

Activity 14: Related Rates

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1. A stone dropped in a pond sends out a circular ripple whose radius increases at a constant rate of 4 ft/sec. After 12 seconds, how rapidly is the area enclosed by the ripple increasing?
2. The volume of a cylinder is decreasing at a rate of 20 m^3 per hour, and the height of the cylinder is decreasing at a rate of 4 meters per hour. At a certain instant, the base radius is 5 meters and the height is 8 meters. What is the rate of change of the radius of the cylinder at the instant? (The volume of a cylinder is $V = \pi r^2 h$, where r is the radius and h is the height.)
3. A person who is 6 feet tall is walking away from a lamp post at the rate of 40 feet per minute. When the person is 10 feet from the lamp post, their shadow is 20 feet long. Find the rate at which the length of the shadow is increasing when they are 30 feet from the lamp post.