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

**DUE: Friday, 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) $f(x) = -4x^2 + 2x - 1$

   (b) $f(x) = \dfrac{1}{\sqrt{x}}$

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

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

   (b) $f(x) = \ln(x)$ and $x_0 = 1$

3. Compute the derivative of each of the following functions.

(a) $y = 8\sqrt[4]{x} - 7\ln(x) + 2e^x - \dfrac{9}{x^5} + 3x + \sqrt{57}$

(b) $y = x^7 \ln(x+1)$

(c) $y = \dfrac{x^2 e^x + 5x - 1}{x^3 + 4}$

(d) $y = \left(e^{x^3} + 11x - 6\right)^{45}$

(e) $y = \ln\left(\dfrac{11\sqrt[3]{x}\, e^{-8x}}{(x^2+1)^6 (x-2)^{100}}\right)$