Math 1031 Practice Exam 3, Fall 2004 Name: ______________________________

YOUR TA's NAME: ______________________________

Math 1031 Practice Exam 3
December 2004

There are ten questions. Show your work in the space provided. You may not use your books or notes or a graphing calculator on this exam. You may use a regular scientific calculator.

1. For each of the following functions say whether it is even, odd, or neither even nor odd (circle one possibility).

   (a) $f(x) = |x|$ is even odd neither

   (b) $f(x) = x$ is even odd neither

   (c) $f(x) = \frac{1}{1+x^2}$ is even odd neither

   (d) $f(x) = \frac{x}{1+x^2}$ is even odd neither

   (e) $f(x) = \frac{1+x}{1+x^2}$ is even odd neither

2. Let $f(x) = \sqrt{x-1}$ and $g(x) = \frac{1}{1+x^2}$. Write down expressions in terms only of x for $(f \circ g)(x)$ and $(g \circ f)(x)$.

   Answer: $(f \circ g)(x) =$ ____________________, $(g \circ f)(x) =$ ____________________

3. Page 223 number 45.

4. Find the equation of the parabola which has x-intercepts $(1, 0)$ and $(3, 0)$ and whose vertex has y-coordinate 5.

5. Sketch the graph of the quadratic function $f(x) = 2x^2 + 4x - 7$. Identify the vertex and intercepts.

6. Find the domain of the function $\frac{1}{x-1} + \frac{1}{\sqrt{x+1}}$.

7. Let f and g be the functions defined in the picture which is question 1 on page 192 of LHH.
   (a) What is the range of g?
   (b) Sketch the graph of $f + g$.
   (c) Sketch the graph of the composite $g \circ f$.
   (d) What is the domain of $f \circ g$?
   (e) Sketch the graph of $g(x-1) + 3$.

8. Page 233 of LHH numbers 1-8: match the functions to the graphs.

9. In each part of this problem, find the inverse function $f^{-1}(x)$, or explain why no inverse function exists. Say also what the range of f is.
   (a) $f(x) = x(x-1)(x-2)$,
   (b) $f(x) = \frac{1}{1+x^3}$.

10. Consider the polynomial function $f(x) = x^3 + 2x^2 - 8x$.
   (a) Solve for x: $f(x) = 0$.
   (b) Describe the right- and left-hand behavior of the function f. (How do you know?)
   (c) How many turning points are there in the graph of f? (How do you know?)
   (d) Sketch the graph of f.