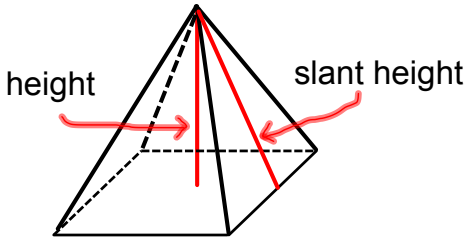
12.3 Surface Area of Pyramids and Cones

Pyramids are polyhedra

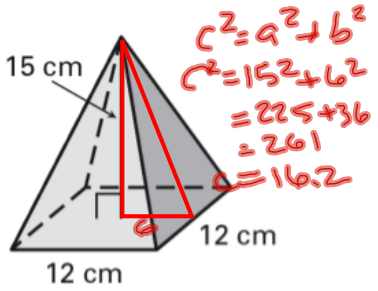
- identify the base
- lateral faces are triangles
- regular pyramids have a regular polygon base
- two kinds of height:

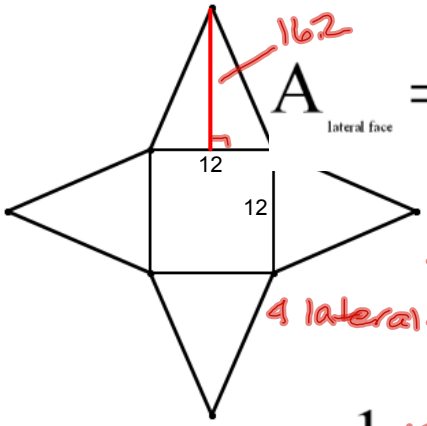
  height (altitude) h

  slant height ℓ



Area of lateral face and Surface Area of a regular pyramid





$$A_{\text{lateral face}} = \frac{1}{2} b\ell$$

$= \frac{1}{2}(12)(16.2)$

$= 97.2$

4 lateral faces $= 4 \times 97.2 = 388.8$

$$SA = B + L$$

$$L = \frac{1}{2} P\ell = 388.8$$

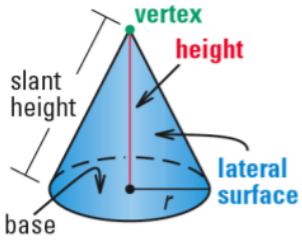
$B = 12 \times 12 = 144$

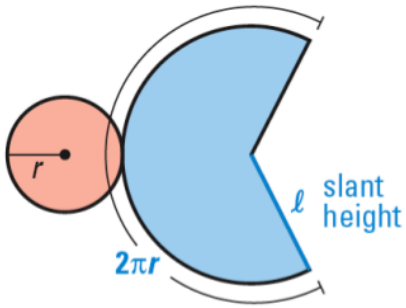
$$SA = B + \frac{1}{2} P\ell$$

$= 144 + \frac{1}{2}(48)(16.2) = 144 + 388.8$

$= 532.8$

Surface Area of a Right Cone:



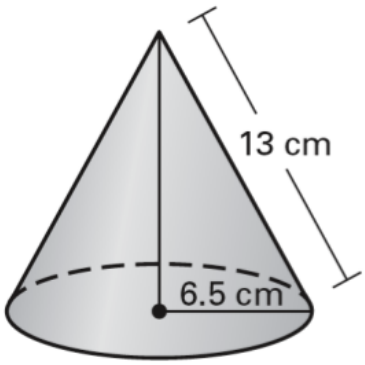


$$B = \pi r^2$$

$$SA = L + B$$

$$SA = \frac{1}{2}(2\pi r)\ell + B$$

Ex: find surface area in terms of pi



$L + B$

$SA = \frac{1}{2}(2\pi r)\ell + \pi r^2$

$= \frac{1}{2}(2\pi(6.5))13 + \pi(6.5)^2$

$= 84.5\pi + 42.25\pi$

$= 126.75\pi \text{ cm}^2$