MAT 254 – Fall Quarter 2002
Test 3

NAME_____

Show work and write clearly.

1. (20 pts.) Find the length of the curve $y = \ln(\sin x)$, $\dfrac{\pi}{6} \le x \le \dfrac{\pi}{3}$.

2. (20 pts.) Find the area of the surface of revolution obtained by rotating the curve $y = \dfrac{x^3}{6} + \dfrac{1}{2x}$, $1 \le x \le 2$ about the x-axis.

3. (20 pts.) Find the volume of the solid formed by revolving the region bounded by $x = \sqrt[3]{y}$ and $y = 8$, $x = 0$ about $x = 1$. Sketch the area.

4. (20 pts.) Solve the initial value problem: $y' + 2xy = 2x^3 y$, $y(0) = 3$.

5. (20 pts.) Solve the differential equation: $y'\sqrt{x}e^{y + \sqrt{x}} = -1$.