

### 12.3 Lateral Area and Surface Area of Pyramids

$$LA = \frac{1}{2}pl$$

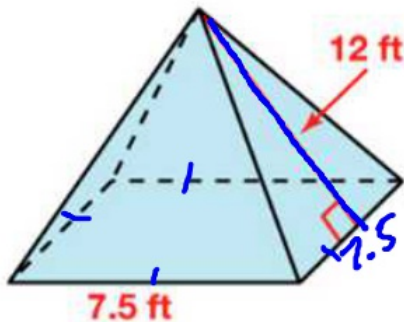
$$SA = LA + B$$

$l$ : slant height

$p$ : perimeter of base

$B$ : Area of the base

**Example:** Find the lateral area and surface area of the pyramid.



$$LA = \frac{1}{2}(30)(12)$$

$$= 180 \text{ ft}^2$$

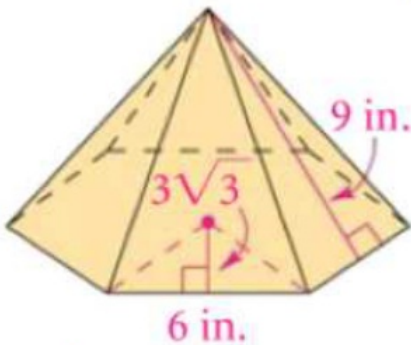
$$SA = 180 + (7.5 \cdot 7.5)$$

$$SA = 180 + 56.25$$

$$LA = \underline{180 \text{ ft}^2}$$

$$SA = \underline{236.25 \text{ ft}^2}$$

**Example:** Find the lateral area and surface area of the pyramid.



hexagonal pyramid

$$LA = \frac{1}{2}pl$$

$$LA = \frac{1}{2}(36)(9)$$

$$LA = 162$$

$$\frac{1}{2}ap$$

$$\frac{1}{2}(3\sqrt{3})(36)$$

$$SA = 162 + \left(\frac{1}{2} \cdot 3\sqrt{3} \cdot 36\right)$$

$$SA = 162 + 54\sqrt{3}$$

≈

$$LA = \underline{162 \text{ in}^2}$$

$$SA = \underline{255.53 \text{ in}^2}$$

### 12.3 Lateral Area and Surface Area of Cones

$$LA = \frac{1}{2}pl$$

OR

$$LA = \pi r l$$

↑  
Circumference

$$SA = LA + B$$

$$SA = LA + \pi r^2$$

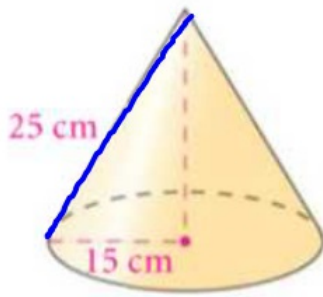
C: circumference

l: slant height

p: perimeter of base

B: Area of the base

**Example:** Find the lateral area and surface area of the cone. Leave answers in terms of  $\pi$ .



$$LA = \frac{1}{2}pl$$

$$LA = \frac{1}{2}(2\pi r)l$$

$$LA = \pi(15)(25)$$

$$LA = 375\pi \text{ cm}^2$$

$$SA = 375\pi + B$$

$$SA = 375\pi + \pi(15)^2$$

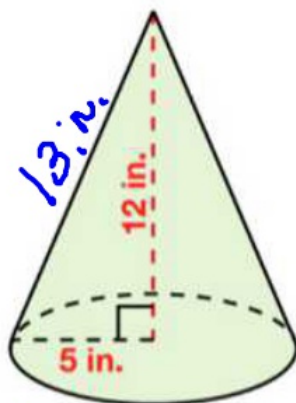
$$375\pi + 225\pi$$

$$600\pi \text{ cm}^2$$

$$LA = \underline{375\pi \text{ cm}^2}$$

$$SA = \underline{600\pi \text{ cm}^2}$$

**Example:** Find the lateral area and surface area of the cone. Leave answers in terms of  $\pi$ .



$$LA = \frac{1}{2}pl$$

$$LA = \frac{1}{2}(2\pi r)l$$

$$LA = \pi(5)(13)$$

$$LA = 65\pi \text{ in}^2$$

$$SA = LA + B$$

$$SA = 65\pi + \pi(5)^2$$

$$65\pi + 25\pi$$

$$90\pi$$

$$LA = \underline{65\pi \text{ in}^2}$$

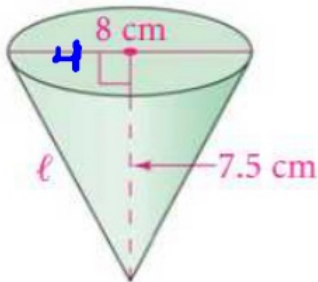
$$SA = \underline{90\pi \text{ in}^2}$$

$$5^2 + 12^2 = c^2$$

$$13 = c$$

### Mixed Review

- 1) The funnel is the shape of a cone. How much filter paper do you need to line the funnel? Round your answer to the nearest whole number.



$$4^2 + 7.5^2 = l^2$$

$$8.5 \approx l$$

$$LA = \frac{1}{2} p l$$

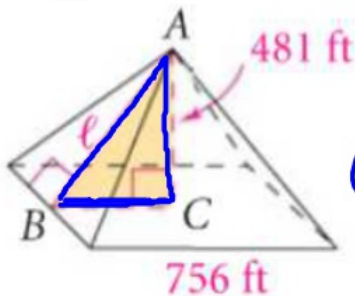
$$LA = \frac{1}{2} (2\pi r) l$$

$$= \pi r l$$

$$= \pi (4)(8.5)$$

$$\approx 34\pi \text{ cm}^2 \approx \boxed{107 \text{ cm}^2}$$

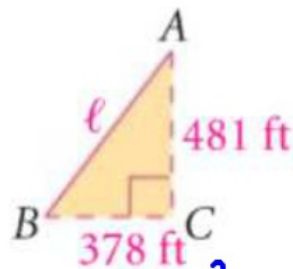
- 2) The Great Pyramid at Giza, Egypt, was built about 2580 B.C as a final resting place for Pharaoh Khufu. At the time it was built, it's height was about 481 ft. Each edge of the square base was about 756 ft long. What was the lateral area of the Great Pyramid?



$$(756)4 = p$$

$$LA = \frac{1}{2} (3024)(611.76)$$

$$\boxed{LA = 924,981.12 \text{ ft}^2}$$



$$378^2 + 481^2 = l^2$$

$$\sqrt{374,245} = \sqrt{l^2}$$

$$611.76 \approx l$$