Quiz 7. Math 10-270. March 28, 2012.   Name

1. Let $f(x) = x^3$. Make use of the definition of the derivative to explain why the two terms
$(4 + 0.0001)^3 - 4^3$ and $3 \cdot 4^2(0.0001)$ are nearly equal to each other.

2. Let $y = f(x)$ be a function and let $[a, b]$ be a closed interval on the x-axis over which the function
is continuous. The definition of $\int_a^b f(x)\, dx$ (it is a number that depends on the function as well as a
and b) is the result of a process. Describe this process precisely and distinguish along the way between
the "working definition" of $\int_a^b f(x)\, dx$ and the true value of $\int_a^b f(x)\, dx$.

3. Explain what the Fundamental Theorem of Calculus says and use it to evaluate $\int_{-1}^{3} x^2 \, dx$.