Name:

Homework for Worksheet 1 MATH 1300 Due Friday, January 18, 2008

1. The relationship we discovered in the worksheet between the slopes of secant lines to the graph of $f(x)$ and the graph of $f^{-1}(x)$, also holds for the slopes of lines tangent to the two graphs (we will prove this later). We know that the functions $y = x^2$ and $y = \sqrt{x}$ are inverses of one another on the interval $[0, +\infty)$. Using the fact that the slope of the tangent line to the parabola $y = x^2$ and the point $(3, 9)$ equals 6, find the equation of the tangent line to the graph of $y = \sqrt{x}$ at the point $(9, 3)$.

2. Consider the two algorithms:

Algorithm 1

Step 0 Take a real number x
Step 1 Square x
Step 2 Add 1 to the result of Step 1
Step 3 Take the positive square root of the result of Step 2
Step 4 . Add 2 to the result of Step 3

Algorithm 2

Step 0 Take any real number x
Step 1 Subtract 2 from x
Step 2 Square the result of Step 1
Step 3 Subtract 1 from the result of Step 2
Step 4 Take the positive square root of the result of Step 3

(a) Determine for which values of x these two algorithms *undo* each other.

Algorithm 1 followed by Algorithm 2.

Algorithm 2 followed by Algorithm 1.

(b) Express each of the above algorithms as a function of the form $y = g(x)$ and determine if they correspond to inverse functions for all, some, or no values of x.