Math 20B Second Midterm 40 points November 15, 2004

- Print Name, ID number and Section on your blue book.
- BOOKS and CALCULATORS are NOT allowed. One sheet of NOTES is allowed.
- **You must show your work to receive credit.**

1. (5 points each) Consider the curve in the first quadrant (that is, $x \geq 0$ and $y \geq 0$) described by $x^4 + y^2 = 1$. Write down, but <u>*do not evaluate*</u> integrals for the following:

   (a) the length of the curve

   (b) the surface area when the curve is rotated about the x-axis.

2. (4 points each) An integral $I = \int_a^b f(x)\,dx$ was approximated using the Trapezoidal Rule with 25 intervals. The error was somehow estimated to be about 0.08. Answer the following. You do *not* need to give reasons.

   (a) What is a reasonable estimate for the error if we decide to use the Trapezoidal Rule with 100 intervals to approximate the integral I?

   (b) What is a reasonable estimate for the error if we decide to use the Midpoint Rule with 25 intervals to approximate the integral I?

3. (5 points each) The complex number z has absolute value 2 and argument $3\pi/4$. Do each of the following and do <u>*not*</u> leave trig functions in your answers.

   (a) Find the Cartesian form of z (that is, $x + iy$).

   (b) Find the polar form of all cube roots of z (that is, r and θ).

4. (6 points) Find $y(3)$, given that $y'(x) = 2xy$ and $y(0) = 2$.

5. (6 points) Evaluate $\displaystyle\int \frac{2x^2\,dx}{x^2 - 1}$.

END OF EXAM