

Practice Related Rates problems

Math 124, Sections C,D

Week 7, Spring Quarter 2006

1. Find the rate of change of the volume of a cube with a side x with respect to its surface area when $x = 10\text{cm}$.
2. An observer on the ground sights an approaching plane flying at constant speed and at an altitude of 20000ft. From his point of view, the plane's angle of elevation is increasing at 0.5° per second when the angle is 60° . What is the speed of the plane? Note that speed is the absolute value of the velocity and therefore must be positive.
3. Gravel is being dumped from a conveyor belt at a rate of $30\text{ ft}^3/\text{min}$, and its coarseness is such that it forms a pile in the shape of a cone whose base diameter and height are always equal. How fast is the height of the pile increasing when the pile is 10 ft high? (Note: The volume of a cone of height h having a base of radius r is given by the formula: $V = \frac{1}{3}\pi r^2 h$.)

4. The hypotenuse of a right triangle is currently 10cm long and increasing at 0.1 cm/sec . The angle θ is $\frac{\pi}{4}$ and decreasing at $.001\text{ rad/sec}$. How long are the other two sides and how fast are they changing?

