HOMEWORK 7 - MATH 112 DUE DATE: Monday, November 14 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. Look at the graphs on page 353 of your book. Find the area of the region bounded by the x-axis and the graph of the function
 - (a) $f(x) = \frac{2}{\sqrt{x}}$ between x = 1 and x = 4.
 - (b) $f(x) = 2e^{x/2}$ between x = 0 and x = 1.
 - (c) $f(x) = \frac{x-2}{x}$ between x = 2 and x = 4.
- 2. Evaluate the definite integrals:
 - (a) $\int_{0}^{3} (3x^{2} + x 2)dx$ (b) $\int_{1}^{4} \sqrt{\frac{2}{x}}dx$ (c) $\int_{0}^{2} \frac{x}{\sqrt{1+2x^{2}}}dx$
- 3. Evaluate the definite integrals:
 - (a) $\int_{-1}^{1} (e^x e^{-x}) dx$ (b) $\int_{0}^{1} \frac{e^{2x}}{e^{2x} + 1} dx$
- 4. Look at the graphs on page 362 of your book. Find the area of the region shown:
 - (a) $f(x) = x^2 + 2x + 1$, g(x) = 2x + 5. (b) $f(x) = (x - 1)^3$, g(x) = x - 1.
 - (c) $f(x) = -x + 3, g(x) = \frac{2}{x}$.
- 5. Sketch the region whose area is represented by the definite integral:
 - (a) $\int_{-1}^{1} [(1-x^2) (x^2-1)] dx$ (b) $\int_{-2}^{3} [(y+6) - y^2] dy.$
- 6. Sketch the region bounded by the graphs of the functions and find the area of the region.

(a)
$$f(x) = \sqrt{3x} + 1, g(x) = x + 1$$

(b) $f(x) = \frac{1}{x}, g(x) = x^3, x = \frac{1}{2}, x = 1$

- 7. Look at the figure on page 369 of your book. Use the midpoint rule with n = 4 to approximate the area of the region under $f(x) = \frac{1}{x}$ from x = 1 to x = 5. Then compare this result with the exact area obtained with the definite integral.
- 8. Use the midpoint rule with n = 4 to approximate the area of the region bounded by the graph of f and the x-axis over the given interval:
 - (a) $f(x) = x^2 + 2$, [-1,1] (b) $f(x) = x^2 - x^3$, [0,1]