MATH 116-023 QUIZ 5 / 14 Feb 2006 Name:_____

1. The integral $\int_0^1 \frac{\pi}{\sqrt{x}}\,dx$ gives the volume of the solid created when the curve $y = \frac{1}{\sqrt[4]{x}}$, for $0 < x \leq 1$, is rotated around the x-axis. Find analytically (by hand) the volume of this object. (3 points)

2. Have you passed the integral gateway? (Check one.) ☐ yes; ☐ no. If no, when will you be going to the lab to take it? _____. (1 point)

3. Carefully explain, without working out the integral, whether $\int_1^\infty \frac{e^x}{1+e^x}\,dx$ converges. (3 points)

4. An overly enthusiastic math professor moves along a path given by $x(t) = t\cos(t)$, $y(t) = t\sin(t)$. Is the professor ever at the point (1,0) (if so, when)? Is the professor's speed increasing or decreasing? At an increasing or decreasing rate? (3 points)