

Name: _____

16.1 Related Rates with Known Equations

Exercise 16.1.1 A spherical balloon is being inflated in such a way that the radius increases 1cm/s . How fast is the volume increasing when the radius is 5cm ? 6cm ?

Exercise 16.1.2 At what rate is the surface area of a cube increasing if its edges are 2 inches and are increasing at a rate of 3 inches per minute?

16.2 Related Rates Given an Equation

Exercise 16.2.1 A particle moves along a circle represented by the equation $x^2 + y^2 = 25$. Suppose that when $x = 3$ it (x) is increasing at a rate of 2 units per minute. How fast is y changing when $x = 3$?

16.3 Determining Equations for Related Rates

Exercise 16.3.1 A streetlight is mounted on the top of a 15-foot tall pole. A 6ft tall woman walks away from the pole along a straight path at a speed of 5 feet per second. How fast is the length of her shadow (distance from her toe to the tip of the shadow) changing when she is 40 feet from the base of the pole?

Exercise 16.3.2 Bonus Question [4 pts]: Schuyler's clock is kaput; the minute hand functions as it should but the hour hand is stuck at 4. The minute hand on the clock is 30 cm long and the hour hand is 10 cm long. Determine the rate of change between the tips of the hands when the minute hand points directly at 12.