Math 1030 Workshop #4 **Name:** _____

DUE: Wednesday, July 22nd 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) $f(x) = 3x^2 - 5x + 12$

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

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

   (a) $f(x) = 3x^2 - 5x + 12$ and $x_0 = -1$

   (b) $f(x) = \dfrac{1}{(x-2)^2}$ and $x_0 = 3$

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

(a) $y = \sqrt[5]{x} + 3\ln(x) + 7e^x - \dfrac{11}{x^{10}} - 5x + 123$

(b) $y = e^{-4x}\ln(x)$

(c) $y = \dfrac{x^2 - 5x + 1}{xe^x}$

(d) $y = \Big(\ln(3x+1) + 55\Big)^{100}$

(e) $y = \ln\left(\dfrac{4(x^5+10)^3 e^{2x}}{\sqrt{x}\,(x-8)^{10}}\right)$