

SI Session: June 24th
Mondays – Thursdays
12:30 PM – 2:00 PM
Room 1229

Prof. Stockton : Calculus I
Summer I 2008
SI Leader : Neil Jody

- [1] A point is moving along the graph of $y = x^3 - 3x^2$ in such a way that the y -coordinate is decreasing at the rate of 3 units/sec (i.e. $\frac{dy}{dt} = -3$). What is $\frac{dx}{dt}$ when $x = 1$?

- [2] A stone is dropped into a lake causing circular waves whose radii increase at a constant rate of 0.5m/sec. At what rate is the circumference of a wave changing when its radius is 4m?

[3] The area of an equilateral triangle is decreasing at a rate of $4 \text{ cm}^2/\text{min}$. Find the rate at which the length of a side is changing when the area of the triangle is 200 cm^2 .

[4] A man 6 ft tall is walking at a rate of 3 ft/s toward a streetlight 18 ft high. (a) At what rate is his shadow length changing? (b) How fast is the tip of his shadow moving?

[5] A hot-air balloon rises vertically as a rope attached to the base of the balloon is released at a rate of 5ft/sec. The pulley that releases the rope is 20 feet from the spot on the ground directly below the balloon. At what rate is the balloon rising when 500 feet of rope have been let out?

[6] Sand falls from a conveyor belt onto a conical pile at a rate of $10 \text{ ft}^3 / \text{min}$. The radius of the base is always equal to half of the pile's height. At what rate is the height of the pile increasing when the pile is 5 feet high?

- [7] A light is at the top of a 16-foot pole. A woman 5 feet tall walks away from the pole at a rate of 4 ft/sec. At what rate is the length of her shadow changing?

- [8] A trough has the shape of the wedge shown below. Water is being poured into the trough at the rate of 2 cubic feet per minute. At what rate is the depth of the water changing when the depth is 1 foot?

