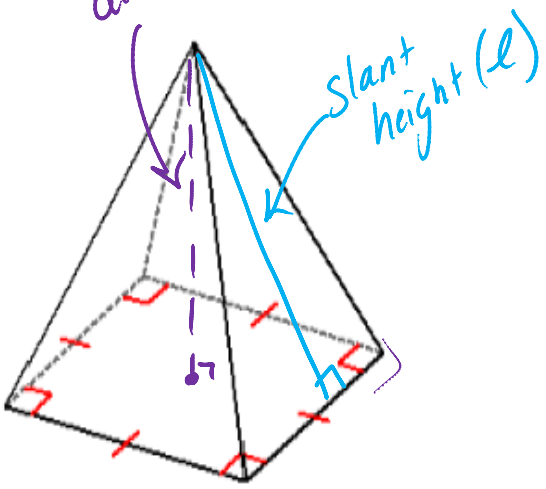
Pyramids, Cones, and Spheres…OH MY!



Pyramid has 1 base

Lateral faces: Triangles that make up the pyramid.

Altitude: height of pyramid (inside)

Slant height: height of triangular face

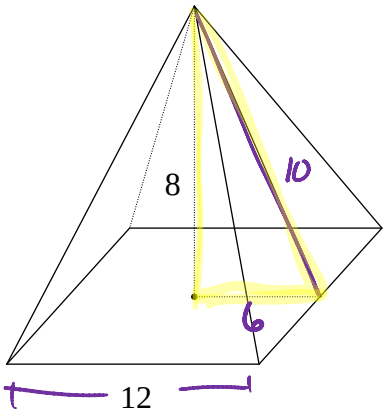
In a **regular pyramid,** we know:

1) Base is regular polygon
2) Lateral edges are ≅
3) Lateral Faces are Δ's

Formula for Regular Pyramids:

$$LA = \frac{P \cdot \ell}{2} \qquad SA = \frac{P\ell}{2} + B$$

Example 1: **Given: A pyramid with a regular base, find the following:**

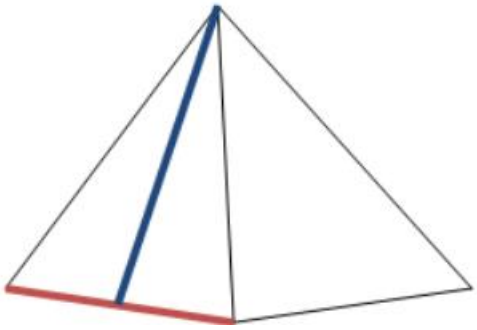


$$LA = \frac{P\ell}{2} = \frac{(4 \cdot 12)10}{2} = \frac{(48)(10)}{2} = \frac{480}{2}$$

$$= 240 \text{ u}^2$$

$$SA = 240 + B$$
$$= 240 + (12 \cdot 12)$$
$$= 240 + 144$$
$$= 384 \text{ u}^2$$

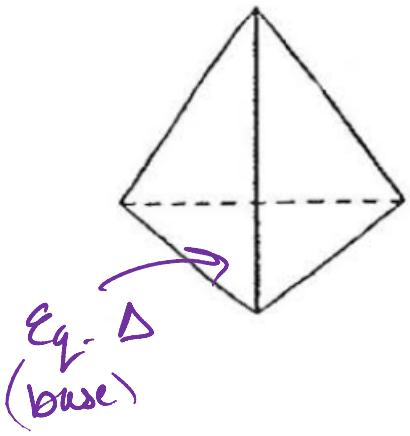
Example 2: **Given the base is a square with a side length of 14, and the slant height is 10. Find LA and SA.**



LA =

SA =

Example 3: Find the total surface area of a regular triangular pyramid with a base length of 8 and slant height of 12.



$LA = \frac{Pl}{2} = \frac{(3 \cdot 8)12}{2}$

$= \frac{(24)(12)}{2}$

$= 144\ u^2$

$SA = 144 + B$

$= 144 + \frac{8^2\sqrt{3}}{4}$

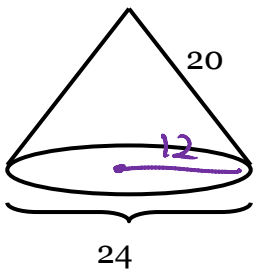
$= 144 + \frac{64\sqrt{3}}{4}$

$= 144 + 16\sqrt{3}$

Formula for a Cone:

$LA = \frac{Cl}{2}$ $\qquad SA = \frac{Cl}{2} + B$

Example 4: Find the LA and SA.



$LA = \frac{Cl}{2}$

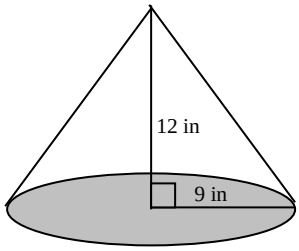
$= \frac{24\pi(20)}{2}$

$= 240\pi\ u^2$

$SA = 240\pi + \pi 12^2 = 240\pi + 144\pi$

$= 384\pi\ u^2$

Example 5: Find the LA and SA.



Formula for a Sphere:

$SA = 4\pi r^2$

Example 6: Find the surface area of a sphere with radius of 10.

$SA = 4\pi 10^2$

$= 4\pi 100$

$400\pi \text{ u}^2$

Example 7: Find the radius of a sphere is the surface area is 196π in^2.

Partner Practice!

1) A birthday hat measures 6 inches wide and 4 inches tall. Find the amount of material needed to make the birthday hat.

2) Find the surface area of an orange that has a radius of 3 cm.

3) A toy in the shape of a square pyramid has a base of 10in and height of 12in. If the toy is hollow inside, how much material is needed to make the toy?

If the material cost $0.40 per square inch, how much would it cost to make the toy?