

Name _____ Per _____

LO: I can solve problems involving volumes of General Cylinders.

DO NOW On the back of this packet

(1)
calculator

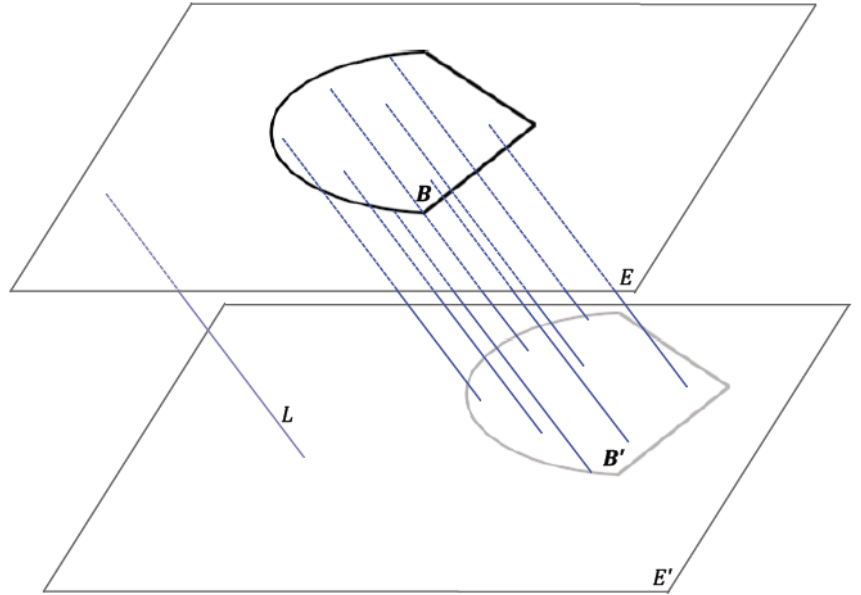
What is a General Cylinder?

General cylinders are 3-dimensional shapes formed by congruent regions (bases) in parallel planes and all of the segments that connect preimage points in one region to the image points in the other (see the diagram at right).

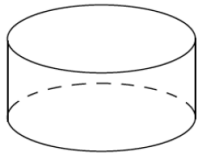
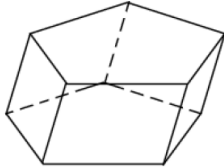
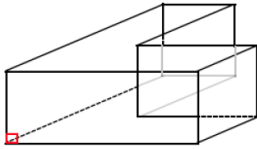
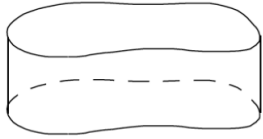
SHADE region B in plane E pink.

SHADE region B' in plane E' pink.

B and B' are bases.



The following solids are all general cylinders. For each solid, shade the base regions pink and then draw the shape of the base region in the box below the solid.

<p>a.</p> 	<p>b.</p> 	<p>c.</p> 	<p>d.</p> 
Empty box for drawing the base of solid a	Empty box for drawing the base of solid b	Empty box for drawing the base of solid c	Empty box for drawing the base of solid d

(2)
cont.
calculator

How does Cavalieri's Principle help us understand the formula for the volume of a General Cylinder?

The darkly shaded region in E' is congruent to the region in E .
The three planes are parallel.

- (a) How do the area's of the regions in E' and E compare?
- (b) How does the area of region E'' compare to the areas of E' and E ?
- (c) If we slide E'' up toward E' or down toward E , how will the darkly shaded region change? Stay the same?

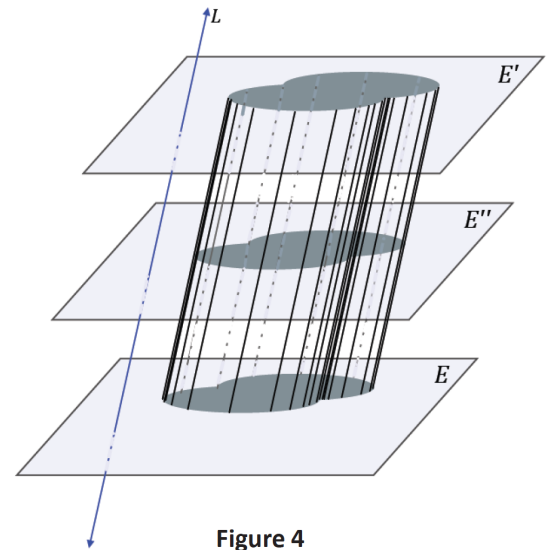
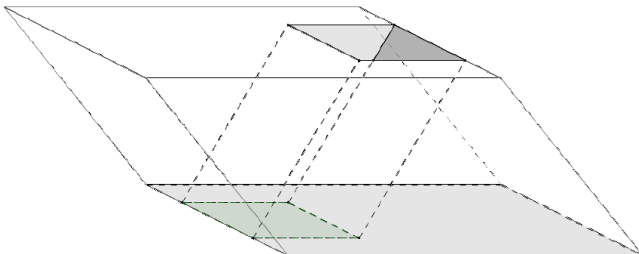


Figure 4

(d) Sliding E'' up and down shows us different "slices" or cross-sections. The volume of a figure can be found by adding up the volume of all of these thinly sliced cross sections. This results in a formula for the volume of a cylinder that states:

$$V = BH$$

(e) Use this formula to find the volume of the oblique prism below. The prism has a rectangular base that is 16 in. x 9 in. A hole in the prism is also the shape of an oblique prism with a rectangular base that is 3 in. wide and 6 in. long, and the prism's height is 9 in. Find the volume of the remaining solid.



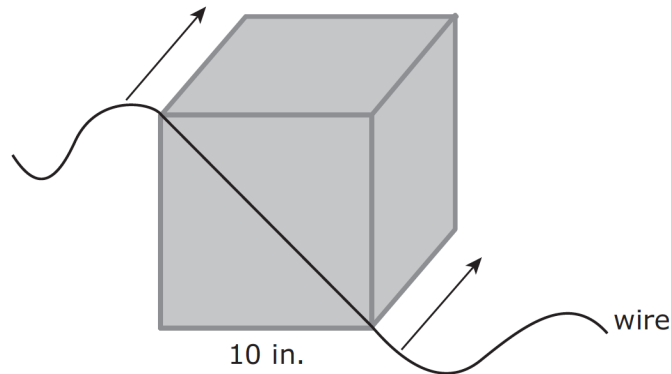


How can we use the volume of General Cylinders to answer real world problems?

USE THE REFERENCE SHEET (on the back of the 9.0 cover page)

Daniel buys a block of clay for an art project. The block is shaped like a cube with edge lengths of 10 inches.

Daniel decides to cut the block of clay into two pieces. He places a wire across the diagonal of one face of the cube, as shown in the figure. Then he pulls the wire straight back to create two congruent chunks of clay.



Daniel wants to keep one chunk of the clay for later use.

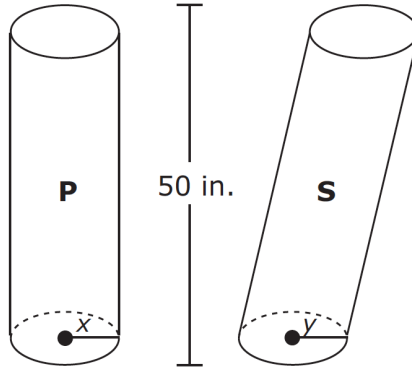
Daniel wants to reshape the other chunk of clay to make a set of clay spheres. He wants each sphere to have a diameter of 4 inches. Find the maximum number of spheres that Daniel can make from the chunk of clay. Show your work.

Enter your answer and your work in the space provided.

(4)
calculator

How can we use the volume of General Cylinders to answer real world problems?

Two cylinders each with a height of 50 inches are shown.



Which statements about cylinders P and S are true?

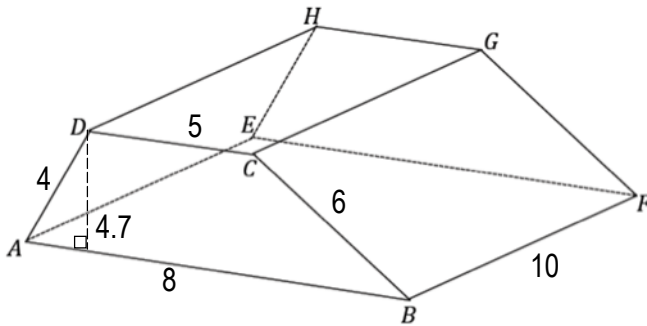
Select **all** that apply.

- (A) If $x = y$, the volume of cylinder P is greater than the volume of cylinder S, because cylinder P is a right cylinder.
- (B) If $x = y$, the volume of cylinder P is equal to the volume of cylinder S, because the cylinders are the same height.
- (C) If $x = y$, the volume of cylinder P is less than the volume of cylinder S, because cylinder S is slanted.
- (D) If $x < y$, the area of a horizontal cross section of cylinder P is greater than the area of a horizontal cross section of cylinder S.
- (E) If $x < y$, the area of a horizontal cross section of cylinder P is equal to the area of a horizontal cross section of cylinder S.
- (F) If $x < y$, the area of a horizontal cross section of cylinder P is less than the area of a horizontal cross section of cylinder S.

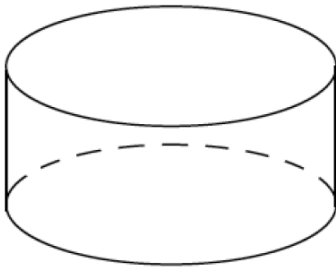
(5) **Exit Ticket**
calculator
ON THE LAST PAGE

(6) **Homework**
calculator
Provide sufficient evidence for each response.

(1) The following right prism has trapezoidal base regions – it is a trapezoidal prism where ABCD is a trapezoid. The lengths of the figure are as shown. Find the volume of the prism.



(2) The base of the following right cylinder has a circumference of 5π and a lateral edge (height) of 8. What is the radius of the base? What is the volume of the right cylinder?



(3) A right prism has base area 5 and volume 30. Find the prism's height, h .

(6) **Homework**

internet

 (4)

A general cylinder has a volume of 144. What is one possible set of dimensions of the base and height of the cylinder if all cross-sections parallel to its bases are ...

- a. Rectangles?
- b. Right triangles?
- c. Circles?

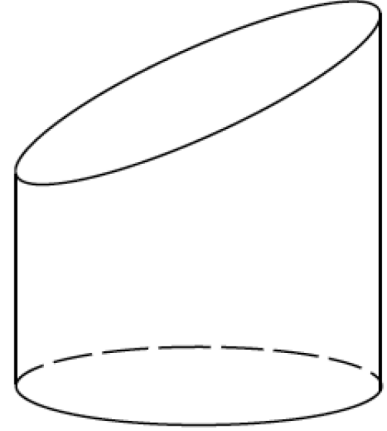
 (5)

A right prism has base area 5 and volume 30. Find the prism's height, h .

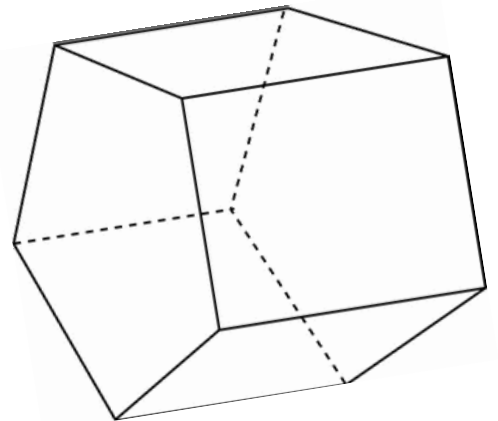
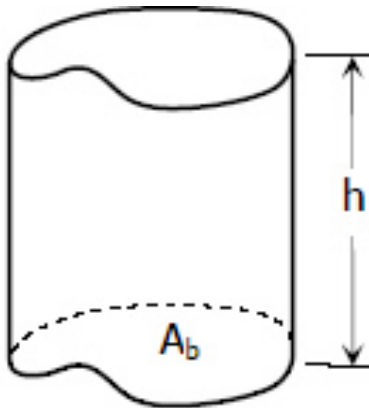
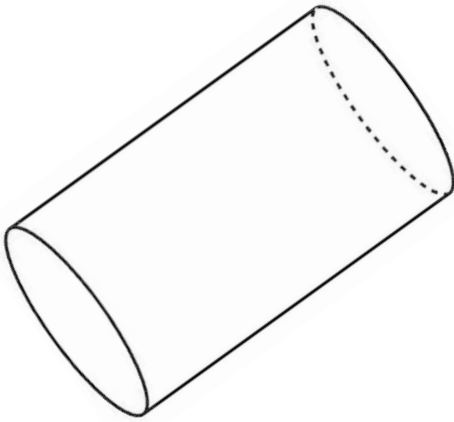
Exit Ticket Name _____ Date _____ Per _____ 9.3R

The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

1. Is this a cylinder? Explain why or why not.



2. For each of the following figures, draw the shape of a cross section of the figure.



DO NOW Name _____ Date _____ Per _____

9.3R

(1) Draw a diagram and write a description for Cavalieri's Principle. Write it as though you were teaching a student who just started the class today. (See lesson 9.3)

(2) What is wrong with the diagram below?

