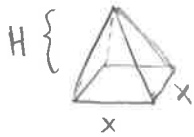
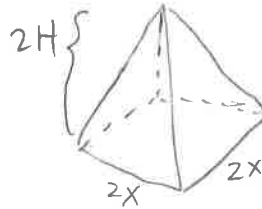


§1.5 #14



$$V_1 = \frac{1}{3} BA \cdot H$$

$$= \frac{1}{3} x^2 \cdot H$$



$$V_2 = \frac{1}{3} BA \cdot H$$

$$= \frac{1}{3} (2x)^2 (2H)$$

$$= \frac{1}{3} (8x^2 H)$$

$$= \frac{8}{3} x^2 H$$

2nd pyramid's volume is 8 times larger

For the comparison of SA's, easier to plug in numbers. Let's choose $x=10$

$H=15$

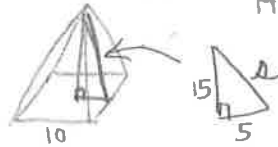
$$SA_1 = 10^2 + 4 \Delta$$

$$= 10(10) + 4 \left(\frac{10 \sqrt{250}}{2} \right)$$

$$= 100 + 20 \sqrt{250}$$

$$= 100 + 316.227766$$

$$= 416.2 \text{ units}^2$$



$$15^2 + 5^2 = a^2$$

$$a = \sqrt{250}$$

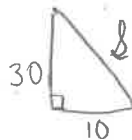
$$SA_2 = 20^2 + 4 \Delta$$

$$= 20(20) + 4 \left(\frac{20 \sqrt{1000}}{2} \right)$$

$$= 400 + 40 \sqrt{1000}$$

$$= 400 + 1264.911064$$

$$= 1664.911064 \text{ units}^2$$



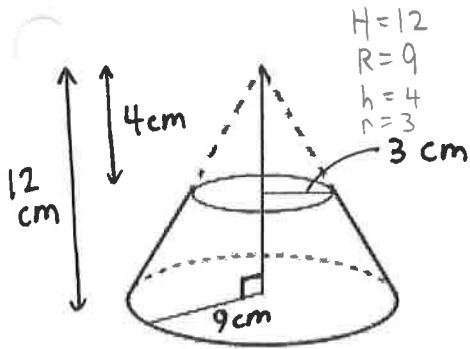
$$30^2 + 10^2 = s^2$$

$$\sqrt{1000} = s$$

$$\frac{1664.911064}{416.2} = 4.00 \dots$$

2nd pyramid is 4 times larger in SA.
phew!

Example 3: Find SA & V of



$$V = \text{Large Cone} - \text{Small Cone}$$

$$\begin{aligned} V &= \frac{1}{3}\pi R^2 H - \frac{1}{3}\pi r^2 h \\ &= \frac{1}{3}\pi (R^2 H - r^2 h) \\ &= \frac{1}{3}\pi (9^2 \cdot 12 - 3^2 \cdot 4) \\ &= \frac{1}{3}\pi (936) \\ &= 312\pi = 980.2 \text{ cm}^3 \end{aligned}$$

L = slant height of large cone
 l = slant height of small cone

$$\begin{aligned} SA &= \text{Large Cone} + \text{Top Circle} - \text{Small Cone} \\ &= (\pi R^2 + \pi RL) + \pi r^2 - \pi rl \\ &= \pi (R^2 + RL + r^2 - rl) \\ &= \pi (9^2 + 9(15) + 3^2 - 3(5)) \\ &= 210\pi = 659.7 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} L^2 &= 12^2 + 9^2 \\ &= 225 \\ L &= 15 \end{aligned}$$

$$\begin{aligned} l^2 &= 3^2 + 4^2 \\ &= 25 \\ l &= 5 \end{aligned}$$

Example 4: If the radius and height of a cylinder are both doubled

a) By how much is the SA increased?

$$\begin{aligned} SA_1 &= 2\pi r^2 + \pi dh \\ &= 2\pi r^2 + 2\pi rh \end{aligned}$$

$$\begin{aligned} SA_2 &= 2\pi (2r)^2 + 2\pi (2r)(2h) \\ &= 2\pi (4r^2) + 8\pi rh \\ &= 8\pi r^2 + 8\pi rh \end{aligned}$$

b) By how much is the V increased?

$$\begin{aligned} V_1 &= \pi r^2 h \\ V_2 &= \pi (2r)^2 (2h) \\ &= \pi 4r^2 \cdot 2h \\ &= 8\pi r^2 h \end{aligned}$$

8 times bigger

4 times bigger