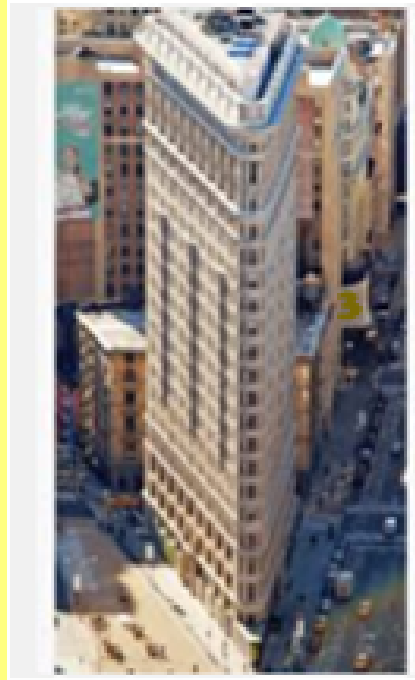


Finding the Volume of Prisms and Pyramids



<https://www.youtube.com/watch?v=GEwheYZX1-s>

Volume: Description



photo courtesy of <http://chairtaichi.files.wordpress.com>

imagine pouring water into a solid
such as a cylinder.....filling it up to its
fullest capacity is known as the
volume of the solid

cubic units

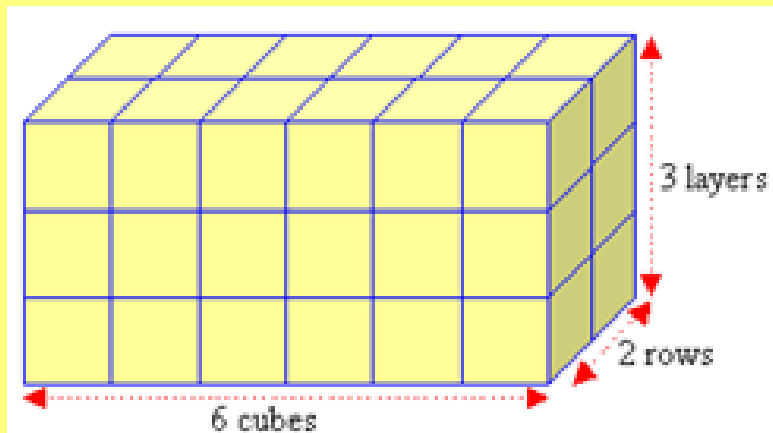
when a rectangular
swimming pool is filled up to
capacity that represent its
volume



photo courtesy of <http://www.cambridgeoutdoor.org/>

capacity = volume

Volume: Rectangular Prism



remember, volume represents capacity so we must think in 3 dimensions

in the prism above, the length is 6, the width is 2, and the height is 3 units

$$l=6 \quad w=2 \quad h=3$$
$$V = 6(2)(3)$$
$$= 36 \text{ u}^3$$

to find the volume of a rectangular prism we take the product of all three dimensions thus obtaining: $V = lwh$

Volume: Rectangular Prism

practice problem

18 in



8 in

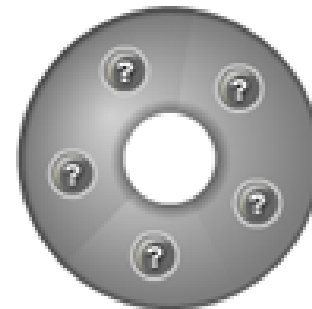
23 in

remember the formula: $V = lwh$
 $V = 8(23)(18) = 3312 \text{ in}^3$

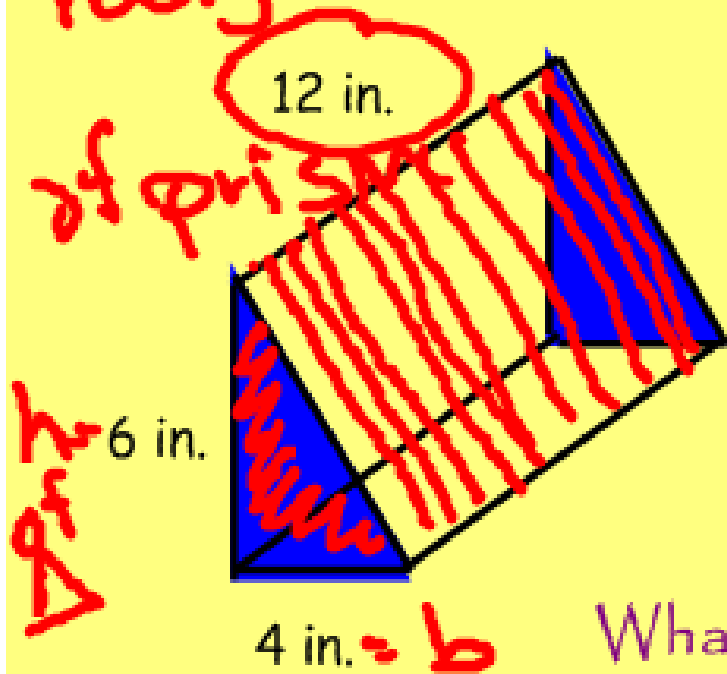
3. What is the volume of the box that holds an XBOX 360?

- A 414 inches³
- B 144 inches²
- C 184 inches³
- D 3312 inches³
- E 3312 inches²

remember cubed for volume



Volume: Triangular Prism



The bases of a triangular prism are congruent. How many of the triangles would it take to fill the prism shown if each triangle were an inch thick?

$$V = Bh$$

What information would we need to find the volume of this triangular prism?

for triangular prism

$$B = \frac{bh}{2}$$

$$h = 12$$

$$\frac{4 \cdot 6}{2} = 12 \text{ in}^2$$

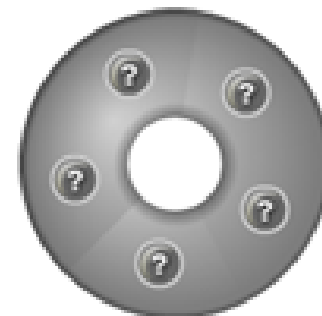
$$\text{so } V = 12(12) = 144 \text{ in}^3$$

4. What is the volume of the triangular prism?

A 288 inches³

B 144 inches³

C 192 inches³



Volume: Pyramid

If the volume of the prism is:

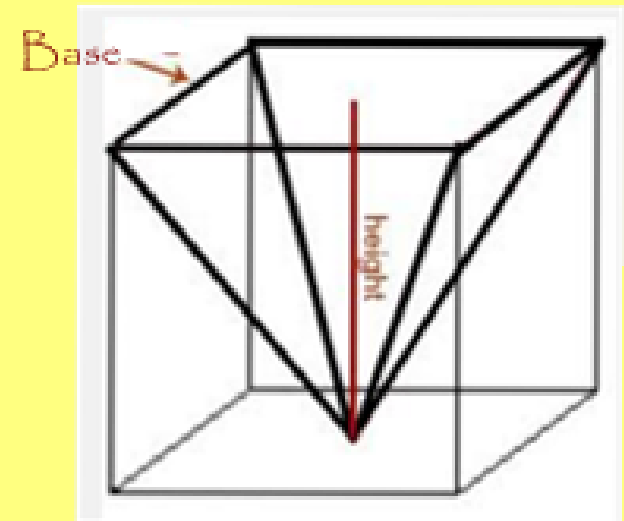
Make a prediction of what relationship the volume of the pyramid with the same base and height will have with the prism.

Volume: Pyramid

imagine a pyramid is filled to capacity with sand....



photo courtesy of <http://www.guardiantrader.com>



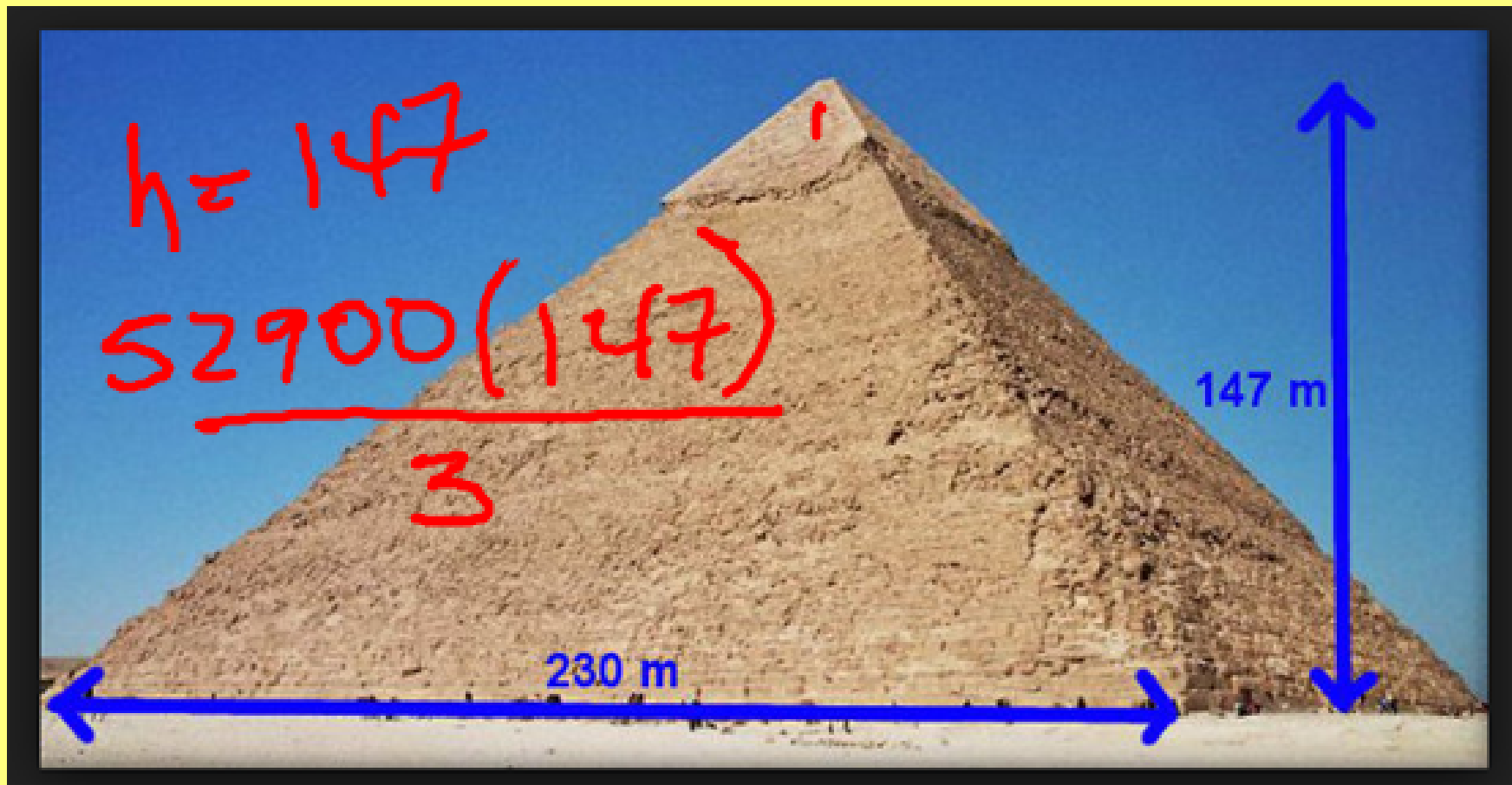
notice the pyramid inside of the cube taking up one-third of its volume

a pyramid is one-third the volume of a cube.....so, instead of $V = lwh$ like we had before, it's now.....

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

B = area of the base

h = vertical height of the pyramid

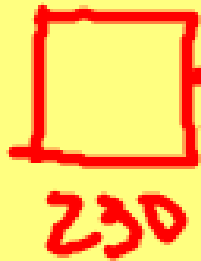


The Great Pyramid at Giza in Egypt has a square base with a side of 230 meters and a vertical height of 147

meters. What is the volume of stone?

$$B = (230)^2 = 52,900 \text{ m}^2 \quad V = \frac{52,900(147)}{3}$$





5. The Great Pyramid at Giza in Egypt, has a square base (B) with side length of 230 meters and a vertical height (h) of 147 meters. What is the volume of stone?

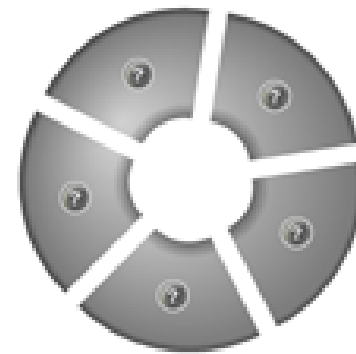
A 7,776,300 meters³

B 2,592,100 meters³

C 17,633.33 meters³

D 11,270 meters³

$$\frac{B \cdot h}{3} = \frac{230 \cdot 147}{3}$$



Volume: Practice

$$V = \frac{Bh}{3}$$

$$\frac{36(8)}{3}$$



6. What is the volume of the square-based pyramid shown?

A 36 inches³

B 288 inches³

C 48 inches³

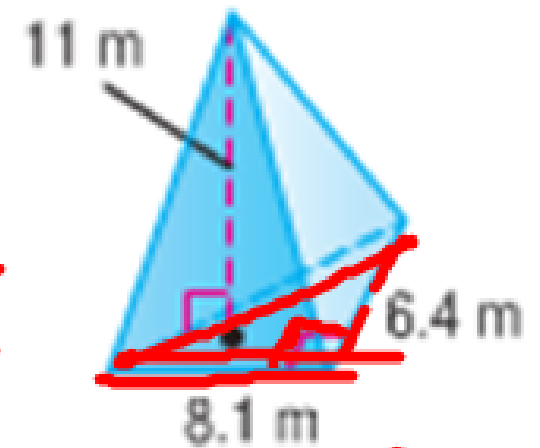
D 96 inches³



$$B = \frac{bh}{2}$$

Volume: Practice

$$B = \frac{8.1(6.4)}{2} = 25.92 \text{ m}^2$$

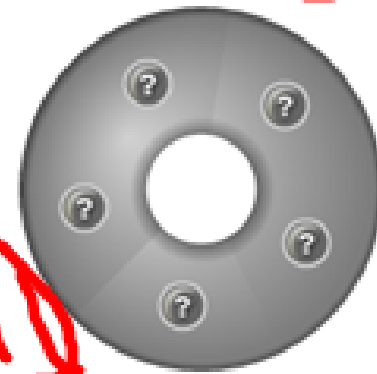


7. What is the volume of the triangular based pyramid?

- A 570.24 meters³
- B 190.08 meters³
- C 95.04 meters³
- D 285.12 meters³
- E 100.04 meters³

$$25.92(11)$$

$$V = \frac{Bh}{3}$$



$$\frac{8.1(6.4)(11)}{2 \cdot 3}$$



The three formulas I learned today are:

Volume of a rectangular prism	$V = l \cdot w \cdot h$ or Bh
Volume of a triangular prism	$V = Bh$ $B = \frac{bh}{2}$ (h)
Volume of a pyramid	$V = \frac{Bh}{3}$ or $\frac{1}{3}Bh$