Practice Problems - Exam 1 (Due Mon, May 19)

Math 1060Q – Summer 2014

Professor Hohn

1. Suppose f and g are the functions completely defined by the tables below:

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

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

Make a table of $f \circ g$ and a table of $g \circ f$.

2. Find the maximum value of $5 - 8x - 2x^2$.

3. Let $f(x) = \dfrac{7x+8}{x+4}$.

(a) Find the domain of f.

(b) Find the range of f.

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

(d) Find the domain of f^{-1}.

(e) Find the range of f^{-1}.

4. Write $\dfrac{27^{100}}{9^{45}}$ as a power of 3.

5. Give an example of a function that is neither even nor odd, and explain why it is neither.

6. Find a number t such that the line containing the points $(t, -5)$ and $(-3, 5)$ is perpendicular to the line that contains the points $(-5, 7)$ and $(1, 11)$.

7. Simplify the expression $\left(\dfrac{(t^3w^5)^{-3}}{(t^{-3}w^2)^4}\right)^{-2}$.

8. Suppose $g(x) = 3 + \dfrac{x}{5x - 2}$. Find the formula for g^{-1}.

9. What is the minimum value of the function f defined by $f(x) = 4x^2 - 8x + 11$? The graph of f is a parabola. Find the vertex of the parabola.

10. Let $f(-1) = 10$, $f(2) = 4$, and $f(3) = 2$. Make a table for $g(x)$ where $g(x) = 5f(3x + 2) - 1$. Find the domain and range of $g(x)$.

11. Show that for every real number t, the point $(5 - 3t, 7 - 4t)$ is on the line containing the points $(2, 3)$ and $(5, 7)$.

12. Simplify $\left(\frac{xy^{-3}}{x^5y^{-10}z^3}\right)^{-3}$.

13. Find all real numbers x such that $2x^4 - 20x^2 - 22 = 0$.

14. Find two positive numbers whose difference equals 4 and whose product equals 15.

15. Suppose f is a function with domain $[1, 3]$ and range $[2, 5]$. Define functions g and h by

$$g(x) = 4f(x) \quad \text{and} \quad h(x) = f(3x).$$

(a) What is the domain of g?

(b) What is the range of g?

(c) What is the domain of h?

(d) What is the range of h?

16. Fill in the blank.

(a) Let $f(x)$ be a function and x be in the domain of f. Then $f^{-1}(f(x)) =$_____.

(b) The equation of the graph $g(x)$ that is obtained by horizontally stretching the graph of $f(x)$ 5 units and by shifting down 7 units is _____.

(c) The degree of the polynomial $p(x) = 4 + 6x^5 + 3x^2$ is _____.

(d) The function $g(x) = 3x^3 + x$ is a function that is _____(even, odd, or neither).

(e) An example of a polynomial of degree four whose only zeros are -3, 4, and 1 is _____.