Math 1030 Workshop #4 (July 23, 2009) **Name:** _____

DUE: Monday, July 27^{th} Please turn in a paper copy and **SHOW YOUR WORK!**

1. Use the limit definition of the derivative to find $f'(x)$ if...
   [You use should the rules we learned to double check your answer.]

   (a) $f(x) = -x^2 + 3x - 1$

   (b) $f(x) = \dfrac{2}{(x-1)^2}$

2. Find the equation of the line tangent to the graph of $y = f(x)$ at $x = x_0$ if...

   (a) $f(x) = -x^2 + 3x - 1$ and $x_0 = 1$

   (b) $f(x) = \dfrac{2}{(x-1)^2}$ and $x_0 = 0$

3. Compute the derivative of each of the following functions. Please simplify your answers.

(a) $y = 3e^x - 5\ln(x) + \sqrt{x} + \frac{1}{x^3} + 3x + 2$

(b) $y = \ln(x)e^{-x}$

(c) $y = \dfrac{x^2 + 3x - 5}{xe^x}$

(d) $y = (x\ln(x) + 5)^{100}$

(e) $y = \ln\left((x^2 + 1)e^{-3x}\right)$