Math 1400  
Homework 4  
Due Feb 16

For problems 1, 2 and 3 use Quotient Rule:

1. Find the derivative for the following:
   (a) \( f(x) = \frac{x^2-7x+2}{x+3} \)
   (b) \( f(x) = \frac{3x+11}{(3x+8)^2} \)
   (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) \( y = \frac{6\sqrt{x}}{(x^2-3)} \)
   (c) \( y = \frac{x^3-3x^2+4}{2x^2+3x-2} \)

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

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

6. (a) \( f(x) = \frac{3x^2}{(x^2+5)^3} \)
   (b) \( f(x) = \sqrt[3]{\frac{1x+1}{2x^2+1}} \)
   (c) \( f(x) = \frac{x^2}{\sqrt{2x^2+1}} \)

7. (a) \( f(x) = 2x^3(x^5 - 4)^9 \)
   (b) \( f(x) = (x^2 - 1)^3(x^2 - 2)^4 \)
   (c) \( f(x) = 3x^3\sqrt[4]{2x^2 + 3} \)
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.