

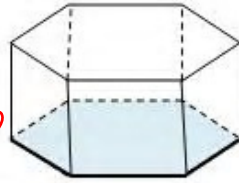
**MATH 10 – UNIT 1 – LESSON 8 – VOLUME OF RIGHT PYRAMIDS, CONES, PRISMS & CYLINDERS**

MEASUREMENT UNIT

Name: Key

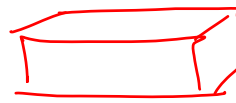
**Right Prism:**

A 3-D object with 2 congruent, parallel bases and all other faces are rectangles



hexagonal prism

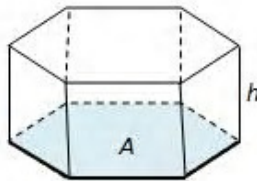
the name of the prism depends on the shape of the base.



Rectangular Prism.

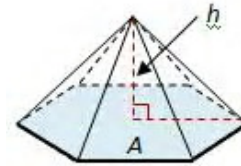
**Volume of a Right Prism**

Volume = (area of base)(height)  
 $V = Ah$



**Volume of a Right Pyramid**

Volume =  $\frac{1}{3}$ (area of base)(height)  
 $V = \frac{1}{3}Ah$



The volume of a right prism is 3 times the volume of a right pyramid with the same base & height

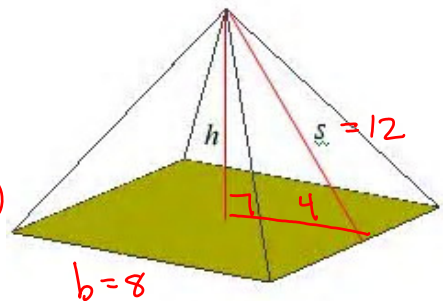
**Example #1:** Calculate the volume of the following right square pyramid to the nearest cubic inch if the slant height is 12 inches and the side length of the base is 8 inches.

#1 Find height!

$12^2 = h^2 + 4^2$   
 $h^2 = 12^2 - 4^2$   
 $h = \sqrt{128}$

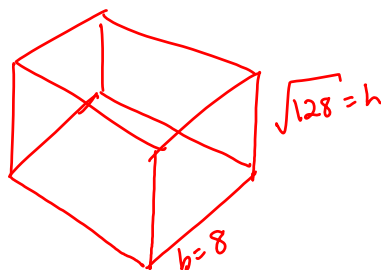
#2 Use formula!

$V = \frac{1}{3}Ah$   
 $V = \frac{1}{3}(8 \times 8)(\sqrt{128})$   
 $V = 241.359$



$\therefore$  the volume is approx. 241 cubic inches

**Example #2:** Sketch a prism with the same base and height as the pyramid in example #1. Calculate the volume of this right prism.



$V = 3 \times 241$   
 $V = 723$

$\therefore$  the volume is approx. 723 cubic in.

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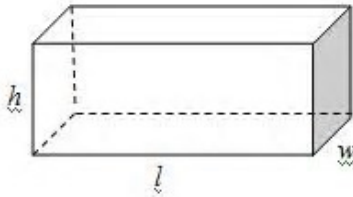
MEASUREMENT UNIT

Name: Key

The volume of a right rectangular prism is 3 times the volume of a right rectangular pyramid with the same base length ; width and height.

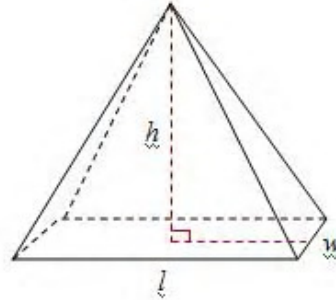
**Volume of a Right Rectangular Prism**

$$V = lwh$$

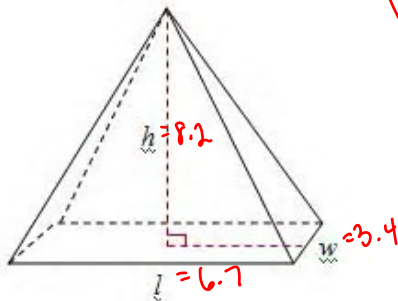


**Volume of a Right Rectangular Pyramid**

$$V = \frac{1}{3}lwh$$



**Example #3:** Find the volume of a right rectangular pyramid with the base dimensions of 3.4 cm by 6.7 cm and a height of 8.2 cm.

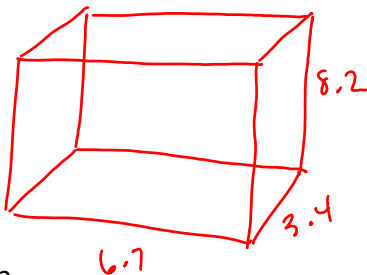


$$V = \frac{1}{3}lwh$$

$$V = \frac{1}{3}(6.7)(3.4)(8.2)$$

$$V = 62.27 \text{ cm}^3$$

**Example #4:** Sketch a rectangular prism with the same base and height as the pyramid in example #3. Calculate the volume of this right rectangular prism.



$$V = 3 \times 62.27$$

$$V = 186.81 \text{ cm}^3$$

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MEASUREMENT UNIT

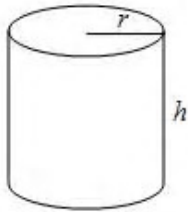
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The volume of a right cylinder is 3 times the volume of a right cone with the same base & height

**Volume of a Right Cylinder**

$$V = \pi r^2 h$$

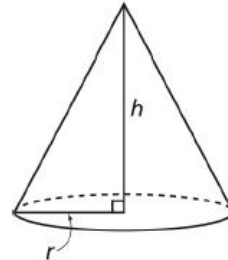
Where  $r$  is the radius of the base, and  $h$  is the height of the cylinder.



**Volume of a Right Cone**

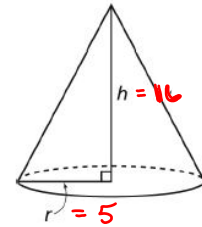
$$V = \frac{1}{3} \pi r^2 h$$

Where  $r$  is the radius of the base, and  $h$  is the height of the cone.



**Example #5:** Calculate the volume of the following cone to the nearest cubic foot if the base has a diameter of 10 feet and the height is 16 feet.

$$V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi (5^2)(16) = 419 \text{ ft.}^3$$



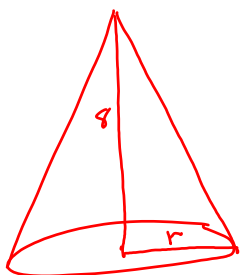
**Example #6:** Sketch a cylinder with the same base and height as the cone from example #5. Calculate the volume of this right cylinder.

$$V = 3 \times 419$$

$$V = 1257 \text{ ft}^3$$



**Example #7:** A cone has a height of 8 yd. and a volume of 416 cubic yards. Determine the radius of the base of the cone to the nearest yard.



$$V = \frac{1}{3} \pi r^2 h$$

$$3 \times 416 = \frac{1}{3} \pi r^2 (8) \times 3$$

$$\frac{1248}{8\pi} = \frac{8\pi r^2}{8\pi}$$

$$r = \sqrt{\frac{1248}{8\pi}} = 7 \text{ yd.}$$

$\therefore$  the radius is approx. 7 yd.

Lesson 8 Homework: WS 10-1-8 "Volume of Right Pyramids, Cones, Prisms & Cylinders"