Math 2554 Quiz 5: $\oint 3.2 - 3.3$ **Name:** _____
due: Tues 17 Feb 2015

This quiz is due on Tuesday, February 17, 2015 at the beginning of your drill. You may use your brain, notes, book, other humans and any pet of your choice. Your solutions must be legible, in order, stapled, de-fringed, and with your name on the top right corner of the each page. If you fail to meet any of these requirements you will receive a zero. Each question is worth one point and is all or nothing.

1. $f(x) = 5x^3$

   Compute $f'(x)$, stating which rules you used in each step. *(Examples 2,3, and 4 in* $\oint 3.2$ *show how much work you should include in your answer.)*

2. $g(w) = 2w^3 + 3w + e^w$

   Compute $g'(w)$, stating which rules you used in each step.

3. $f(x) = \dfrac{x^2 - 7x - 8}{x + 1}$

   Find $f'(x)$, $f''(x)$, and $f^{(3)}(x)$, using any of the rules we've covered so far (up to $\oint 3.3$).

4. $f(t) = t^3 - 27t + 5$

   (a) Find the values of t for which the slope of the curve $y = f(t)$ is 0.

   (b) Find the values of t for which the slope of the curve $y = f(t)$ is 21.

5. (a) Find an equation of the line tangent to e^x at $x = \ln 3$. *Hint: Review your algebra for log and exponential functions.*

   (b) Using any method you like (computer, graphing calculator, etc.), draw a well-labeled graph showing e^x and the line from part (a) on the same axes.

6. (a) Find an equation of the line tangent to $f(x) = \dfrac{2x^2}{3x - 1}$ at $x = 1$.

   (b) Using any method you like, draw a well-labeled graph showing $f(x)$ and the line from part (a) on the same axes.

7. Give two ways to differentiate $f(x) = (x - 3)(x^2 + 4)$.

8. For the following questions, your answer should include units, and if it is a dollar amount, should be rounded to two decimal places. A \$200 investment in a savings account grows according to the formula

$$A(t) = 200e^{0.0398t}$$

where $t \geq 0$ is the number of years elapsed.

   (a) Find the balance of the account after 10 years.

   (b) How fast is the account growing at $t = 10$ years?

   (c) Use your answers to (a) and (b) to write the equation of the line tangent to the curve $y = A(t)$ at the point $(10, A(10))$.

9. $p(x) = \dfrac{4x^3 + 3x + 1}{2x^5}$

   Differentiate $p(x)$ using any of the methods we've covered through $\oint$ 3.3. Show your work.

10. $f(x) = xe^{2x}$

   (a) Find the values of x for which the slope of the curve $y = f(x)$ is 0.

   (b) Explain the meaning of your answer to part (a) in terms of the graph of f.