HOMEWORK 8 - MATH 112
DUE DATE: Monday, April 4
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Use the midpoint rule with $n = 4$ to approximate the area of the region bounded by the graph of $f(x) = 2x - x^3$ and the x axis over the interval $[0, 1]$. Compare your result with the exact area.

2. Find the volume of the solid formed by revolving the region bounded by the graph(s) of the equations) about the x-axis:

   (a) $y = \frac{1}{x}, y = 0, x = 1, x = 3$

   (b) $y = e^x, y = 0, x = 0, x = 1$

3. Use the disk method to verify that the volume of a right circular cone is $\frac{1}{3}\pi r^2 h$, where r is the radius of the base and h is the height.

4. Find the indefinite integrals:

   (a) $\int \frac{2y^3}{y^4+1} dy$

   (b) $\int \frac{1}{\sqrt{5x+1}} dx$

   (c) $\int \frac{e^{\sqrt{x+1}}}{\sqrt{x+1}} dx$

   (d) $\int t e^{t^2+1} dx$

5. Evaluate the definite integrals:

   (a) $\int_0^2 e^{-2x} dx$

   (b) $\int_0^1 x(x+5)^4 dx$

6. Find the area of the region bounded by the graphs of the equations $y = x\sqrt[3]{1-x}, y = 0$ (see page 395 of your book for a sketch of this region).

7. Find the indefinite integrals:

   (a) $\int x e^{-x} dx$

   (b) $\int \ln(x^2) dx$

8. Evaluate the definite integrals:

   (a) $\int_0^2 \frac{x^2}{e^x} dx$

   (b) $\int_1^e x^5 \ln x\, dx$