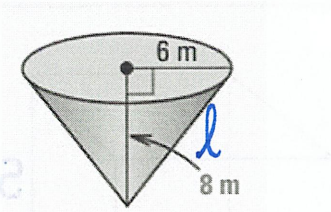
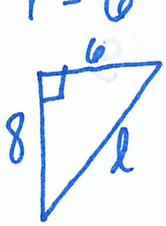
Example #5: Find the surface area of the right cone.



$$SA = \pi r^2 + \pi r \ell$$
$$= \pi 6^2 + \pi 6(10)$$
$$= 36\pi + 60\pi$$
$$= 96\pi$$
$$\boxed{SA \approx 301.59\ m^2}$$

$r = 6$

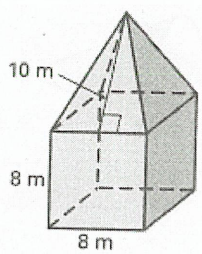


$\sqrt{6^2 + 8^2} = \sqrt{\ell^2}$

$10 = \ell$

Example #6: Find the surface area of the solid. The pyramids are regular and the cones are right. Round your answer to the nearest hundredth, if necessary.

a.)



$B = 8^2 = 64$

$\ell = 10 \quad h = 8$

$P = 8 \cdot 4 = 32$

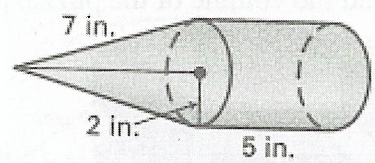
$$SA_{total} = SA_{cube} - 1B + SA_{pyramid} - 1B$$
$$= 2B + Ph - B + B + \tfrac{1}{2}P\ell$$
$$= 2(64) + 32(8) - 64 + 64 + \tfrac{1}{2}(32)10$$
$$= \underline{128 + 256} - 64 + 64 + 160$$
$$= 384 - 64 + 64 + 160 - 64$$
$$SA = 544 - 64 = \boxed{480 m^2}$$

$$SA = \underset{\text{Cube or}}{B + Ph} + \underset{\text{LA pyramid}}{\tfrac{1}{2}P\ell}$$

$64 + 32(8) + \tfrac{1}{2}(32)(10)$

$\boxed{SA = 480\ m^2}$

b.)



$B = \pi 2^2 = 4\pi \quad C = 2\pi 2$

$C = 4\pi$

$\ell = 7$

SA cyl. (no base) LA cone

$$SA_{tot} = B + Ch + \tfrac{1}{2}P\ell$$
$$= 4\pi + 4\pi(5) + \tfrac{1}{2}(4\pi)7$$
$$= 4\pi + 20\pi + 14\pi$$

$SA = 38\pi$

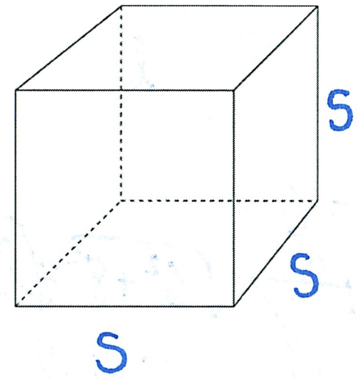
$\boxed{SA = 119.38\ in^2}$

Chapter 12.4: Volume of Prisms and Cylinders

Volume: *$units^3$

(3D)

# of cubic units in the interior



Volume of a Cube (Postulate 27):

The volume of a cube is the cube of the length of its side. S^3

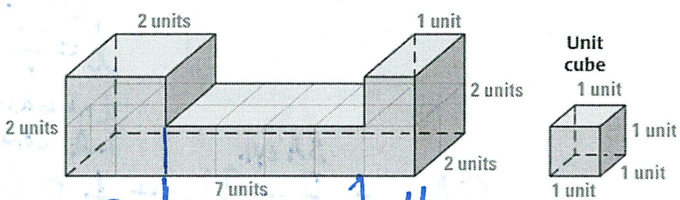
Volume Congruence Postulate (Postulate 28):

If two polyhedral are congruent, then they have the same volume.

Volume Addition Postulate (Postulate 29):

The volume of a solid is the sum of the volumes of all its nonoverlapping parts.

Example #1: Find the volume of the puzzle piece in cubic units.



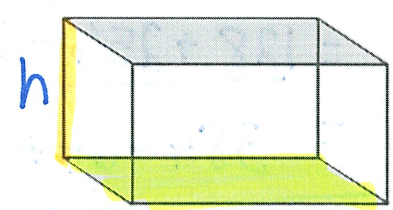
8 | 8 | 4

$V = 20 \text{ units}^3$

Volume of a Prism (Theorem 12.6):

The volume V of a prism is Bh

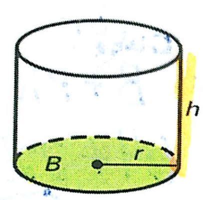
where B is the area of a base and h is the height.



Volume of a Cylinder (Theorem 12.7):

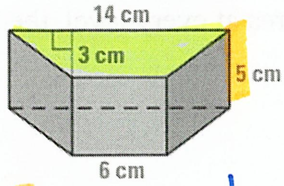
The volume V of a cylinder is $(\pi r^2)h$ or Bh

Where B is the area of a base, h is the height, and r is the radius of a base.



Example #2: Name each solid then find the volume. Round your answer to two decimal places, if necessary.

a.)



$V = 30 \cdot 5$

$h = 5$

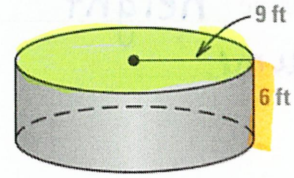
$\boxed{V = 150 cm^3}$

$V = Bh$

$B = \frac{(b_1+b_2)h}{2}$

$B = \frac{(6+14)3}{2} = 30 \text{ cm}^2$

b.)



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

$= \pi 9^2(6)$

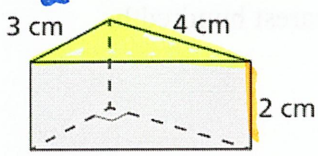
$V = Bh$

$V = 486\pi$

$B = \pi r^2$

$\boxed{V \approx 1526.81 ft^3}$

c.)



$V = Bh$

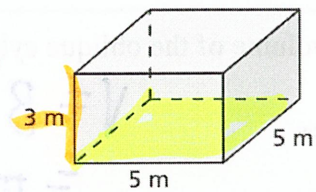
$= 6 \cdot 2$

$\boxed{V = 12 cm^3}$

$B = \frac{3 \cdot 4}{2} = 6$

$h = 2$

d.)



$V = Bh$

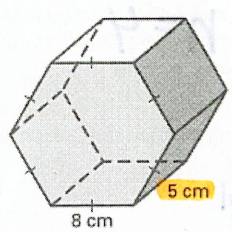
$= 25(3)$

$B = 5 \cdot 5 = 25$

$\boxed{V = 75 m^3}$

$h = 3$

e.)



$\frac{360}{6} = 60$

$\frac{60}{2} = 30$

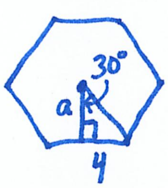
$V = Bh$

$B = \frac{6.93(48)}{2} = 166.32$

$P = 8(6) = 48$

$V = 166.32(5)$

$\boxed{V = 831.6 cm^3}$

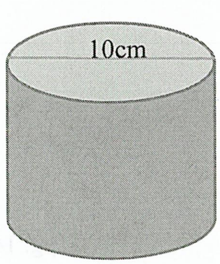


$\tan 30 = \frac{4}{a}$

$\frac{a \tan 30}{\tan 30} = \frac{4}{\tan 30}$

$a \approx 6.93$

Example #3: The volume of the right cylinder is 200π cm^3. Find the height.



$r = 5$

$V = Bh$

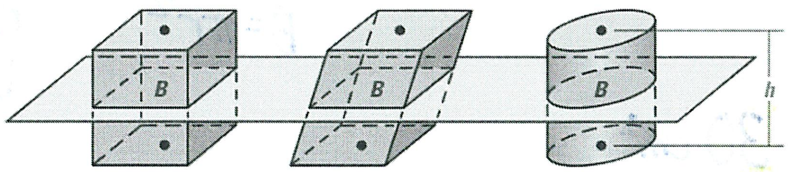
$\frac{200}{(25\pi)} = \frac{\pi 5^2(h)}{(25\pi)}$

$\boxed{2.55_{cm} \approx h}$

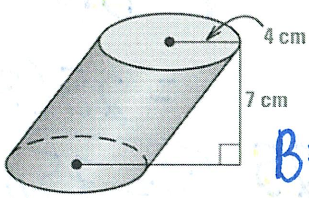
Cavalieri's Principle (Theorem 12.8):

If two solids have the same height and the same cross-sectional area at every level, then they have the same volume

Which means…



Example #4: Find the volume of the oblique cylinder. Round answers to the nearest hundredth.



$B = \pi r^2$

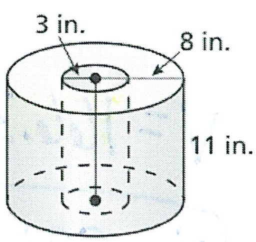
$V = Bh$

$= \pi 4^2(7)$

$\boxed{V \approx 351.86 \text{ cm}^3}$

Example #5: Find the volume of each solid. Round answers to the nearest hundredth.

a.)



$V = V_{\text{lg cyl}} - V_{\text{sm cyl}}$

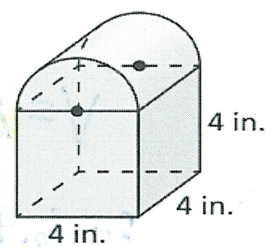
$V = \pi 8^2(11) - \pi 3^2(11)$

$V = 704\pi - 99\pi$

$V = 605\pi$

$\boxed{V \approx 1900.66 \text{ in}^3}$

b.)



$r = 2$

$h = 4$

$V = V_{\text{cube}} + V_{\text{half cyl}}$

$= 4^3 + \frac{1}{2}(\pi 2^2)4$

$= 64 + 8\pi$

$\boxed{V \approx 89.13 \text{ in}^3}$