Name: ID #:   Section:

Exam II
Math 2423-010
October 27, 2008

Problem 1:   Problem 2:

Problem 3:   Problem 4:

Total:

1(a) Find the inverse function $f^{-1}(x)$ when $f(x) = \log_{10}(1 + \frac{1}{x})$.

(b) Find the domain of $f(x) = \ln(x^2 - 2x)$.

(c) Evaluate $\displaystyle\int_1^{e^3} \frac{(\ln x)^2}{x}\, dx$.

2. Find the volume of the solid generated when the region R bounded by $y = x^2$, $y = 0$, and $x = 2$ is rotated about the line $y = -1$, as follows.

(a) In the xy-plane, draw carefully the region R and the axis of rotation.

(b) Decide whether to use washers or shells, draw the typical washer or shell for this example, and find its area.

(c) Find the volume of the solid.

3(a) Find the average value of $f(x) = \sqrt{x}$ on the interval $[1, 4]$.

(b) Let S be the solid obtained by rotating the region shown about the x-axis. Set up, but do not evaluate, an integral representing the volume of S using disks. Why are disks preferable to shells in this case?

4(a) Use logarithmic differentiation to find $\frac{dy}{dx}$ where $y = \sqrt{x}e^{x^2}(x^2+1)^{10}$.

(b) Find the derivative of $F(t) = e^{t\sin(2t)}$.

Extra Credit Find the derivative of $y = e^{e^{e^{e^x}}}$.