

12.5 Volume of Pyramids & Cones

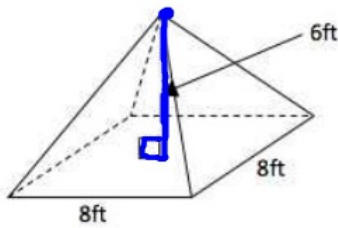
$$V = \frac{1}{3} Bh \text{ or } \frac{Bh}{3}$$

B : Area of the base

h : height

Examples: Find the volume of the following figures. Leave answers in terms of π when necessary.

1)

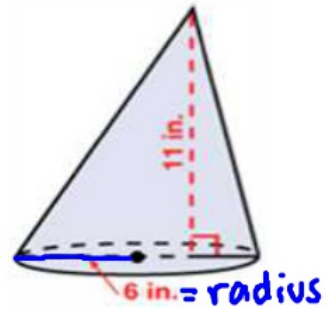


$$V = \frac{1}{3} Bh$$

$$V = \frac{1}{3}(64)(6)$$

$$V = \underline{128 \text{ ft}^3}$$

2)

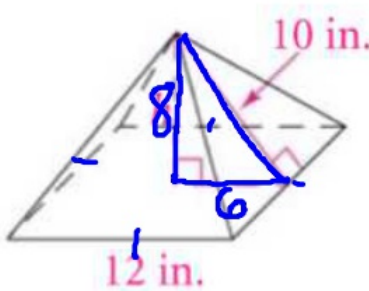


$$V = \frac{1}{3} Bh$$

$$V = \frac{1}{3}(\pi(6)^2)(11)$$

$$V = \underline{132\pi \text{ in}^3}$$

3)



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

$$V = \frac{1}{3}(144)(8)$$

$$V = \underline{384 \text{ in}^3}$$

$$h^2 + 6^2 = 10^2$$

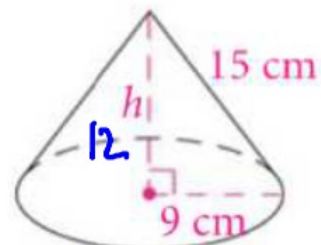
$$h^2 + 36 = 100$$

$$\quad -36 \quad -36$$

$$h^2 = 64$$

$$h = 8$$

4)



$$h^2 + 9^2 = 15^2$$

$$h = 12$$

$$V = \frac{1}{3}\pi(9)^2(12)$$

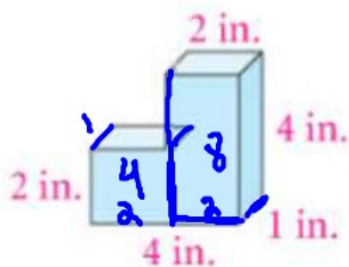
$$V = \underline{324\pi \text{ cm}^3}$$

Composite Space Figures

A **composite space figure** is a three-dimensional figure that is the combination of two or more solids.

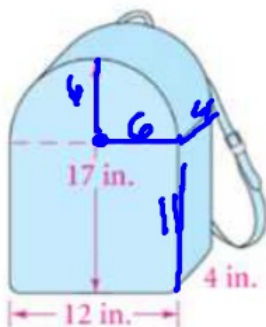
You can find the volume of a composite solid by adding the volumes of the figures that are combined.

Example 5: Find the volume of the composite solid.



$$(2 \cdot 2 \cdot 4) + (2 \cdot 2 \cdot 4)$$
$$4 + 8$$
$$\underline{12 \text{ in}^3}$$

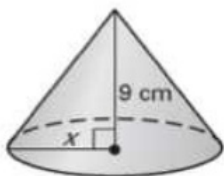
Example 6: Find the volume of the composite solid.



$$\frac{1}{2} \text{ cylinder} + \text{ prism}$$
$$\frac{1}{2} \cdot \pi (6)^2 (4) + (12 \cdot 6) 11$$
$$72\pi + 528$$
$$\approx 754.19 \text{ in}^3$$

Example 7: Find the value of x.

a) $V = 147\pi \text{ cm}^3$



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

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

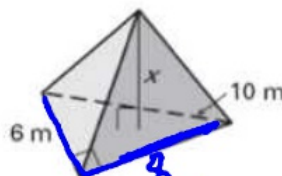
$$147\pi = \frac{1}{3} \pi r^2 (9)$$

$$\frac{147\pi}{3\pi} = \frac{3\pi r^2}{3\pi}$$

$$r^2 = 49$$

$$r = 7 \text{ cm}$$

b) $V = 56 \text{ m}^3$



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

$$56 = \frac{1}{3} (24) h$$

$$\frac{56}{8} = \frac{8h}{8}$$

$$7 \text{ m} = h$$

$$B = \frac{1}{2} b \cdot h$$

$$a^2 + b^2 = 10^2$$

$$36 + b^2 = 100$$

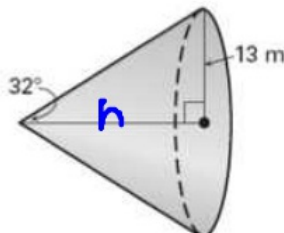
$$b^2 = 64$$

$$b = 8$$

$$B = \frac{1}{2} \cdot 6 \cdot 6$$

$$B = 24$$

Example 8: Find the volume.



$$\tan 32 = \frac{13}{h}$$

$$h \frac{\tan 32}{\tan 32} = \frac{13}{\tan 32}$$

$$h = 20.8$$

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

$$V = \frac{1}{3} \pi (13)^2 (20.8)$$

$$V = 1171.7\pi$$

$$\approx 3681 \text{ m}^3$$