Quiz 1   Name: _____

Math 1220–7

August 31, 2012

Directions: Show all work for full credit. Clearly indicate all answers. Simplify all mathe-
matical expressions completely. No calculators are allowed on this quiz. Each part of each
question is worth 10 points.

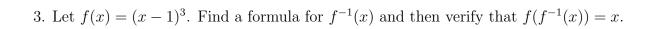1. Find the derivative of each of the following functions of x:

   (a) $z = x^2 \ln x^2 + \left(\ln x \right)^3$

   (b) $y = x^3 e^x$

2. Find each of the following integrals:

   (a) $\displaystyle \int \frac{x^4}{x^5 + \pi} \, dx$

   (b) $\displaystyle \int (x+3)e^{x^2+6x} \, dx$

3. Let $f(x) = (x - 1)^3$. Find a formula for $f^{-1}(x)$ and then verify that $f(f^{-1}(x)) = x$.

4. Let $f(x) = \ln(x^2 + 1)$. Identify the domain of the function, as well as where it is increasing and decreasing.