

# EMT111 Practice Problems- Rates of Change

November 8, 2011

1. The mechanics at a Toyota Automotive are reboring a 6-in deep cylinder to fit a new piston. The machine they are using increases the cylinder's radius one-thousandth of an inch every 3 minutes. How rapidly is the cylinder's volume increasing when the bore's radius is 3.8 in. ?
2. A spherical balloon is being filled with air at a rate such that its radius is increasing at a rate of 2 inches per second. How quickly is the volume increasing when the radius is 6 inches?
3. A rocket is being launched. It takes off with a velocity of 550 mph. Twenty-five miles away, there is a photographer video-taping the launch. At what rate is the angle of elevation of the camera changing when the rocket achieves an altitude of 25 miles?
4. Sand is falling off a conveyor and is forming a conical pile at the rate of 20 cubic feet per minute. The diameter of the base of the cone is approximately three times the height of the cone. At what rate is the height of the pile changing when the pile is 10 feet high?