(Printed First Name) (Printed Last Name) $\binom{\text{XXX0000}}{\text{Net ID}}$ (First Letter of Last Name) $\binom{\text{001 – 502}}{\text{Section}}$

Take Home Quiz 1

Penalty

Instructions

1. Fill in the requested information on the line above.
2. This handout is due at the beginning of lecture on Tuesday (08-30-2016). **One point** penalty per minute late. Submit right away, don't wait for the end of class! THQ with missing name will receive **10 points** penalty.
3. This handout must be printed out and. You may print it single sided or double sided. Failing to print costs **10 points**.
4. This handout must be stapled. Failing to staple costs **10 points**.
5. Your work must be hand written *on this handout*.
6. You must *show all work*. You may receive zero or reduced points for insufficient work.
7. Your work must be *neatly organized and written*. You may receive zero or reduced points for sloppy work.
8. Only a **subset** of these questions will be graded. You will not be told which questions will be graded in advance.

Due Date: Tuesday, 08-30-2016

Problem 1 *For functions,*

$$f(x) = \frac{x}{x-2} + 5x \text{ and } g(x) = \sqrt{x+3}$$

find,

1. $(f+g)(x)$

2. $(f+g)(2)$

3. $(f-g)(x)$

4. $(f-g)(1)$

5. $(fg)(x)$

6. $(fg)(2)$

7. $\left(\frac{f}{g}\right)(x)$

8. $\left(\frac{f}{g}\right)(2)$

9. $\left(\frac{g}{f}\right)(x)$

10. $\left(\frac{g}{f}\right)(1)$

11. $(f \circ g)(x)$

12. $(f \circ g)(3)$

13. $(g \circ f)(x)$

14. $(g \circ f)(3)$

Problem 2 *For functions,*

$f(x) = e^{(2x+3)}$ *and* $g(x) = \ln(3x+5)$

1. $(f+g)(x)$

2. $(f+g)(0)$

3. $(f-g)(x)$

4. $(f-g)(0)$

5. $(fg)(x)$

6. $(fg)(1)$

7. $\left(\frac{f}{g}\right)(x)$

8. $\left(\frac{f}{g}\right)(0)$

9. $\left(\frac{g}{f}\right)(x)$

10. $\left(\frac{g}{f}\right)(0)$

11. $(f \circ g)(x)$

12. $(f \circ g)(1)$

13. $(g \circ f)(x)$

14. $(g \circ f)(1)$

Problem 3 *Use the properties of logarithms to expand each of the following function.*

$(a) f(x) = \ln\left(9x^7(x-2)^6\right)$

$(b) f(x) = \ln\left(3x(3x-4)^2 e^{6x^2}\right)$

$(c) f(x) = \ln\left(\dfrac{x^2(3x-5)}{3(2x+1)e^{7x}}\right)$

$(d) f(x) = \ln\left(\dfrac{5x^3\sqrt{2x+3}}{(4x+3)^5 e^{-3x}}\right)$

Problem 4 *Evaluate the limit for each of the following functions, if exist.*

(a) $\lim_{x\to 1} \dfrac{3x^2-5}{x^2-3x-4}$

(b) $\lim_{x\to 4} \dfrac{\sqrt{x}-3}{2x-8}$

(c) $\lim_{x\to 4} \dfrac{x^2-5x+4}{x^2-20}$

Problem 5 *Evaluate the limit for each of the following functions, if exist.*

(*a*) $\lim_{x\to 6} \dfrac{2x-12}{x^2-4x-12}$

(*b*) $\lim_{x\to 9} \dfrac{\sqrt{x}-3}{x^2-81}$

(*c*) $\lim_{x\to -2} \dfrac{x^2+3x+2}{x^2-4}$

Problem 6 *Evaluate the limit for each of the following functions, if exist.*

(*a*) $\lim_{x\to\infty} \dfrac{x^4 - 3x^2 + 3}{4x^3 + 2x + 1}$

(*b*) $\lim_{x\to\infty} \dfrac{2x^3 - 3x^2 + 13}{5x + 7x^2 - 9x^3}$

(*c*) $\lim_{x\to\infty} \dfrac{12x^3 - 2x + 3}{7x - 9x^6}$