

(DN) ON BACK OF PACKET

Name _____ Per _____

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

(1)
calculator

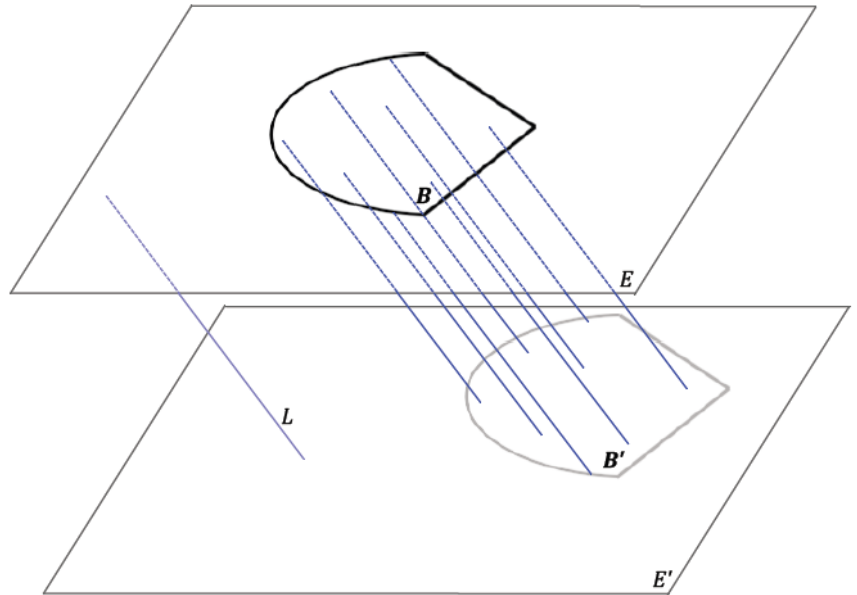
What is a General Cylinder?

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 base	Empty box for drawing base	Empty box for drawing base	Empty box for drawing base

□ (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?

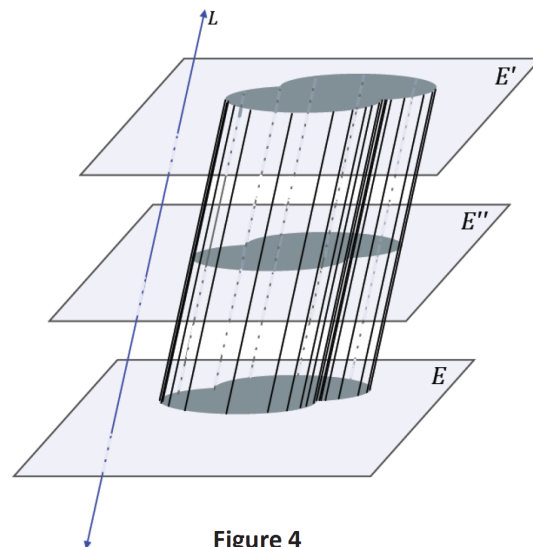
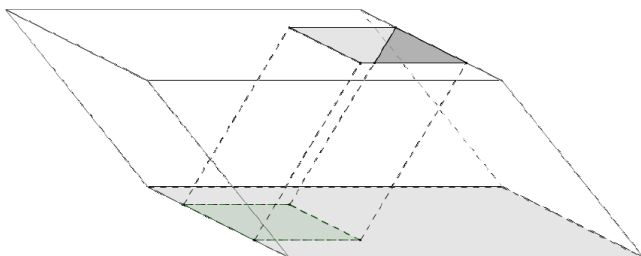


Figure 4

(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.



(3)
calculator

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

A machine part is manufactured from a block of iron with circular cylindrical slots. The block of iron has a width of 14 in., a height of 16 in., and a length of 20 in. The number of cylinders drilled out of the block is determined by the weight of the leftover block, which must be less than 1,000 lb.

- a. If iron has a weight of roughly 491 lb/ft³, how many cylinders with the same height as the block and with radius 2 in. must be drilled out of the block in order for the remaining solid to weigh less than 1,000 lb.?

- b. If iron ore costs \$115 per ton (1 ton=2200 lb.) and the price of each part is based solely on its weight of iron, how many parts can be purchased with \$1,500? Explain your answer.

(8) **Exit Ticket**

calculator

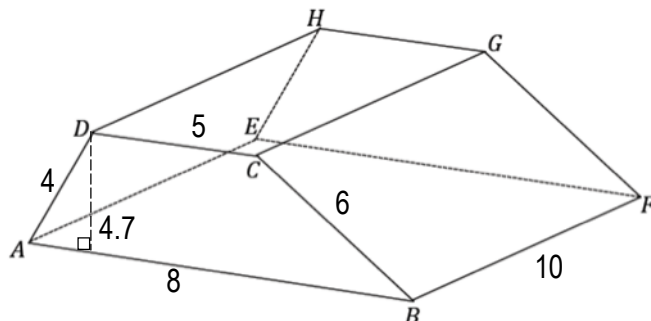
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 (9) **Homework**

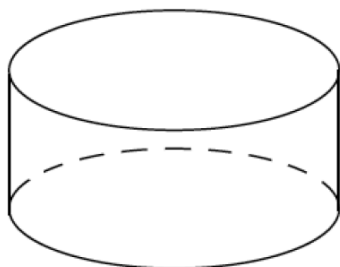
calculator

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

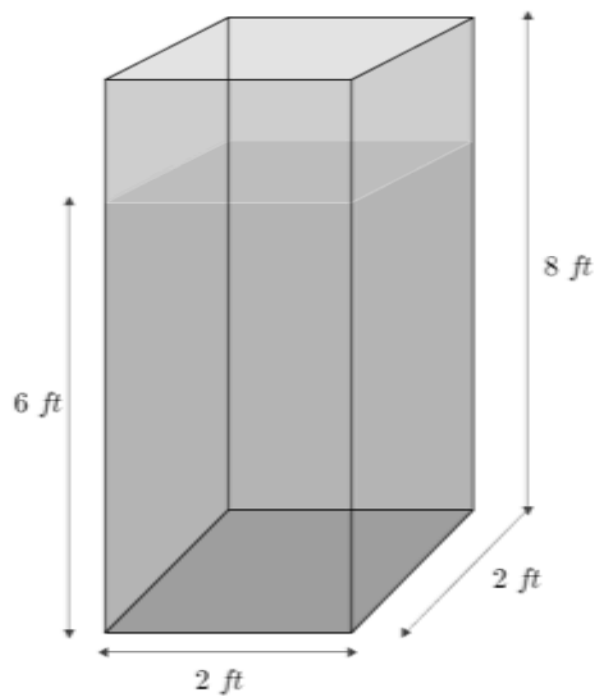
(4)

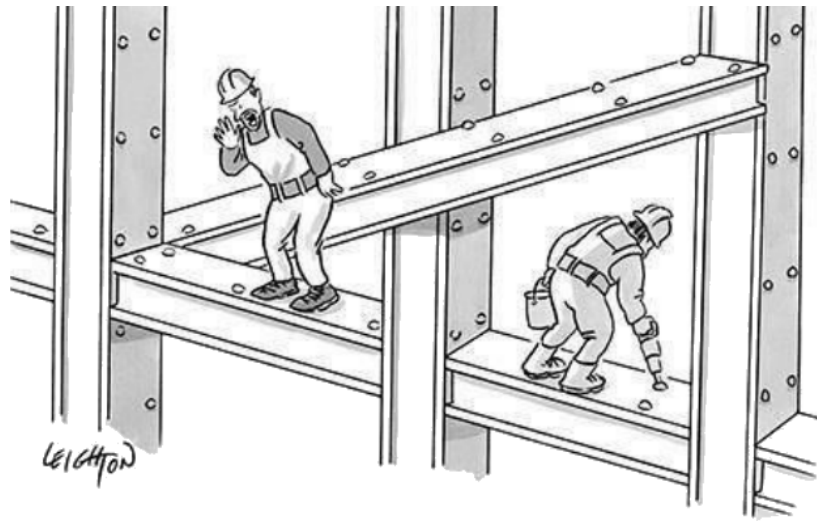
A general cylinder has a volume of 144. What is one possible set of dimensions of the base and height of the cylinder if all cross-sections parallel to its bases are ...

- Rectangles?
- Right triangles?
- Circles?

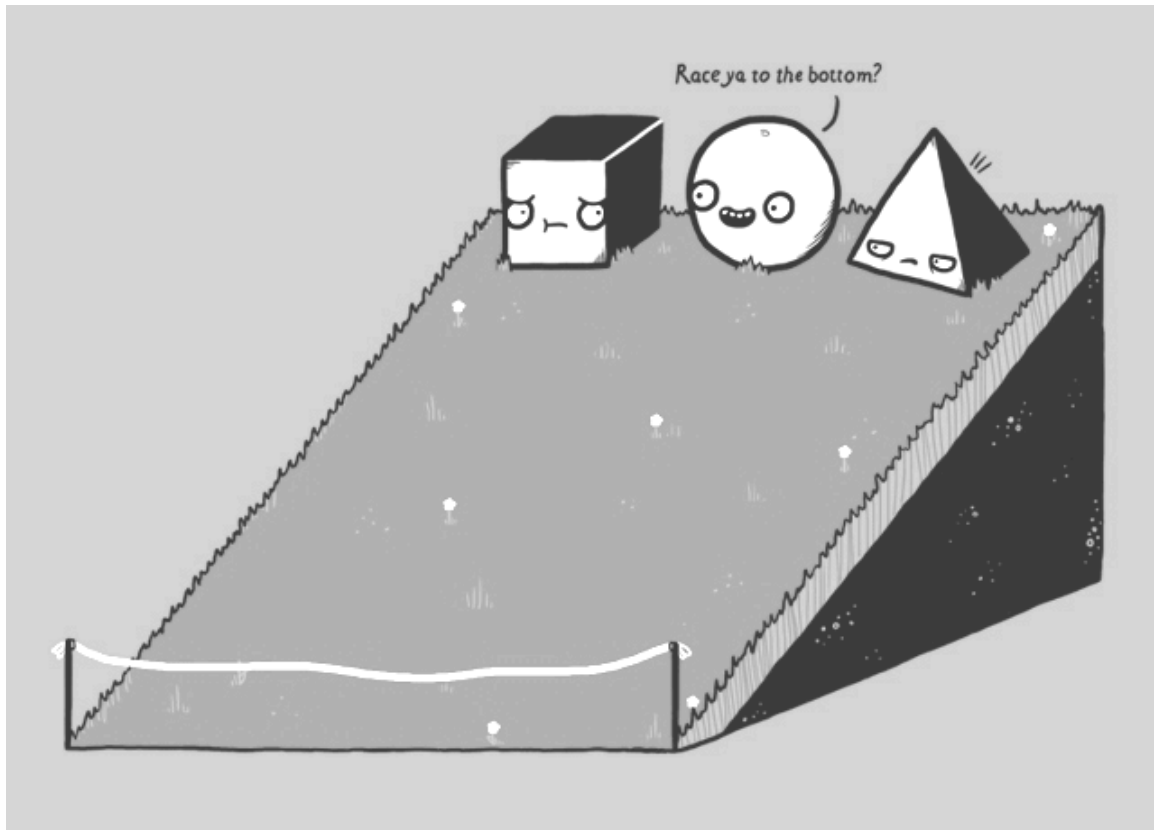
(5)

A tank is the shape of a right rectangular prism with base $2\text{ ft.} \times 2\text{ ft.}$ and height 8 ft. The tank is filled with water to a depth of 6 ft. A person of height 6 ft. jumps in and stands on the bottom. About how many inches will the water be over the person's head? Make reasonable assumptions.

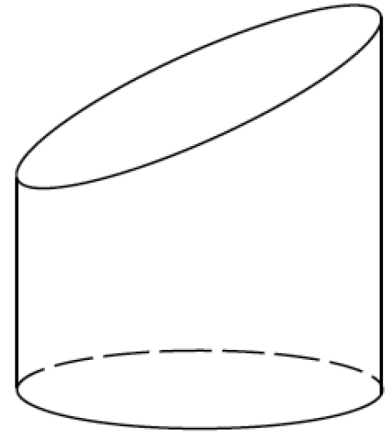




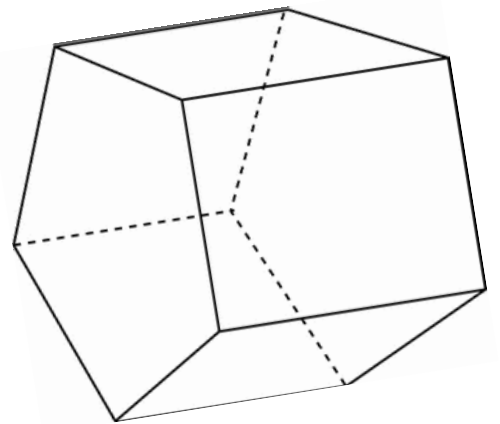
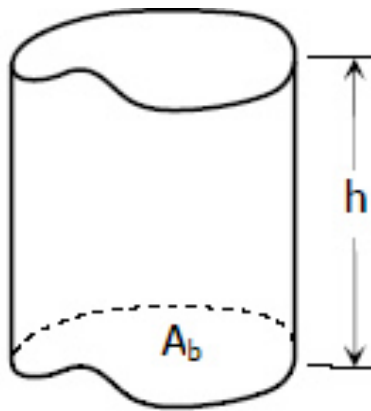
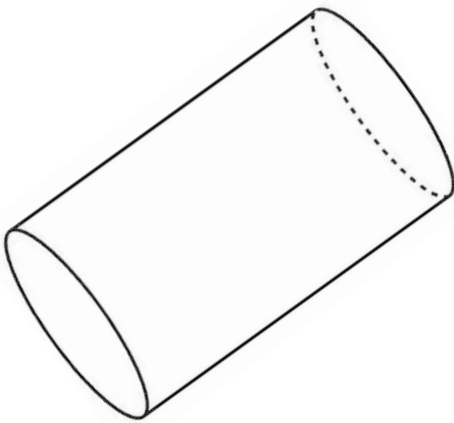
Escher, get up here!



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** _____

9.2

(1) Watch the remainder of the web tutorial from 9.2 and write down what Cavalieri's Principle states for 3D figures.