

## Geometry 12.4

Find volumes of prisms\*

Find volumes of cylinders\*\*

volume (capacity)

units

composite solid

oblique

Cavalieri's principle

$$V = l \cdot w \cdot h = Bh$$

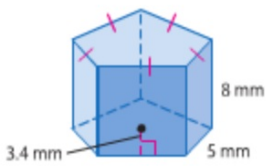
Whiteboards

\*6th grade standard

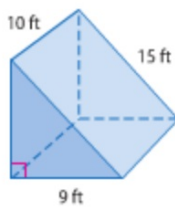
\*\*8th grade standard

► Guided Practice

1A.



1B.



$$V = B \cdot h$$

$$= \left( \frac{1}{2} \cdot 9 \cdot 10 \right) \cdot 10 = 70.8 \text{ ft}^3$$

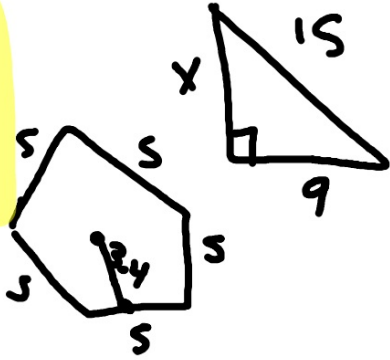
$$V = B \cdot h$$

$$= (42.8) \cdot 8$$

$$= 340 \text{ mm}^3$$

$$A = \frac{1}{2} a p$$


$$= \frac{1}{2} \cdot 34 \cdot 25$$



$$x^2 + 9^2 = 15^2$$

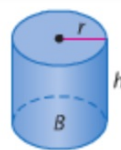
$$x^2 + 81 = 225$$

$$x = 12$$

 **Key Concept** Volume of a Cylinder

**Words** The volume  $V$  of a cylinder is  $V = Bh$  or  $V = \pi r^2 h$ , where  $B$  is the area of the base,  $h$  is the height of the cylinder, and  $r$  is the radius of the base.

**Model**



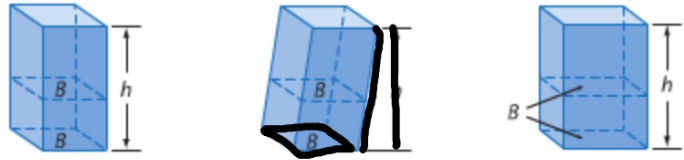
**Symbols**  $V = Bh$

We can find volumes of oblique prisms/cylinders

**Key Concept Cavalieri's Principle**

**Words** If two solids have the same height  $h$  and the same cross-sectional area  $B$  at every level, then they have the same volume.

**Models**

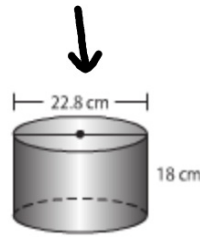


These prisms all have a volume of  $Bh$ .

**Guided Practice**

4. The containers at the right are filled with popcorn. About how many times as much popcorn does the larger container hold?

- F 1.6 times as much
- G 2.5 times as much
- H 3.3 times as much
- J 5.0 times as much



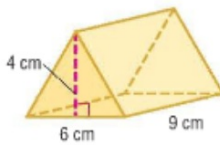
$$V = (\pi \cdot 7.25^2) 18$$
$$= 2972.3 \text{ cm}^3$$

$$V = (\pi \cdot 11.4^2) (18)$$
$$= 7349.1 \text{ cm}^3$$

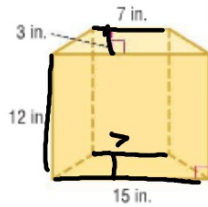
$$2972.3 \times = 7349.1$$

**Examples 1 and 3** Find the volume of each prism.

1.



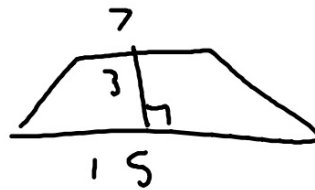
2.



$$V = B h$$

$$= (\underline{33}) 12$$

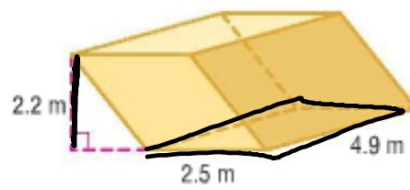
$$= 396 \text{ in}^3$$



$$\frac{1}{2} h (b_1 + b_2)$$

$$\frac{1}{2} \cdot 3 (22)$$

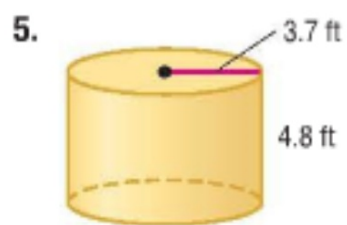
3. the oblique rectangular prism shown at the right
4. an oblique pentagonal prism with a base area of 42 square centimeters and a height of 5.2 centimeters



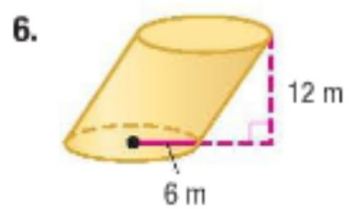
$$V = ( \quad ) h \quad V = (12.25) 2.2$$

$$42 \cdot 5.2 \text{ cm}^3 \quad = 26.95 \text{ m}^3$$

Find the volume of each cylinder. Round to the nearest tenth.

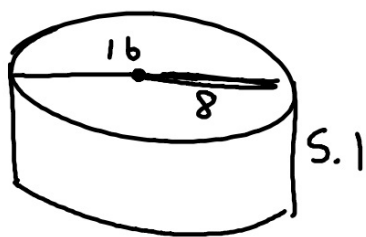


( ) h

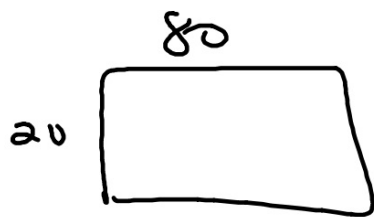




7. a cylinder with a diameter of 16 centimeters and a height of 5.1 centimeters
8. a cylinder with a radius of 4.2 inches and a height of 7.4 inches



9. **MULTIPLE CHOICE** A rectangular lap pool measures 80 feet long by 20 feet wide. If it needs to be filled to four feet deep and each cubic foot holds 7.5 gallons, how many gallons will it take to fill the lap pool?



$$\begin{aligned} V &= ( \quad ) h \\ &= (20 \cdot 80) \cdot 4 \\ &= 6400 \text{ ft}^3 \end{aligned}$$

$$48,000 \text{ gal.}$$

WR 12.3-12.4

Quiz wed.