Name: _____ **Quiz 5:** **Improper Integrals, Arc Length, Surface Area**

MAT 296 **Spring 2015**

Problem 1: Set up the integral for ***but do not evaluate*** the following:

(i) The length of the curve $x = \frac{2}{5}\sqrt{(y-1)^5}$ between $1 \leq y \leq 3$.

(ii) The surface area generated by $f(x) = 3 + \sin x$ between $0 \leq x \leq \pi$ rotated about the x-axis.

Problem 2: Determine if the following integral is convergent or divergent. If it converges, find the value.

$$\int_1^\infty \frac{1+\sin^2(x^3)}{\sqrt{x}}\,dx$$

Problem 3: Show whether this integral converges or diverges. If it converges, find the value.

$$\int_1^\infty \frac{dx}{2x^2 + x}$$

[Hint: Try using partial fractions. Be ***very*** careful evaluating this integral!]