Name:_____

MA 2310 Quiz 5

Compute the following. No calculators.

1. Compute $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for $y = \frac{3x-1}{5x+7}$.

2. Compute the equation of the tangent line for $f(x) = x^2 \sec(x)$ at the point $x = \pi$.

3. A stone is thrown verically with initial velocity of 64 ft/sec from a height of 32 feet above the ground. The height (s) of the stone in t seconds is given by
$$s(t) = -16t^2 + 64t + 32.$$

   (a) Find the veolcity of the stone after t seconds.

   (b) At what time does the stone reach its highest point?

   (c) What is that height?

   (d) When does the stone hit the ground?

   (e) At what velocity does the stone hit the ground?

4. Define the cost of production and the price by the formulas below where x is the number if items.

$$C(x) = -0.02x^2 + 50x + 100 \qquad\qquad p(x) = 100 - 0.1x$$

   (a) Find the profit function P.

   (b) Find the average profit function and the marginal profit function.

   (c) Find the average profit and the marginal profit if $x = 500$.

   (d) Interpert your computations above.

5. Find $\frac{dy}{dx}$ for $y = \cos^4(7x^3)$.

6. Find $\frac{d^2y}{dx^2}$ for $y = \sqrt{3x^3 + 4x + 1}$.