DUE: Tuesday, June 15th 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) $f(x) = 3x^2 - x + 8$

   (b) $f(x) = \dfrac{1}{x^3}$

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

   (a) $f(x) = 3x^2 - x + 8$ and $x_0 = 1$

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

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

(a) $y = 10\ln(x) - 6e^x + \sqrt[3]{x} + \frac{1}{x} + 9x - 42$

(b) $y = \ln(2x + 1)e^x$

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

(d) $y = (xe^x + 1)^{25}$

(e) $y = \ln\left(\dfrac{(5x + 1)e^{10x}}{x^3}\right)$