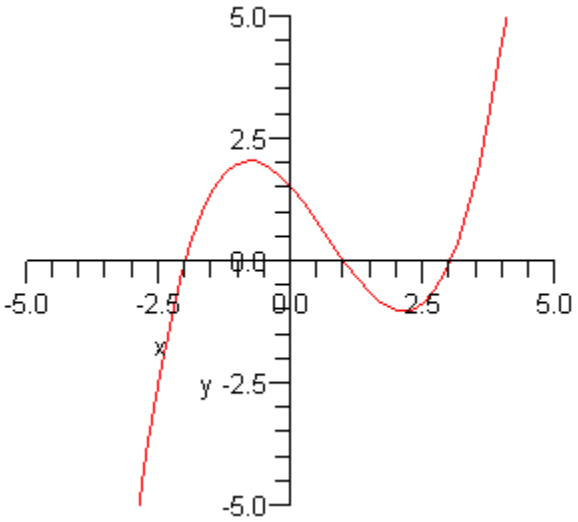
Graded Homework Set 2 -- Calculus I -- Math191 (Page references in red)

1. a. If f(x) = $3x^2$ + 5x,I find f '(x) by using the definition (2) (Page 123)

   b. If $f(x) = \sqrt{3x}$, follow example 3 page 125, and find the value of f '(x).

2. Consider the function shown below to be that of p(x).



Find the following values by observing the slope of the tangent line to the curve, by "eyeball," graphically: (See problems 1 and 3 on page 131)

   a. p '(0)
   b. p '(2.5)
   c. p '(-2.5)
   d. p '(-1)
   e. p '(1)

3. Sketch a graph of p '(x) defined in problem 2 above.
   (See problems on page 131)

4. Use the differentiation formulas from section 3.3 to find dy/dx for the following functions:

   a. $y = f(x) = 2 - 4x + 8x^5$

   b. $y = f(x) = \sqrt[6]{6}$

   c. $y = f(x) = -\frac{12}{x^5}$

   d. $y = f(x) = (3x^3 - 5x^2 + 6x) \cdot (x^2 - 6x + 2)$ Do <u>not</u> simplify. Use a formula.

e. $y = f(x) = \dfrac{2x+6}{x^2-4x}$ Do <u>not</u> simplify. Use a formula.

5. Find the derivative, dy/dx, of the functions shown below using examples in section 3.5: (Do <u>not</u> simplify algebraically, use the formulas)

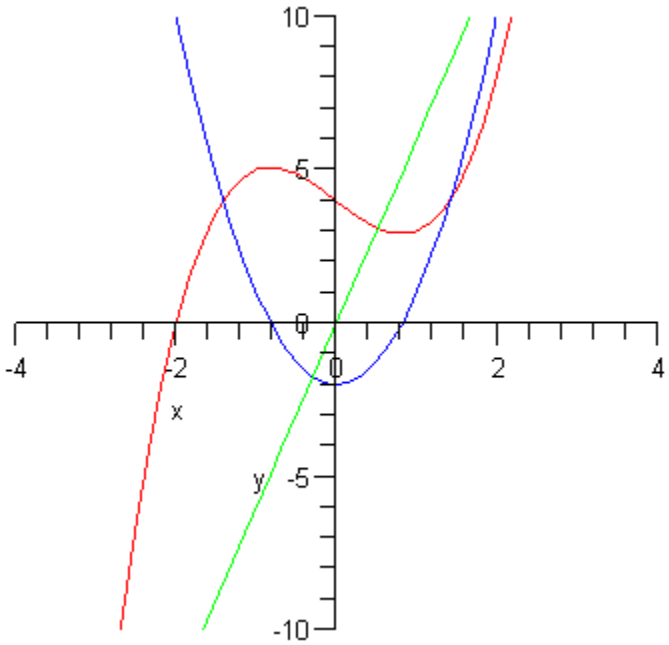
a. $y = f(x) = (3x^5 - 2x)^7$

b. $y = f(x) = (2x-7)^3(5x-2)^{13}$

c. $y = f(x) = \dfrac{(2x^3 - 3x^2 + 2x)^9}{(8x-5)^4}$

d. $y = f(x) = (5-3x)^{\frac{1}{9}}$

6. The figure below shows f(x), f '(x) and f "(x).



a. What is the color of the graph representing f(x)?
b. What is the color of the graph representing f '(x)?
c. What is the color of the graph representing f "(x)?

(See problems 39 and 40 on page 133)

7. Find the equation of the tangent line in point/slope format, $y - y_c = m(x - x_c)$, for the functions given below as indicated: [Use any method to find the slope of the tangent line by taking the derivative and evaluating it at the point indicated]

a. $y = \sqrt{x}$ when x = 25.

b. $y = x^2 - 2x + 6$ when x = 0.

8. a. Find the equation of the tangent line to the curve $y = f(x) = \sqrt[3]{1+3x}$ when x = 0.

b. Use this tangent line equation which is a linear approximation for f(x) to approximate the value of $\sqrt[3]{1.03}$ where x takes on the value of 0.01.

(See example 1 page 189)