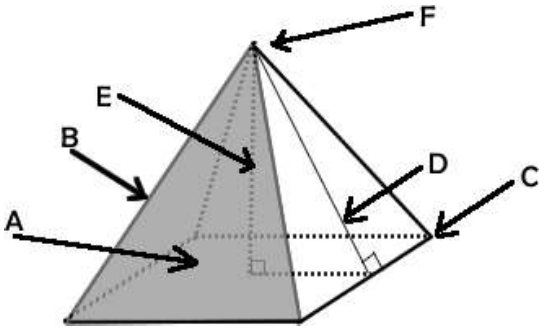
Volume – Pyramids & Spheres

G.GMD.A.3 Hw Section 17.3 Name_____

Match the following terms to the diagram.

1.



D Slant Height

F Apex

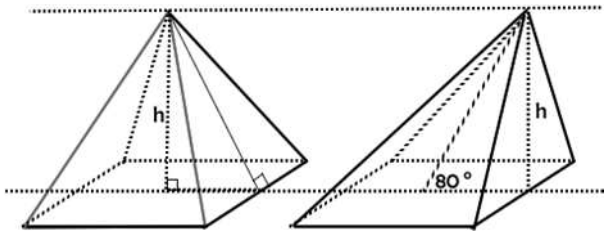
E Height

B Lateral Edge

A Face

C Vertex

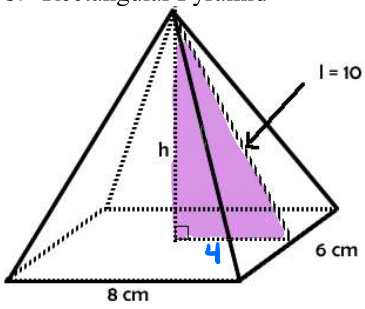
2. Two pyramids with the same base are side by side. One is a right pyramid and the other is an oblique pyramid. If the oblique pyramid has been tilted to an angle of 80°, what is volume relationship between the two pyramids?



The volumes are the same because they have the same bases and same height.

Determine the volume of the following.

3. Rectangular Pyramid



$V_{PyR} = \frac{1}{3} B \cdot h$

$= \frac{1}{3}(48)(2\sqrt{21})$

$V_{PyR} = 32\sqrt{21}\ cm^3$

$B = b \cdot h$

$= 8(6)$

$B = 48\ cm^2$

$x^2 + y^2 = r^2$

$(4)^2 + h^2 = 10^2$

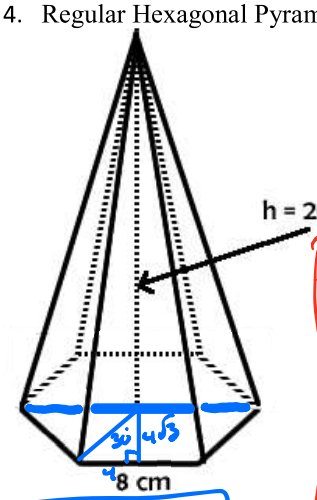
$16 + h^2 = 100$

$h^2 = 84$

$h = \pm\sqrt{84}$

$h = 2\sqrt{21}$

4. Regular Hexagonal Pyramid



$V_{PyR} = \frac{1}{3} B \cdot h$

$= \frac{1}{3}(96\sqrt{3})(20)$

$V_{PyR} = 640\sqrt{3}\ cm^3$

$m\angle C = \frac{360°}{n}$

$= \frac{360°}{6}$

$m\angle C = 60°$

$P = ln$

$= 8(6)$

$P = 48$

$B = \frac{1}{2} Pa$

$= \frac{1}{2}(48)(4\sqrt{3})$

$B = 96\sqrt{3}$

Volume – Pyramids & Spheres

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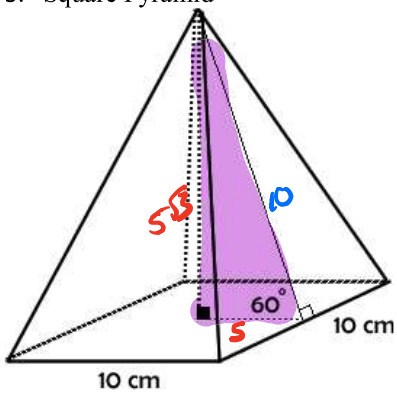
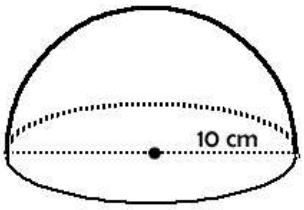
5. Square Pyramid



$B = b \cdot h$
$= 10(10)$
$B = 100$

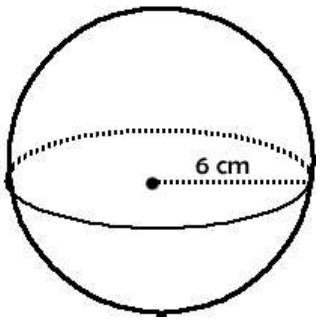
$V_{PYR} = \frac{1}{3}Bh$
$= \frac{1}{3}(100)5\sqrt{3}$
$V_{PYR} = \frac{500\sqrt{3}}{3}\ cm^3$

7.



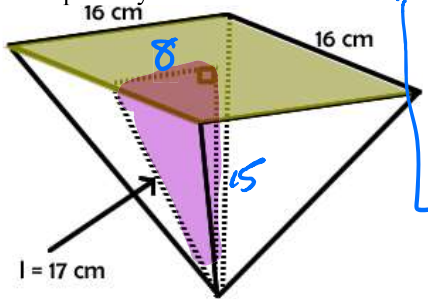
$V_{semi} = \frac{1}{2}V_O$
$= \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$
$= \frac{2}{3}\pi(10)^3$
$= \frac{2}{3}(1000\pi)$
$V_{semi} = \frac{2000\pi}{3}\ cm^3$

6.



$V_O = \frac{4}{3}\pi r^3$
$= \frac{4}{3}\pi(6)^3$
$= \frac{4}{3}(216\pi)$
$V_O = 288\pi\ cm^3$

8. Square Pyramid



$B = bh$
$= 16(16)$
$B = 256\ cm^2$

PT
8-15-17

$V_{PYR} = \frac{1}{3}Bh$
$= \frac{1}{3}(256)(15)$
$V_{PYR} = 1280\ cm^3$

Volume – Pyramids & Spheres

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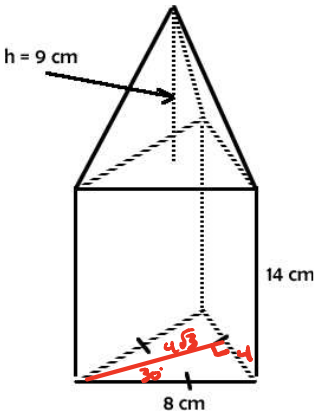
9.



$B = \frac{1}{2}bh$

$= \frac{1}{2}(8)(4\sqrt{3})$

$B = 16\sqrt{3}$

$V_{PYR} = \frac{1}{3}B \cdot h$

$= \frac{1}{3}(16\sqrt{3})(9)$

$V_{PYR} = 48\sqrt{3}$

$V_{prism} = Bh$

$= (16\sqrt{3})(14)$

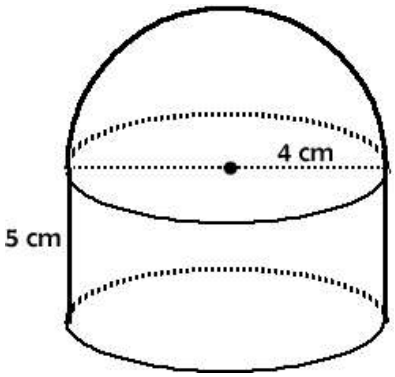
$V_{prism} = 224\sqrt{3}$

$V_{FIG} = V_{PYR} + V_{prism}$

$= 48\sqrt{3} + 224\sqrt{3}$

$V_{FIG} = 272\sqrt{3}\ cm^3$

10.



$B = \pi r^2$

$= \pi(4)^2$

$B = 16\pi$

$V_{CYL} = B \cdot h$

$= 16\pi(5)$

$V_{CYL} = 80\pi\ cm^3$

$V_{semi} = \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$

$= \frac{2}{3}\pi(4)^3$

$= \frac{2}{3}\pi(64)$

$V_{semi} = \frac{128}{3}\pi\ cm^3$

$V_{FIG} = V_{CYL} + V_{semi}$

$= 80\pi + \frac{128}{3}\pi$

$= \frac{240\pi}{3} + \frac{128\pi}{3}$

$V_{FIG} = \frac{368\pi}{3}\ cm^3$

Volume – Pyramids & Spheres

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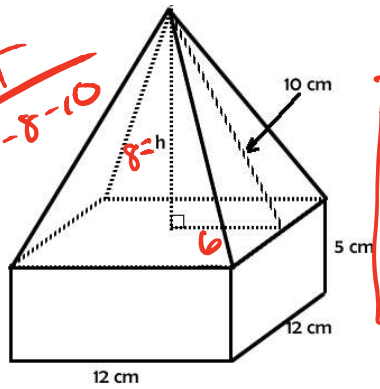
11.



PT
6-8-10

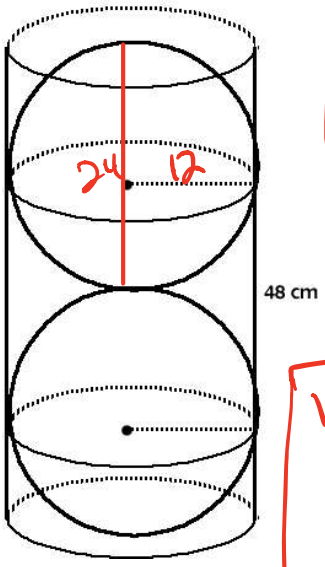
$B = bh$
$= 12(12)$
$B = 144\ cm^2$

$V_{Prism} = Bh$
$= (144)(5)$
$V_{Prism} = 720\ cm^3$

$V_{PYR} = \frac{1}{3}Bh$
$= \frac{1}{3}(144)(8)$
$V_{PYR} = 384\ cm^3$

$V_{FIG} = V_{Prism} + V_{PYR}$
$= 720 + 384$
$V_{FIG} = 1104\ cm^3$

12. Two tennis balls fit exactly in the 48 cm tall cylindrical can. What is the volume of air in the can?



$B = \pi r^2$
$= \pi(12)^2$
$B = 144\pi$

$V_{CYL} = B \cdot h$
$= (144\pi)(48)$
$V_{CYL} = 6912\pi\ cm^3$

$V_{SPHERE} = \frac{4}{3}\pi r^3$
$= \frac{4}{3}\pi(12)^3$
$= \frac{4}{3}\pi(1728)$
$V_{SPHERE} = 2304\pi\ cm^3$

$V_{CAN\ AIR} = V_{CYL} - 2V_{SPHERE}$
$= 6912\pi - 2(2304\pi)$
$= 6912\pi - 4608\pi$
$V_{CAN\ AIR} = 2304\pi\ cm^3$