

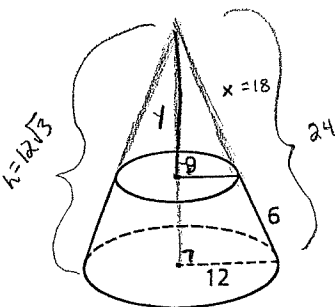


Name _____

Frustum Homework - Geometry (H)

For each given frustum, find the total surface area and the volume. Show all work. Be neat and organized.

$$\begin{aligned}
 1. \quad SA_{\text{frustum}} &= SA_{\text{lg cone}} - LA_{\text{sm cone}} + B_{\text{sm cone}} \\
 &= \frac{1}{2} \cdot 2\pi(12) \cdot (24) + \pi(12)^2 - \frac{1}{2} \cdot 2\pi(9) \cdot (18) + \pi(9)^2 \\
 &= 288\pi + 144\pi - 162\pi + 81\pi \\
 &= 351\pi
 \end{aligned}$$



$$\begin{aligned}
 V_{\text{frustum}} &= V_{\text{lg cone}} - V_{\text{sm cone}} \\
 V_{\text{frustum}} &= \frac{1}{3} \cdot \pi(12)^2 \cdot (12\sqrt{3}) - \frac{1}{3} \cdot \pi(9)^2 \cdot (9\sqrt{3}) \\
 &= 576\pi\sqrt{3} - 243\pi\sqrt{3} \\
 &= 333\pi\sqrt{3}
 \end{aligned}$$

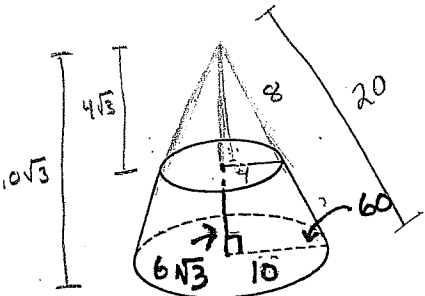
$$\begin{aligned}
 \frac{x}{x+6} &= \frac{9}{12} & y^2 + 9^2 &= 18^2 & h^2 + 12^2 &= 24^2 \\
 12x &= 9x + 54 & y^2 &= 18^2 - 9^2 & h^2 &= 24^2 - 12^2 \\
 3x &= 54 & y &= \sqrt{243} & h &= \sqrt{432} \\
 x &= 18 & y &= 9\sqrt{3} & h &= 12\sqrt{3}
 \end{aligned}$$

Total Surface Area: 351π u²

Volume: 333π√3 u³

2.

$$\begin{aligned}
 SA_{\text{frustum}} &= SA_{\text{lg cone}} - LA_{\text{sm cone}} + B_{\text{sm cone}} \\
 &= \frac{1}{2} \cdot 2\pi(10) \cdot (20) + \pi(10)^2 - \frac{1}{2} \cdot 2\pi(4) \cdot (8) + \pi(4)^2 \\
 &= 200\pi + 100\pi - 32\pi + 16\pi \\
 &= 284\pi
 \end{aligned}$$



$$\begin{aligned}
 V_{\text{frustum}} &= V_{\text{lg cone}} - V_{\text{sm cone}} \\
 &= \frac{1}{3} \cdot \pi(10)^2 \cdot (10\sqrt{3}) - \frac{1}{3} \cdot \pi(4)^2 \cdot (4\sqrt{3}) \\
 &= \frac{1000\pi\sqrt{3}}{3} - \frac{64\pi\sqrt{3}}{3} = \frac{936\pi\sqrt{3}}{3} = 312\pi\sqrt{3}
 \end{aligned}$$

Total Surface Area: 284π u²

Volume: 312π√3 u³



3.

$$\frac{x}{x+6} = \frac{4}{8}$$

$$8x = 4x + 24$$

$$4x = 24$$

$$x = 6$$

$$y^2 = 6^2 + 4^2$$

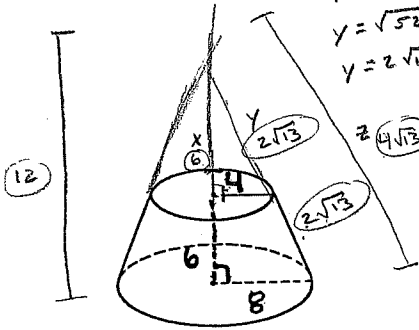
$$y = \sqrt{52}$$

$$y = 2\sqrt{13}$$

$$z^2 = 8^2 + 12^2$$

$$z = \sqrt{208}$$

$$z = 4\sqrt{13}$$



$$SA_{\text{frustum}} = SA_{\text{lg cone}} - LA_{\text{sm cone}} + B_{\text{sm cone}}$$

$$= \frac{1}{2} \cdot 2\pi(8) \cdot (4\sqrt{13}) + \pi(8)^2 - \frac{1}{2} \cdot 2\pi(4)(2\sqrt{13}) + \pi(4)^2$$

$$= 32\pi\sqrt{13} + 64\pi - 8\pi\sqrt{13} + 16\pi$$

$$= 24\pi\sqrt{13} + 80\pi$$

$$V_{\text{frustum}} = V_{\text{lg cone}} - V_{\text{sm cone}}$$

$$= \frac{1}{3} \cdot \pi(8)^2 \cdot (12) - \frac{1}{3} \cdot \pi(4)^2(6)$$

$$= 256\pi - 32\pi$$

$$= 224\pi$$

Total Surface Area: $(24\pi\sqrt{13} + 80\pi) \text{ u}^2$

Volume: $224\pi \text{ u}^3$

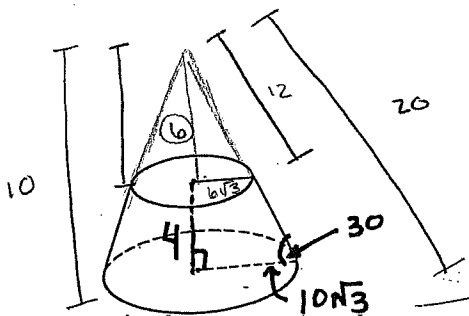
4.

$$SA_{\text{frustum}} = SA_{\text{lg cone}} - LA_{\text{sm cone}} + B_{\text{sm cone}}$$

$$= \frac{1}{2} \cdot 2\pi(10\sqrt{3})(20) + \pi(10\sqrt{3})^2 - \frac{1}{2} \cdot 2\pi(6\sqrt{3})(12) + \pi(6\sqrt{3})^2$$

$$= 200\pi\sqrt{3} + 300\pi - 72\pi\sqrt{3} + 108\pi$$

$$= 128\pi\sqrt{3} + 408\pi$$



$$V_{\text{frustum}} = V_{\text{lg cone}} - V_{\text{sm cone}}$$

$$= \frac{1}{3} \cdot \pi(10\sqrt{3})^2 \cdot 10 - \frac{1}{3} \cdot \pi(6\sqrt{3})^2 \cdot 6$$

$$= 1000\pi - 216\pi$$

$$= 784\pi$$

Total Surface Area: $(128\pi\sqrt{3} + 408\pi) \text{ u}^2$

Volume: $784\pi \text{ u}^3$