12 - 6
Surface Area of Cones

right cone: axis is the altitude
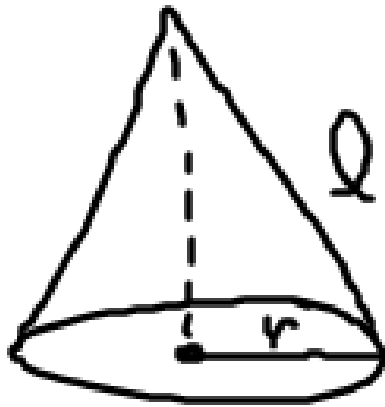
oblique cone: axis is not the altitude

slant height: ℓ

Lateral Area: $\pi r \ell$

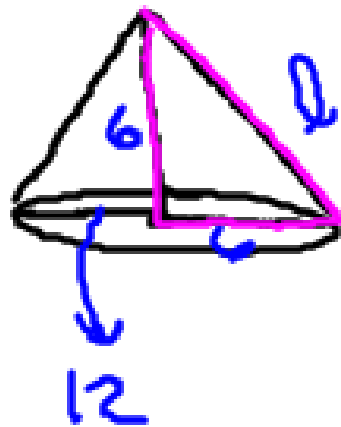**Ex:** Find the lateral area of a cone with an altitude of 6 in and a diameter of 12 in.

$$6^2 + 6^2 = \ell^2$$
$$36 + 36 = \ell^2$$
$$72 = \ell^2$$
$$\sqrt{72} = \ell$$

$$\pi r \ell$$
$$\pi \cdot 6 \cdot \sqrt{72}$$
$$\boxed{159.9 \text{ in}^2}$$

Surface Area: $\pi r \ell + \pi r^2$

Ex: Find the surface area of a cone with a slant height of 13.6 cm and a radius of 4.7 cm.
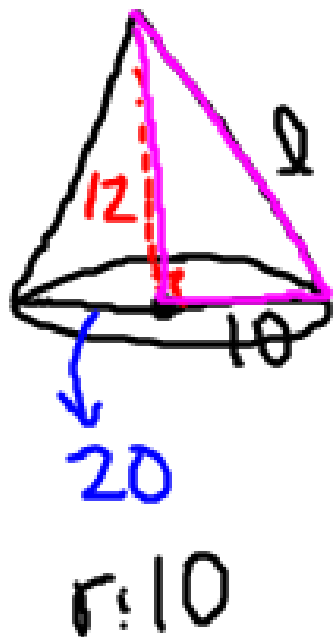
$$\pi r \ell + \pi r^2$$

$$\pi(4.7)(13.6) + \pi(4.7)^2$$

$$63.92\pi + 22.09\pi$$

$$86.01\pi$$

$$270.2 \, cm^2$$

Ex: Find the surface area of a cone with an altitude of 12 ft and the diameter of its base is 20 ft.

$$12^2 + 10^2 = \ell^2$$

$$144 + 100 = \ell^2$$

$$244 = \ell^2$$

$$\sqrt{244} = \ell$$

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

$$\pi(10)(\sqrt{244}) + \pi(10)^2$$

$$156.2\pi + 100\pi$$

$$256.2\pi$$

$$\boxed{804.9 \, ft^2}$$

$r : 10$

20

Homework:

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