

**Definitions:**

1. pyramid- solid in which all faces except one intersect at one point

2. slant height-  $l$  - from vertex to base edge - not edge!

3. Lateral area of a pyramid-

$$L = \frac{1}{2} P \cdot l$$

$P$  = perimeter  
 $l$  = slant ht.

4. Total surface area of a pyramid-

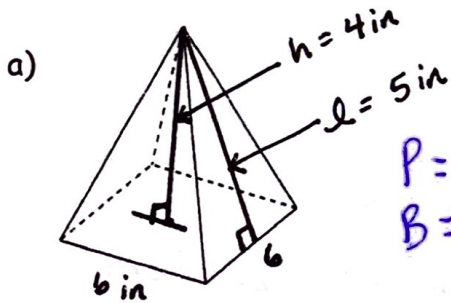
$$T = L + B$$

5. Volume of a pyramid-

$$V = \frac{1}{3} B \cdot h$$

**EXAMPLES:**

1. Find the lateral area, total surface area, and volume of each regular pyramid.



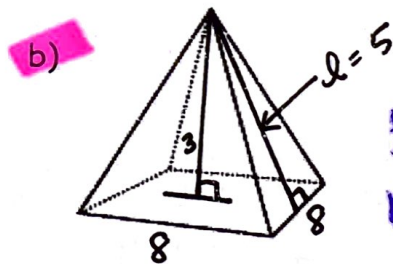
$$P = 6(4) = 24$$

$$B = 6^2 = 36$$

$$L = \frac{1}{2} (24)(5) = 60 \text{ in}^2$$

$$T = 60 + 36 = 96 \text{ in}^2$$

$$V = \frac{1}{3} (36)(4) = 48 \text{ in}^3$$



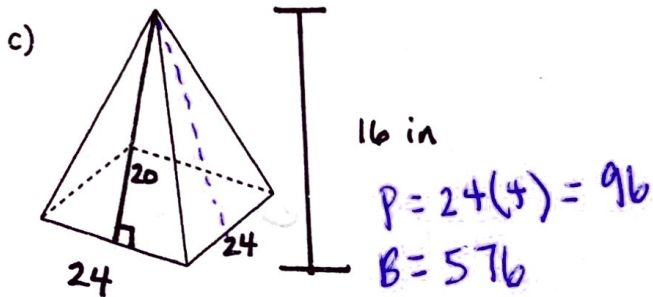
$$P = 8(4) = 32$$

$$B = 8^2 = 64$$

$$L = \frac{1}{2} (32)(5) = 80 \text{ units}^2$$

$$T = 80 + 64 = 144 \text{ u}^2$$

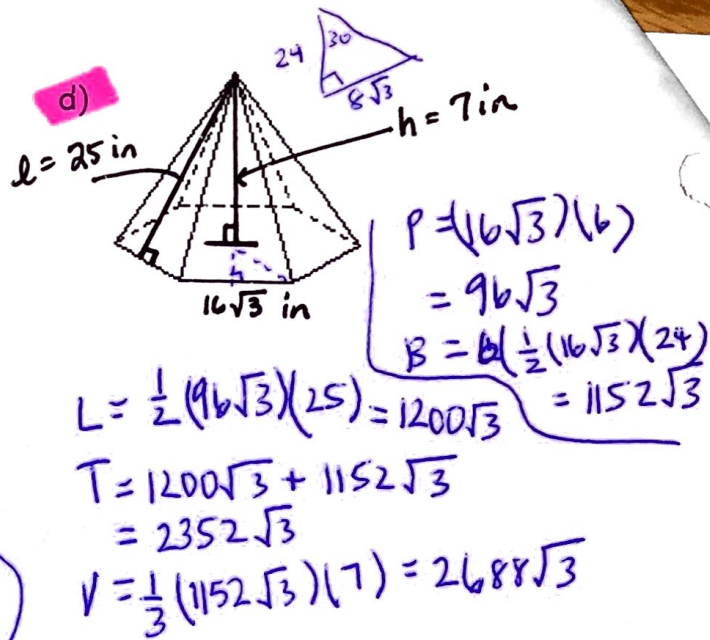
$$V = \frac{1}{3} (64)(3) = 64 \text{ u}^3$$



$$L = \frac{1}{2}(96)(20) = 960 \text{ in}^2$$

$$T = 960 + 576 = 1536 \text{ in}^2$$

$$V = \frac{1}{3}(576)(16) = 3072 \text{ in}^3$$



2. Find the volume of a regular square pyramid if the height is 11 cm and the diagonal base is 14 cm.

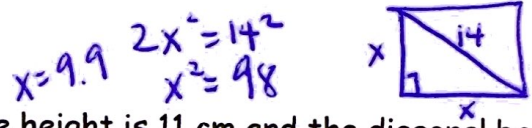
$$h = 11$$

$$\text{side} = 9.9$$

$$B = 98$$

$$V = \frac{1}{3}(98)(11)$$

$$= \frac{1078}{3} = 359.33 \text{ cm}^3$$



3. The lateral area of a regular hexagonal pyramid is 48 cm<sup>2</sup> and the slant height is 4 cm. Find the length of a side of the base, the area of the base, the total area, and the height of the pyramid.

$$L = 48$$

$$l = 4$$

$$\text{side} = ?$$

$$B =$$

$$T =$$

$$h =$$

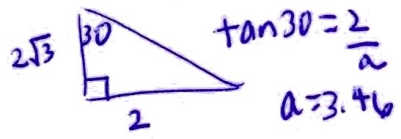
$$48 = \frac{1}{2} P \cdot 4$$

$$48 = 2P$$

$$24 = P$$

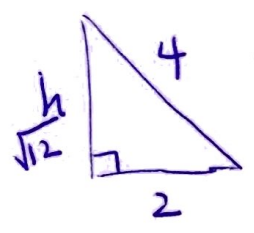
$$\text{side} = 4$$

$$B = 6\left(\frac{1}{2}(4)(3.46)\right) = 41.57$$



$$T = 48 + 41.57 = 89.57 \text{ cm}^2$$

$$V = \frac{1}{3}(41.57)(\sqrt{12}) = 48 \text{ cm}^3$$



Definitions:

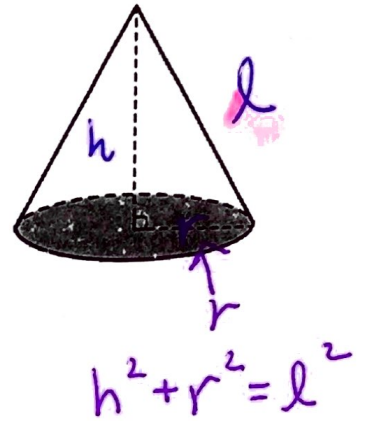
1. cone- solid with a circular base

2. slant height of a cone-  $l$

3. Lateral area of a cone-  $L = \pi r l$

4. Total surface area of a cone-  $T = L + \pi r^2$

5. Volume of a cone-  $V = \frac{1}{3} \pi r^2 h$



If the lateral area of a cone is  $255\pi$  and the total area is  $480\pi$ , find the volume.

$$255\pi = \pi r l$$

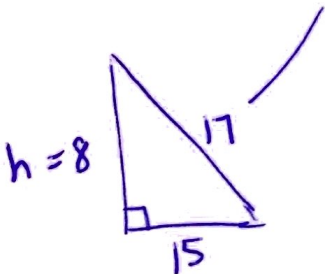
$$255 = 15l$$

$$l = 17$$

$$480\pi = 255\pi + \pi r^2$$

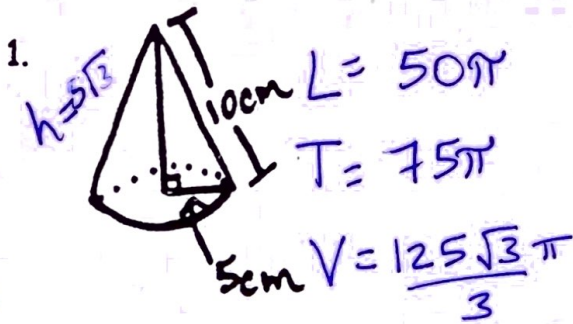
$$225\pi = \pi r^2$$

$$15 = r$$



$$V = \frac{1}{3} \pi (15)^2 (8)$$
$$= 600\pi$$

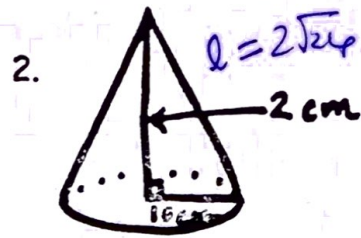
EXAMPLES: Find the lateral area and total surface area of each cone. Also, find the volume



$$L = \pi r \ell$$

$$T = \pi r \ell + \pi r^2$$

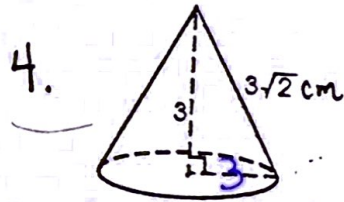
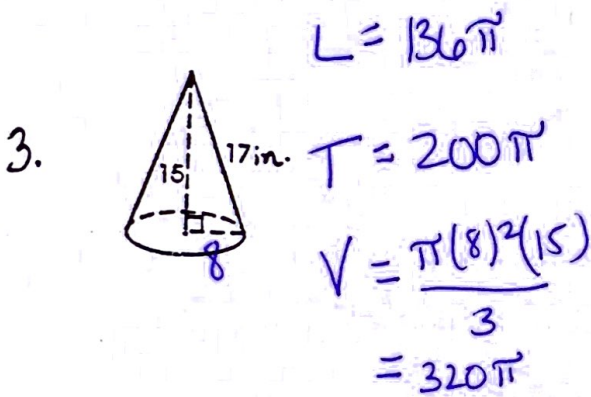
$$V = \frac{\pi r^2 h}{3}$$



$$L = \pi(10)(2\sqrt{26}) = 20\sqrt{26}\pi$$

$$T = 20\sqrt{26}\pi + \pi(10)^2 = 20\sqrt{26}\pi + 100\pi$$

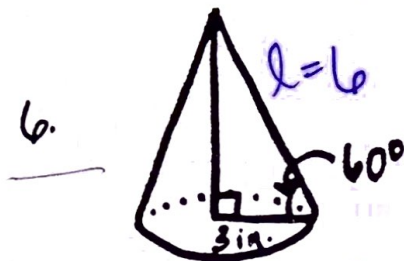
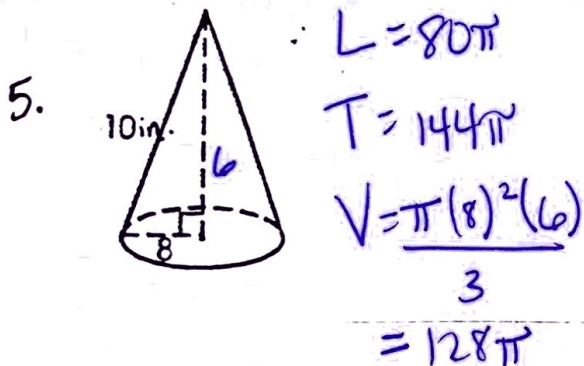
$$V = \frac{\pi(10)^2(2)}{3} = 66.67\pi$$



$$L = 9\sqrt{2}\pi$$

$$T = 9\sqrt{2}\pi + \pi(3)^2 = 9\sqrt{2}\pi + 9\pi$$

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



$$L = 18\pi$$

$$T = 27\pi$$

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