LESSON 11.2

Volume of Prisms and Cylinders

Learning Target:

I can apply the volume formulas for prisms and cylinders to solve problems.

The dynamic exploration on p. 543 of the teacher e-book can be used to investigate the concept of volume and how to find the volume of a prism.

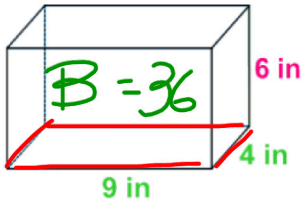
VOLUME: the number of cubic units contained in the interior of a solid.

To find the **volume of a prism**, multiply the area of one of the bases by the height of the prism.

V = Bh, where B = the area of a base of the prism and h = height of the prism.

Find the volume of each prism.

1.

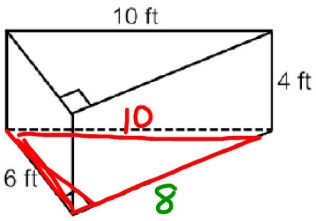


$V = Bh$

$V = (36)(6)$

$V = 216\ in^3$

2.



$6^2 + x^2 = 10^2$

$36 + x^2 = 100$

$-36 \quad -36$

$\sqrt{x^2} = \sqrt{64}$

$x = 8$

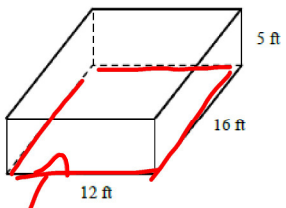
$B = \frac{1}{2}(8)(6)$

$B = 24$

$V = (24)(4)$

$V = 96\ ft^3$

3. A cubic foot of dirt weighs 70 lbs. Mr. Lindahl is interested digging a swimming pool in his back yard with the following dimensions. How many pounds of dirt will he be removing?



$V = Bh$

$V = (192)(5)$

$V = 960\ ft^3$

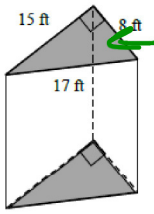
$B = (12)(16)$

$B = 192$

$(960)(70)$

67,200 lbs

4. The prism below has a volume of 720 ft^3. Find the height of the prism.



$B = \frac{1}{2}(15)(8)$

$B = 60$

$V = Bh$

$\frac{720}{60} = \frac{60h}{60}$

12 ft $= h$

The volume of a cylinder has the same formula as the volume of a prism, $V = Bh$. However, since the shape of the base of a cylinder is always the same we can be more specific with the formula.

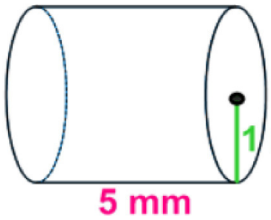
What shape is the base of the prism and what is the area of that shape?

If you substitute the area of the base formula in for the B in $V = Bh$ you get the volume formula for a cylinder. What is the volume formula for a cylinder?

To find the **volume of a cylinder**, multiply the area of the circle base by the height of the prism.

V = $\pi r^2 h$, where r = the radius of the circular base and h = height of the prism.

5.



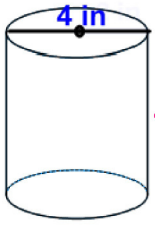
$r = 1$
$h = 5$

$V = \pi r^2 h$

$V = \pi(1)^2(5)$

$V = 15.8 \text{ mm}^3$

6.

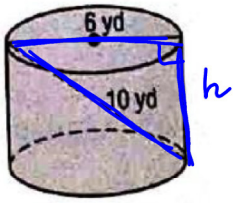


$r = 2$
$h = 10$

$V = \pi(2)^2(10)$

$V = 125.7 \text{ in}^3$

7. Find the volume of the cylinder below.



$r = 3$
$h = 8$

$V = \pi(3)^2(8)$

$V = 226.2\ yd^3$

8. The volume of a cylinder is 2160π ft^3 and has a height of 15 feet. Find the diameter of the cylinder's base.

$V = \pi r^2 h$

$\frac{2160\pi}{15} = \frac{\pi r^2(15)}{15}$

$\sqrt{144} = \sqrt{r^2}$

$12 = r$

$d = 24$ ft