Test 3
Fall 2006
MATH 111 Section 04
October 26, 2006

Directions : You have 75 minutes to complete all 5 problems on this exam. There are a possible 100 points to be earned. You may not use your book, notes, or any graphing/programmable calculator. Please be sure to show all pertinent work. *An incorrect answer with no work will receive no credit!* If any portion of the exam is unclear please come to me and I will elaborate provided I can do so without giving away the problem.

1. (15 points)
   Determine the inverse of the function
   $$f(x) = (x^5 + 1)^7.$$

2. (15 points)
   Determine the inverse of the function
   $$g(x) = \frac{2x+3}{x+3}.$$

3. (20 points)

Use the theorem on inverse functions to prove that f and g are inverse functions of each other, and sketch the graphs of f and g on the same coordinate plane.
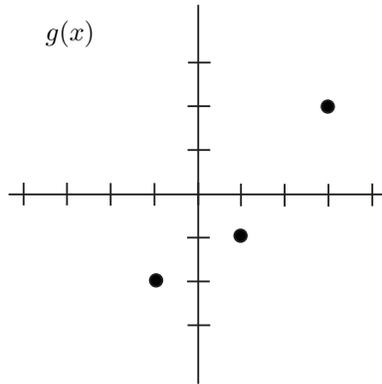
$$f(x) = -x^2 + 3, \ x \geq 0$$
$$g(x) = \sqrt{3 - x}, \ x \leq 3.$$

4. (20 points)

Let $h(x) = 2x + 3$. Use h, the table, and the graph to evaluate the expression $h^{-1} \circ g \circ h \circ g^{-1} \circ f^{-1}(-1)$.

x	-2	0	3	7
f(x)	-1	-2	1	2

$g(x)$

5. (15 points)
   Solve the equation

$$4^x \cdot \left(\frac{1}{2}\right)^{3-2x} = 8 \cdot (2^x)^2 .$$

6. (15 points)

    Sketch the graph of the function
    $$f(x) = 4\left(2^{x-3}\right) - 3$$