Math 1400 Homework 4 Due Feb 16

For problems 1, 2 and 3 use *Quotient Rule*:

1. Find the derivative for the following: (a) $f(x) = \frac{x^2 - 7x + 2}{x + 2}$

(a)
$$f(x) = \frac{x^2 - 7x + x + 5}{x + 5}$$

(b) $f(x) = \frac{6x + 11}{(3x + 8)^2}$
(c) $f(x) = \frac{125x^2}{x^2 + 100}$

2. Find $\frac{dy}{dx}$ for the following: (a) $y = \frac{2\sqrt{x}}{x^2 - 3x + 1}$ (b) $x = -\frac{6\sqrt[3]{x}}{x^2}$

(b)
$$y = \frac{6\sqrt[3]{x}}{(x^2-3)}$$

(c) $y = \frac{x^3-3x+4}{2x^2+3x-2}$

3. Find $\frac{dy}{dx}$ for the following:

(a)
$$y = \frac{x^2 - 3x + 1}{\sqrt[4]{x^2}}$$

(b) $y = \frac{(2x^2 - 1)(x^2 + 3)}{(x^2 + 1)}$
(c) $f(x) = \frac{2x - 1}{(x^3 + 2)(x^2 - 3)}$

4. Problem No. 65 (a), (b) and 66 (a), (b) from Text book Page 603.

For problems 5, 6 and 7 use *General Power Rule* to find the derivative.

5. (a)
$$f(x) = \sqrt{x^2 + 4x + 5}$$

(b) $f(x) = \sqrt[3]{x^4 - 4x^3 + 4x + 20}$
(c) $f(x) = (x^3 - 4x + 5)^7$

6. (a)
$$f(x) = \frac{3x^2}{(x^2+5)^3}$$

(b) $f(x) = \sqrt{\frac{4x+1}{2x^2+1}}$
(c) $f(x) = \frac{x^2}{\sqrt[3]{x^2+1}}$

7. (a)
$$f(x) = 2x^3(x^5 - 4)^9$$

(b) $f(x) = (x^2 - 1)^3(x^2 - 2)^4$
(c) $f(x) = 3x^3\sqrt{2x^2 + 3}$

- 8. (a) Find the equation of the line tangent to the graph of $f(x) = \frac{x}{x-2}$ at x = 4.(b) Find the equation of the line tangent to the graph of $f(x) = \frac{2x-5}{2x-3}$ at x = 2.
- 9. (a) Find x-value(s) where the graph of $f(x) = (2x 9)(x^2 30)$ has horizontal tangent line. (b) Find x-value(s) where the graph of $f(x) = (x^2 + 3)(x^2 + 4x)$ has horizontal tangent line.
- 10. Consider the function $f(x) = \sqrt{(4x+1)}$: (a) Find the equation of the tangent line to the graph of f at x = 6.

 - (b) Find the value(s) of x where the tangent line is horizontal.