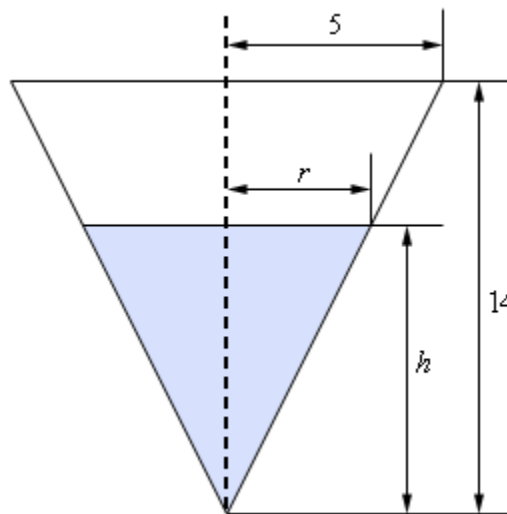


**Example** Air is being pumped into a spherical balloon at a rate of  $5 \text{ cm}^3/\text{min}$ . Determine the rate at which the radius of the balloon is increasing when the diameter of the balloon is 20 cm.

**Example** A 15 foot ladder is resting against the wall. The bottom is initially 10 feet away from the wall and is being pushed towards the wall at a rate of  $\frac{1}{4} \text{ ft/sec}$ . How fast is the top of the ladder moving up the wall 12 seconds after we start pushing?

**Example** A tank of water in the shape of a cone is leaking water at a constant rate of  $2 \text{ ft}^3/\text{hour}$ . The base radius of the tank is 5 ft and the height of the tank is 14 ft. At what rate is the depth of the water in the tank changing when the depth of the water is 6 ft? At what rate is the radius of the top of the water in the tank changing when the depth of the water is 6 ft?



**Example** A light is on the top of a 12 ft tall pole and a 5ft 6in tall person is walking away from the pole at a rate of 2 ft/sec.

- At what rate is the tip of the shadow moving away from the pole when the person is 25 ft from the pole?
- At what rate is the tip of the shadow moving away from the person when the person is 25 ft from the pole?

