Calculus Review Homework #3

due Thursday 9/13 at 2:30 pm - please write neatly.

Reminder Quiz on Tuesday 9/18 - (make a copy of your solutions to this homework)

1) Given \( x^3 + xy^3 = 2 \). Find \( y' \) at the point \((1,1)\)

2) Find equations of the tangent and normal lines to \( x^2 + 3xy + y^2 = 5 \) at the point \((1,1)\)

3) Find a value prescribed by the Law of the Mean (see Mean Value Theorem for Derivatives) given \( y = x^3 \) on \([0,6]\)

4) Let \( f(x) = x^4 + 2x^3 - 3x^2 - 4x + 4 \)

   a) the critical values of \( f(x) \) [Hint: one root of \( f'(x) \) is \( x=1 \)]

   b) the points at which \( f \) has a relative extremum (min or max)

   c) the intervals on which \( f \) is increasing or decreasing

   d) Plot the graph of the curve of \( f \) for \(-3 \leq x \leq 2\)

5) Examine \( y = 3x^4 - 10x^3 - 12x^2 + 12x - 7 \) for

   concavity and points of inflection

   [You are not asked to find relative extrema/min/max]