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BLAKE FARMAN

Lafayette College

Name: _____

1. Gas is escaping a spherical balloon at the rate of 4 cm^3 per minute. How fast is the surface area shrinking when the radius is 24 cm ? For a sphere, $V = \frac{4}{3}\pi r^3$ and $S = 4\pi r^2$ where V is volume, S is surface area and r is the radius of the balloon.

2. The top of a ladder slides down a vertical wall at a rate of 0.15 meters/second. At the moment when the bottom of the ladder is 3 meters from the wall, it slides away from the wall at a rate of 0.2 meters/second. How long is the ladder?

3. Two cars start moving from the same point. One travels south at 60 mi/h and the other travels west at 25 mi/h. At what rate is the distance between the cars increasing two hours later?

4. A street light is mounted at the top of a 15-ft-tall pole. A man 6 ft tall walks away from the pole with a speed of 5 ft/s along a straight path. How fast is the tip of his shadow moving when he is 40 ft from the pole?

(Hint: The length of the shadow is measured from the person to the tip of the shadow; the rate at which the tip of the shadow is moving is measured from the pole to the tip of the shadow.)