

HOMEWORK 8 - MATH 112

DUE DATE: Monday, April 3

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. 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.