Name: _____

Score: _____ /15

Homework 3 (Due Thurs, May 15)

Math 1060Q – Summer 2014
Professor Hohn

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

1. Suppose $f(x) = 3x - 5$

    (a) Find the domain of f. Write your answer in interval notation.

    (b) Find a formula for f^{-1}.

(c) Check your solution by verifying $f \circ f^{-1} = I$ and $f^{-1} \circ f = I$.

(d) Find the range of f. Write your answer in interval notation.

(e) Find the domain of f^{-1}. Write your answer in interval notation.

(f) Find the range of f^{-1}. Write your answer in interval notation.

2. Suppose $f(x) = \dfrac{1}{4x - 5}$

    (a) Find the domain of f. Write your answer in interval notation.

    (b) Find a formula for f^{-1}.

(c) Check your solution by verifying $f \circ f^{-1} = I$ and $f^{-1} \circ f = I$.

(d) Find the range of f. Write your answer in interval notation.

(e) Find the domain of f^{-1}. Write your answer in interval notation.

(f) Find the range of f^{-1}. Write your answer in interval notation.

3. Suppose $f(x) = \dfrac{2x}{x+3}$

   (a) Find the domain of f. Write your answer in interval notation.

   (b) Find a formula for f^{-1}.

   (c) Find the range of f. Write your answer in interval notation.

   (d) Find the domain of f^{-1}. Write your answer in interval notation.

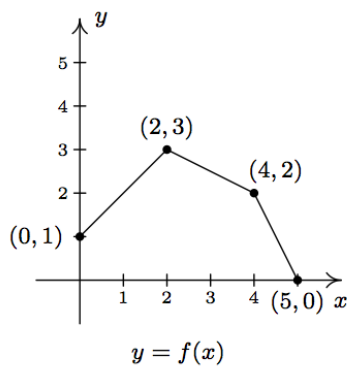   (e) Find the range of f^{-1}. Write your answer in interval notation.

4. Let $f(x) = \dfrac{10x}{x^2 + 1}$.

   (a) Find the domain of f. Write your answer using interval notation.

   (b) Find the x- and y-intercepts of the graph of $y = f(x)$.

   (c) Is f even, odd, or neither? Explain.

5. The complete graph of $y = f(x)$ is given below.

$$y = f(x)$$

Let $g(x) = 3 - f\left(\dfrac{1 - x}{2}\right)$. Sketch the graph of $y = g(x)$. From your graph, determine the domain and

range of g. List the intervals over which g is increasing and the intervals over which g is decreasing. List the local maximums and local minimums, if any.

6. Let $f(x) = x^2$. Find a formula for a function g whose graph is obtained from the graph of $y = f(x)$ after the following sequence of transformations:

   (a) Shift left 3 units.

   (b) Reflection across the y-axis.

   (c) Shift down 1 unit.

   (d) Vertical scaling by a factor of 2.

   (e) Reflection across the x-axis.

7. Suppose f and g are functions defined below.

x	$f(x)$
1	4
2	5
3	2
4	3

x	$g(x)$
2	3
3	2
4	4
5	1

(a) What is the domain of f?

(b) What is the range of f?

(c) Give the table of values for $g \circ f$.

(d) Give the table of values for f^{-1}.

(e) Give the table of values for g^{-1}.

(f) What is the domain of f^{-1}?

(g) What is the range of f^{-1}?

(h) Give the table of values for $g \circ g^{-1}$.

(i) Give the table of values for $(f \circ g)^{-1}$.

(j) Give the table of values for $f^{-1} \circ g^{-1}$.

8. Explain why an even function whose domain contains a nonzero number cannot be a one-to-one function.