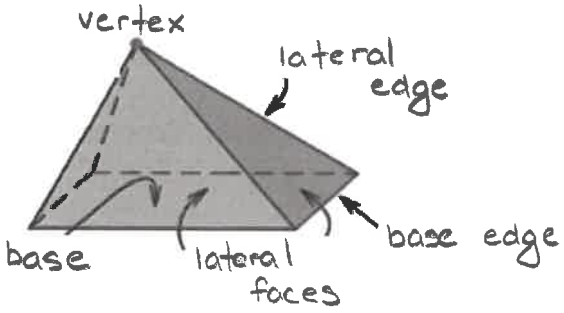
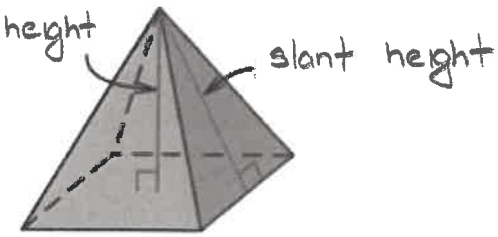
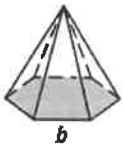
Pyramid: a solid in which the base is a polygon and lateral faces are triangles w/ a common vertex

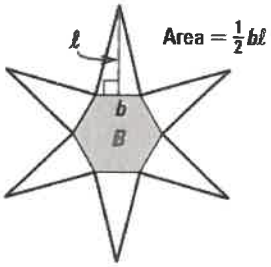




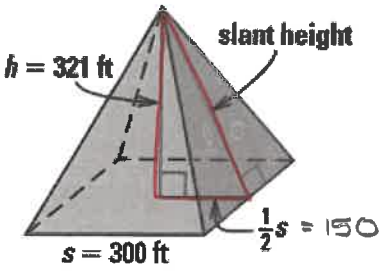
Regular Pyramid: has a regular polygon for a base and its height meets the base at its center



ℓ = slant height



1. Use the diagram to find the area of each lateral face of this regular pyramid

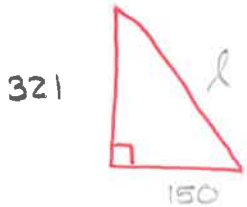


one triangle

$A = \frac{1}{2}bh$

$= \frac{1}{2}(300)(354.32)$

$= 53,148 \text{ ft}^2$



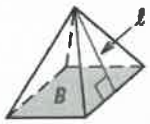
$\ell^2 = 321^2 + 150^2$

$\ell^2 = 125,541$

$\ell = 354.32$

Regular Pyramid:

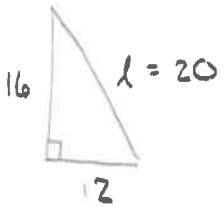
$$S = B + \frac{1}{2}Pl$$

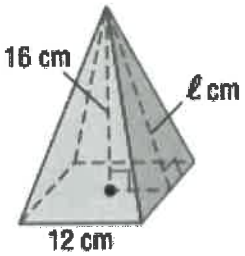


Where B is the area of the base, P is the perimeter of the base, and l is the slant height

2. Find the surface area of the regular pyramid below:

a.





$16^2 + 12^2 = l^2$

$400 = l^2$

$20 = l$

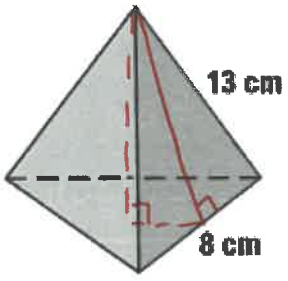
$S = B + \frac{1}{2}Pl$

$= (12)(12) + \frac{1}{2}(12+12+12+12)(20)$

$= 144 + 480$

$= 624\ cm^2$

b.



$S = B + \frac{1}{2}Pl$

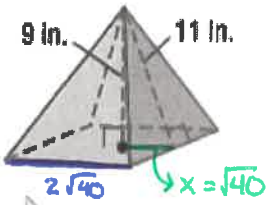
$= \left(\frac{\sqrt{3}}{4}s^2\right) + \frac{1}{2}Pl$

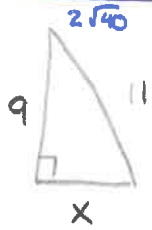
$= \left(\frac{\sqrt{3}}{4}(8)^2\right) + \frac{1}{2}(8+8+8)(13)$

$= 16\sqrt{3} + 156$

$= 183.7\ cm^2$

c.





$9^2 + x^2 = 11^2$

$x^2 = 40$

$x = \sqrt{40}$

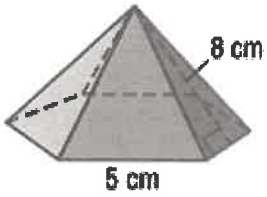
$S = B + \frac{1}{2} P l$

$= (2\sqrt{40})(2\sqrt{40}) + \frac{1}{2}(2\sqrt{40} + 2\sqrt{40} + 2\sqrt{40} + 2\sqrt{40})(11)$

$= 160 + 44\sqrt{40}$

$= 438.3 \text{ in}^2$

3. Find the surface area of the regular pyramid below:



$S = B + \frac{1}{2} P l$

$= \frac{1}{2} a P + \frac{1}{2} P l$

$= \frac{1}{2}\left(\frac{2.5}{\tan 30}\right)(30) + \frac{1}{2}(30)(8)$

$= 64.9519 + 120$

$= 184.9 \text{ cm}^2$

$n = 6$

$a = \frac{2.5}{\tan 30}$

$s = 5$

① central angle

$\frac{360}{6} = 60°$

② triangle

$\tan 30 = \frac{2.5}{a}$

$a = \frac{2.5}{\tan 30}$

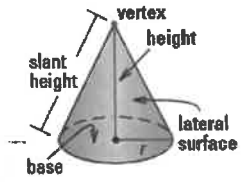
③ Perimeter

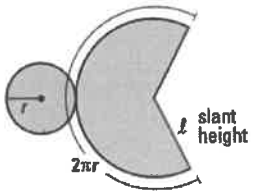
$P = ns$

$= 6(5)$

$= 30$

Cone: has a circular base and a vertex that is not in the same plane as the base.





Right Cone

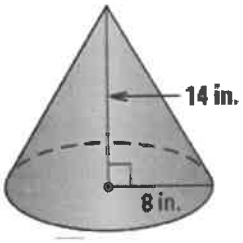
$$S = \pi r^2 + \pi rl$$

Where r is the radius of the base and l is the slant height.

* $S = B + \frac{1}{2}Cl$

$= B + \frac{1}{2}Pl$

4. Find the slant height of the cone below:



$14^2 + 8^2 = l^2$

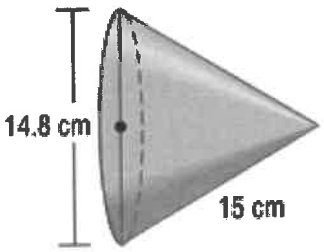
$196 + 64 = l^2$

$260 = l^2$

$16.12 \approx l$

5. Find the surface area of the cone below:

a.



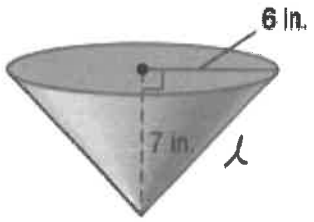
$S = \pi r^2 + \pi r l$

$= \pi (7.4)^2 + \pi (7.4)(15)$

$= 54.76\pi + 111\pi$

$= 165.76\pi \text{ cm}^2$

b.



$6^2 + 7^2 = l^2$

$36 + 49 = l^2$

$85 = l^2$

$\sqrt{85} = l$

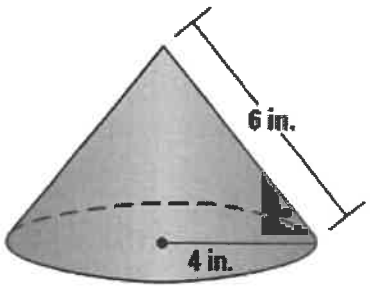
$S = \pi r^2 + \pi r l$

$= \pi(6)^2 + \pi(6)\sqrt{85}$

$= 36\pi + 6\sqrt{85}\,\pi$

$= 286.9\ in^2$

c.



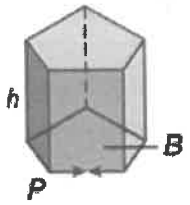
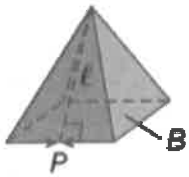
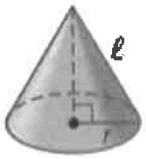
$S = \pi r^2 + \pi r l$

$= \pi(4)^2 + \pi(4)(6)$

$= 16\pi + 24\pi$

$= 40\pi\ in^2$

ConceptSummary Lateral and Surface Areas of Solids

Solid	Model	Lateral Area	Surface Area
prism		$L = Ph$	$S = L + 2B$ or $S = Ph + 2B$
cylinder		$L = 2\pi rh$	$S = L + 2B$ or $S = 2\pi rh + 2\pi r^2$
pyramid		$L = \frac{1}{2}P\ell$	$S = \frac{1}{2}P\ell + B$
cone		$L = \pi r\ell$	$S = \pi r\ell + \pi r^2$