Name: _____

Rates of Change

1) A supply function for a certain product is given by $S(p) = 0.08p^3 + 2p^2 + 10p + 11$ where S is the number of items sold at a price p, in dollars.

   1) Find the rate of change of supply with respect to price

   2) How many units will the seller allow to be sold when the price is $3 per unit?

   3) What is the rate of change at p = 3? Interpret.

   4) Estimate the change in the number of units supplied when the price per unit increases from 3$ to 4$.

   5) Find the actual change in the number of units supplied when the price per unit increases from $3 to $4.

2) The population of a city grows from an initial size of 100,000 to an amount P given by $P(t) = 100000 + 2000t^2$ where t is given in years from now.

   1) Find the growth rate.

   2) Find the number of people in the city after 10 years.

   3) Find the growth rate at t = 10 and interpret.

3) A ball is thrown straight down from the top of a building. Its distance from the ground is given by the position function $s(t) = 220 - 22t - 16t^2$.

   Find its velocity and acceleration after 3 seconds.