Chapter 11 Volume Study Guide Part 2:

Key

Volume of Prisms, Cylinders, Pyramids, Cones, Spheres and Composite Figures

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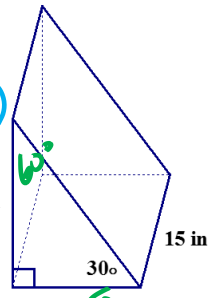
Directions: Please show ALL work to justify your answer.

1)



$A_B = \frac{(10)(10\sqrt{3})}{2}$

$A_B = 50\sqrt{3}$

$V = A_B \cdot h$

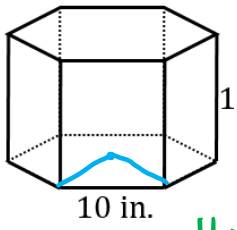
$V = (50\sqrt{3})(15)$

$V = 750\sqrt{3}\ in^3$

Name the 3-D Solid: Triangular Prism

Volume: $V = 750\sqrt{3}\ in^3$

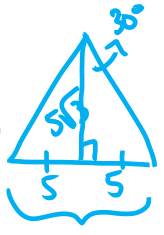
2)



$V = A_B \cdot h$

$V = (150\sqrt{3})(18)$

$V = 2700\sqrt{3}$



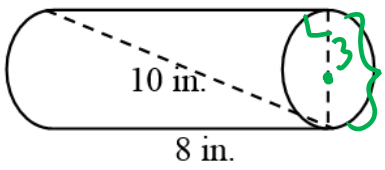
$A = \frac{1}{2}(5\sqrt{3})(60)$

$A = 150\sqrt{3}$

Name the 3-D Solid: Hexagonal Prism

Volume: $V = 2700\sqrt{3}\ in^3$

3)



8

6

$V = A_B \cdot h$

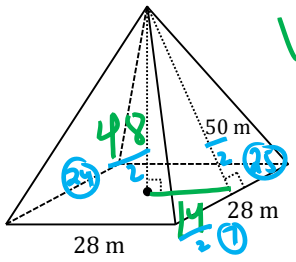
$V = (3^2\pi)8$

$V = 72\pi$

Name the 3-D Solid: Cylinder

Volume: $V = 72\pi\ in^3$

4)



$V = \frac{A_B \cdot h}{3}$

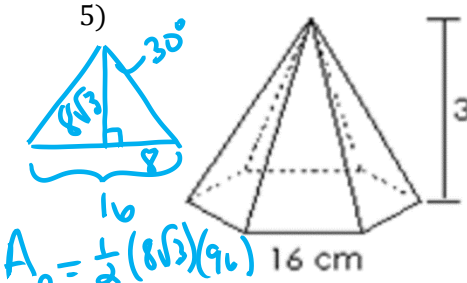
$V = \frac{(28 \cdot 28) \cdot 48}{3}$

$V = 12,544$

Name the 3-D Solid: Square Pyramid

Volume: $V = 12,544\ m^3$

5)



$A_B = \frac{1}{2}(8\sqrt{3})(96)$

$A_B = 384\sqrt{3}$

$V = \frac{A_B \cdot h}{3}$

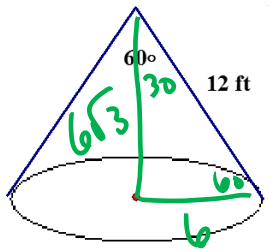
$V = \frac{(384\sqrt{3})(30)}{3}$

$V = 3840\sqrt{3}$

Name the 3-D Solid: Hexagonal Pyramid

Volume: $V = 3840\sqrt{3}\ cm^3$

6)



$V = \frac{A_B \cdot h}{3}$

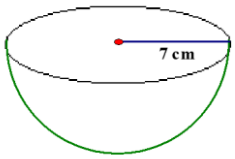
$V = \frac{(6^2\pi)(6\sqrt{3})}{3}$

$V = \frac{216\sqrt{3}\pi}{3} = 72\sqrt{3}\pi$

Name the 3-D Solid: Cone

Volume: $V = 72\sqrt{3}\pi\ ft^3$

7)



$V_S = \frac{4\pi r^3}{3}$

$= \frac{4\pi 7^3}{3}$

$V_{HS} = \frac{1372\pi}{3} \cdot \frac{1}{2}$

$V = \frac{1372\pi}{6} \approx 2155.1$

Name the 3-D Solid: Hemisphere

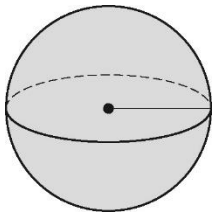
Volume: $V = 2,155.1\ cm^3$

8) Find the volume of a Sphere with a circumference of 16π.

$C = 2\pi r$

$\frac{16\pi}{2\pi} = \frac{2\pi r}{2\pi}$

$8 = r$



$V = \frac{4\pi 8^3}{3}$

$= \frac{2048\pi}{3} \approx 6827$

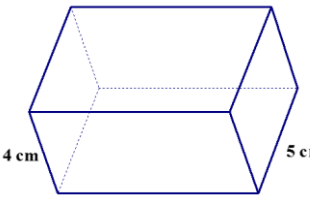
Volume: $V = 6827\ u^3$

9) What would happen to the volume of a cone if the height were doubled?

The volume would also double.

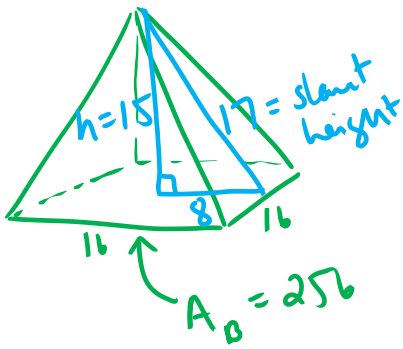
10) What would happen to the volume of the prism below of the length and width were changed by a factor of $\frac{1}{3}$?

$\frac{1}{3} \times \frac{1}{3} = \left(\frac{1}{3}\right)^2$



The volume would be reduced by a factor of $\left(\frac{1}{3}\right)^2$ or $\frac{1}{9}$

11) The volume of a square pyramid is 1280 cm^3 and the area of the base is 256 cm^2. Find the base edge length, height and slant height of this figure.



$A_B = s^2$

$\sqrt{256} = \sqrt{s^2}$

$s = 16$

$V = \frac{A_B \cdot h}{3}$

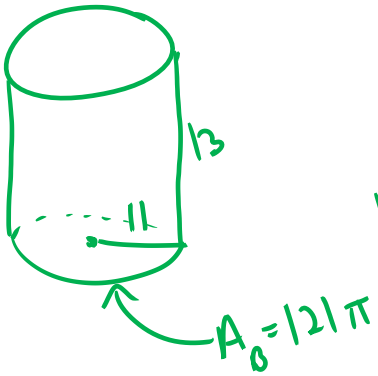
$3 \cdot 1280 = \frac{256 \cdot h}{3} \cdot 3$

$3840 = 256h$

$h = 15$

b edge = 16
h = 15
s.h. = 17

12) The volume of a cylinder is 1573π and the area of the base is 121π. Find the diameter and height of the cylinder.



$A_B = \pi r^2$

$121\pi = \pi r^2$

$\sqrt{121} = \sqrt{r^2}$

$r = 11$

$d = 22$

$V = A_B h$

$1573\pi = (121\pi)h$

$1573 = 121h$

$h = 13$

13) Estimate the number of gallons required to fill a cylindrical tank that has a diameter of 40 feet and a height of 35 feet if 1 gallon of water is approximately 0.134 ft^3. Round your answer to the nearest tenth.

$d = 40$, $r = 20$

$V = A_B \cdot h$

$= \pi 20^2 (35)$

$V = 14{,}000\pi$

$V \approx 43{,}982.3$

$\frac{gal}{ft^3} \rightarrow \frac{1}{0.134} = \frac{x}{43{,}982.3}$

$0.134x = 43{,}982.3$

$x = 328{,}226.1$ gal

14) Lisa needs to store 8 boxes while she is moving. Each box is a cube with edge length 3 feet. A storage facility charges \$0.75 for every cubic foot of storage per month. Find the amount of money Lisa will pay to store her boxes for one month.

1 box $\rightarrow V = A_B \cdot h$

$= (3 \cdot 3)(3)$

$= 27\ ft^3$

8 boxes $\rightarrow V_{total} = 27 \cdot 8 = 216\ ft^3$

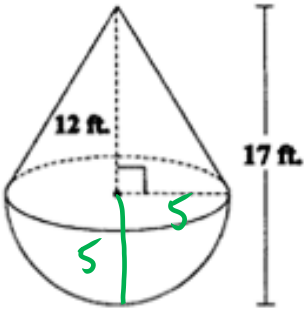
$\frac{\$0.75}{1\ ft^3} = \frac{x}{216\ ft^3}$

$x = (0.75)(216)$

$x = \$162$

Find the volume of the following composite shapes. Round to the nearest hundredth if necessary.

15)



$V_{cone} = \frac{A_B \cdot h}{3}$

$= \frac{(5^2\pi)(12)}{3}$

$V_c = 100\pi$

$V_{Hs} = \frac{4\pi 5^3}{3} \cdot \frac{1}{2}$

$= \frac{500\pi}{6}$

$V_{Hs} = 83\frac{1}{3}\pi$

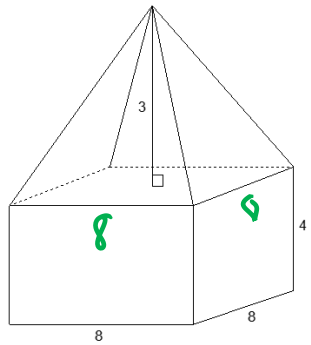
$V_{total} = 100\pi + 83\frac{1}{3}\pi$

$= 183\frac{1}{3}\pi$

$V_t \approx 575.96\ ft^3$

Volume = 575.96 ft^3

16)



$V_{pyramid} = \frac{A_B \cdot h}{3}$

$= \frac{8^2 \cdot 3}{3}$

$= \frac{192}{3}$

$V_{pyramid} = 64$

$V_{prism} = A_B \cdot h$

$= 8^2 \cdot 4$

$V_{prism} = 256$

$V_{Total} = 64 + 256$

$= 320\ u^3$

Volume = 320 u^3