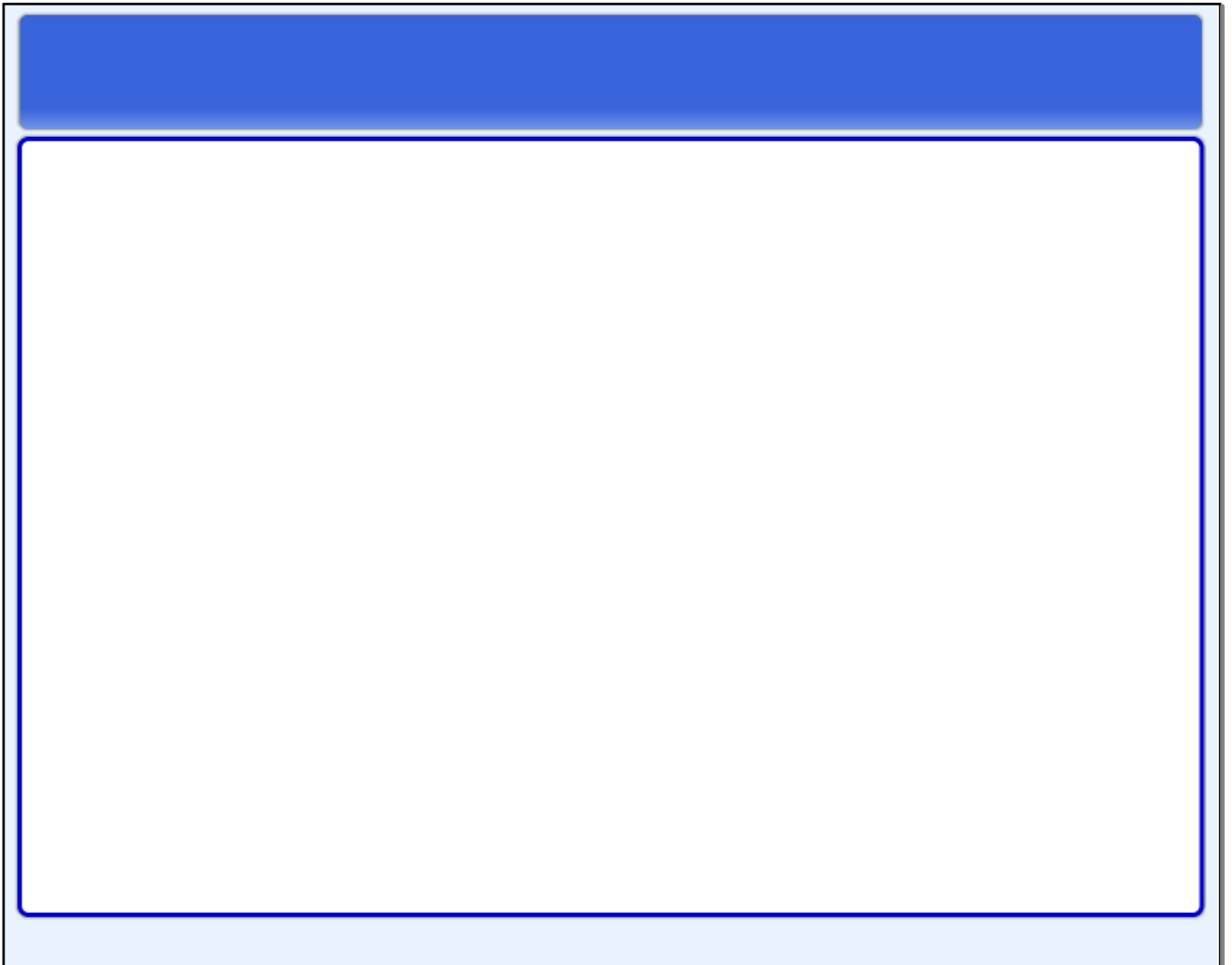
Find the volume.

1)



2)





Attachments

Volume_Sphere.pdf