Name: _____

Score: _____ /15

Homework 2 (Due Wed, May 14)

Math 1060Q – Summer 2014

Professor Hohn

Answer the following questions. Three questions will be chosen randomly to be graded.

1. Let
$$f(x) = \frac{x+2}{x-1}.$$

Evaluate and simplify the following expressions.

(a) $f\left(\dfrac{x}{3}\right)$

(b) $\dfrac{f(a+t) - f(a)}{t}$

2. Let f be defined by the following table.

x	$g(x)$
3	13
4	-5
6	$\dfrac{2}{7}$
8.4	-5

(a) What is the domain of f?

(b) What is the range of f?

(c) Find two different values of x such that $f(x) = -5$.

3. Show that the function f defined by $f(x) = mx + b$ is an odd function if and only if $b = 0$.

4. Let f and g be defined by the following table.

x	$f(x)$
1	4
2	1
3	2
4	2

x	$g(x)$
1	2
2	4
3	1
4	3

Evaluate the following expressions.

(a) $(f \circ g)(1)$

(b) $(g \circ f)(1)$

(c) $(f \circ f)(3)$

(d) $(g \circ g)(4)$

5. Suppose that
$$h(x) = \sqrt{\frac{1}{x^2 + 1}} + 2.$$

(a) If $f(x) = \sqrt{x}$, then find a function g such that $h = f \circ g$.

(b) If $f(x) = \sqrt{x + 2}$, then find a function g such that $h = f \circ g$.

6. Suppose
$$f(x) = \frac{x+2}{x-3}, \qquad g(x) = \frac{1}{x+1}.$$

(a) Find the formula for $f \circ g$, and simplify your results as much as possible.

(b) Find the formula for $g \circ f$, and simplify your results as much as possible.

7. Find a number b such that $f \circ g = g \circ f$, where $f(x) = 2x + b$ and $g(x) = 3x + 4$.