HOMEWORK 8 - MATH 112
DUE DATE: Tuesday, April 10
INSTRUCTOR: George Voutsadakis

Read each problem **very carefully** before starting to solve it. Four out of the eight problems will be chosen at random and graded. Each problem graded is worth 3 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Sketch the region whose area is represented by the definite integral and, then, use a geometric formula to evaluate it:
   (a) $\int_0^5 (x+1)dx$
   (b) $\int_{-3}^3 \sqrt{9-x^2}dx$
2. Find the area of the shaded region (look at page 353)
   (a) $y = 3e^{-x/2}$
   (b) $y = \frac{x^2+4}{x}$
3. Evaluate the definite integrals:
   (a) $\int_1^4 \frac{2x-1}{\sqrt{x}}dx$
   (b) $\int_0^2 \frac{x}{\sqrt{1+2x^2}}dx$
   (c) $\int_0^1 e^{2x}\sqrt{e^{2x}+1}dx$
   (d) $\int_0^2 \frac{x}{1+4x^2}dx$
4. Find the area of the shaded region (look at page 362)
   (a) $f(x) = x^2+2x+1$, $g(x) = 2x+5$
   (b) $f(x) = x^2-4x+3, g(x) = -x^2+2x+3$
   (c) $f(x) = -x+3, g(x) = \frac{2}{x}$
5. Sketch the region bounded by the graphs of the functions and find the area of the region:
   (a) $f(x) = \sqrt[3]{x}, g(x) = x$
   (b) $f(x) = 4-x^2, g(x) = x^2$
   (c) $y = \frac{1}{x}, y = x^3, x = \frac{1}{2}, x = 1$
6. 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.
7. Find the volume of the solid formed by revolving the region bounded by the graph(s) of the equation(s) about the x-axis.
   (a) $y = x^2+1, y = 5$
   (b) $y = \frac{1}{x}, y = 0, x = 1, x = 3$
   (c) $y = x^2, y = 4x - x^2$
8. 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.