

Show all work. Label your answers with the proper units.

1. A spherical ball is being inflated at the rate of 12 cubic inches per second. Find the rate at which the radius of the sphere is growing when the radius is 2 inches long.
2. A 13 foot ladder is leaning against a wall. The base of the ladder is being pulled away from the wall at the rate of 4 feet per minute. How fast is the top of the ladder coming down the wall when the base of the ladder is 5 feet from the wall?
3. A 5-ft woman moves away from a streetlight that is 16 feet high at the rate of 3 feet per second. How fast is her shadow length increasing when she is 10 feet away from the base of the streetlight?
4. A weather balloon travels vertically at a speed of 40 ft/min. The balloon is tracked by an observer stationed 500 feet from the launching pad. Find the rate at which the angle between the telescope and the ground is increasing 30 minutes after lift-off.
5. A conical tank with vertex down has a radius of 5 feet at the top and is 12 feet high. If the water flows into the tank at a rate of 10 cubic feet per minute, how fast is the depth of the water increasing when the water is 6 feet deep?
6. A stone dropped in a still pond creates a circular ripple whose radius increases at the constant rate of 2 feet per second. At what rate is the area of the circle increasing when the radius is 8 feet?