Math 151 HW3 due Feb. 12, 1998 Name _____

Use a separate piece of paper to answer the following:

sec. 3.1 1.) Suppose a particle is moving back and forth along the x-axis as described by the equation: $x(t) = -4t^2 + 24t + 10$ where *t* stands for the time in seconds and *x* stands for the position in feet. (Show work on part *a* (no calculator needed). For part *b*, you may use your calculators' derivative feature, but show what you plugged into your calculator. For part *c* you may use the shortcuts that you learned in section 3.2)

a.) Find the average rate of change of position from $t = 2$ seconds to $t = 4$ seconds.
b.) Find the average rate of change of position from $t = 3.4$ seconds to $t = 3.6$ seconds.
c.) Find the instantaneous rate of change at $t = 3.5$ seconds.

sec 2.3 2.) do # 46

sec. 3.2 3.) You learned from the product rule that if *u* and *v* are differentiable functions of *x*, then $(uv)' = u'v + uv'$. Suppose *u* and *v* can be differentiated an unlimited number of times. Use the product rule again to find:

a.) $(uv)''$

b.) $(uv)'''$

c.) Write a conjecture as to what $(uv)^{(n)}$ is. Hint: You should notice a pattern similar to one you learned in precalculus for a different situation.

sec. 3.4 4.) Use the quotient rule or the power rule, $\frac{d(\cos x)}{dx} = -\sin x$, and the fact that $\sec x = \frac{1}{\cos x}$ to find the derivative of sec *x*.