Geometry

9.4: Volume of Prisms and Cylinders

Name:_____

Students will be able to find the volume of prisms and cylinders.

☆**Volume:** Number of cubic units contained in its interior.

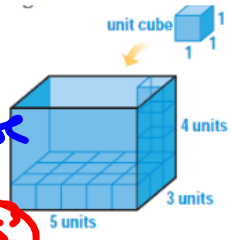
☆**Units for Volume:** measured in cubic units (units cubed) Ex: m^3, ft^3, yd^3

Example 1: Find the volume of the box by determining how many unit cubes fit in the box.

Base: $5 \times 3 = 15$ units^3

takes 15 cubes to cover base

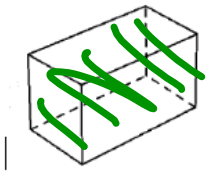
There are 4 layers, each layer has 15 units, so $4 \cdot 15 = 60$ units^3

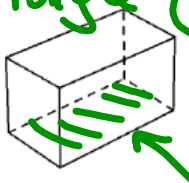


Volume of a prism = **area of base** × **height**

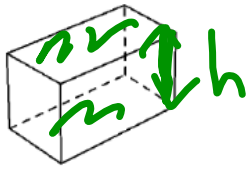
Rectangle (bh)

Triangle ($\frac{bh}{2}$)





B

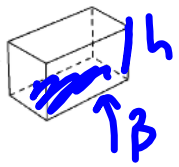


h

Volume of a prism:

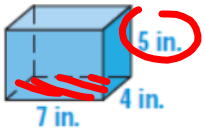
V = $V = Bh$

B = area of base
h = height



Example 2: Name the prism and then find the volume of the prism.

a.



Name: Rectangular prism

$V = Bh$

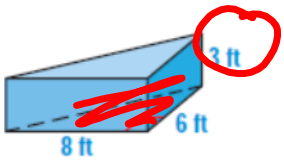
$B = 7 \cdot 4 = 28 in^2$

$h = 5 in$

$V = 28 \cdot 5$

$V = 140 in^3$

b.



Name: Triangular Prism

$V = Bh$

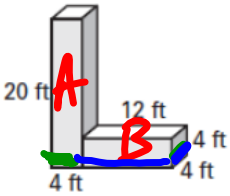
$B = \frac{6 \cdot 8}{2} = 24 ft^2$

$h = 3 ft$

$V = 24 \cdot 3$

$V = 72 ft^3$

c.



A

$V = Bh$

$V = 16 \cdot 20$

$V = 320 ft^3$

$B = 4 \cdot 4 = 16 ft^2$

$h = 20 ft$

B

$V = Bh$

$B = 4 \cdot 12 = 48$

$h = 4 ft$

$V = 48 \cdot 4$

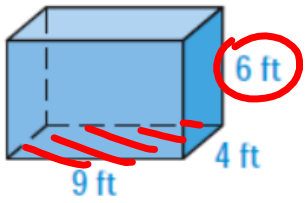
$V = 192 ft^3$

$V_{total} = 320 + 192$

$= 512 ft^3$

Try: Name the prism and then find the volume of the prism.

a.



Name: Rectangular Prism

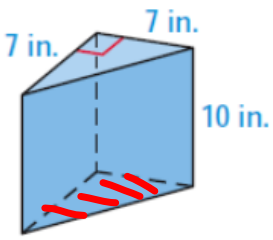
$V = Bh$

$V = 36 \cdot 6 = 216\ ft^3$

$B = 9 \cdot 4 = 36\ ft^2$

$h = 6\ ft$

b.



Name: Triangular Prism

$V = Bh$

$B = \frac{7 \cdot 7}{2} = 24.5\ in^2$

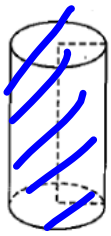
$h = 10\ in$

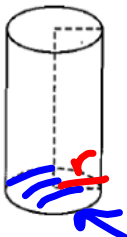
$V = 24.5 \cdot 10$

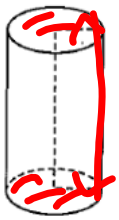
$V = 245\ in^3$

Volume of a cylinder = area of base x height

circle: πr^2







Volume of a cylinder:

since base is a circle

$V = Bh$

(area of base) x (height)

$V = \pi r^2 h$

r: radius

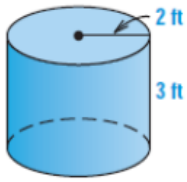
h: height

Example 3: Find the volume of the cylinder. Round your answer to the nearest whole number.

a. 

$r = 1in$
$h = 5in$

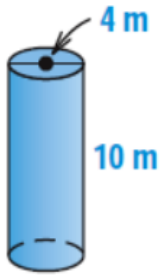
$V = \pi r^2 h$
$V = \pi(1)^2(5)$ ✓
$V = \pi(1)(5)$
$V = 5\pi$
$V = 5(3.14)$
$V = 15.7 in^3$
$V = 16 in^3$

b. 

$r = 2ft$
$h = 3ft$

$V = \pi r^2 h$
$V = \pi(2)^2(3)$ ✓
$V = \pi(4)(3)$
$V = 12\pi$
$V \approx 12(3.14)$
$V \approx 37.68 ft^3$
$V \approx 38 ft^3$

Try: Find the volume of the cylinder. Round your answer to the nearest whole number.



$r = 2m$

$h = 10m$

$V = \pi r^2 h$

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

$V = \pi (4)(10)$

$V = 40\pi$

$V \approx 40(3.14)$

$V \approx 125.6m^3$

$V \approx 126m^3$

Example 4:

a. Find the volume of the paint can and the can of car wax.

Paint

$r = 3$
$h = 4$

$V = \pi r^2 h$
$V = \pi(3)^2(4)$
$V = \pi(9)(4)$
$V = 36\pi$

Car Wax

$r = 4$
$h = 3$

$V = \pi r^2 h$
$V = \pi(4)^2(3)$
$V = \pi(16)(3)$
$V = 48\pi$

b. What gives a greater volume: a bigger radius or a bigger height? Why?

Bigger radius because you have to square the radius.

$V = \pi r^2 h$

Homework: Worksheet 9.4