HOMEWORK 8 - MATH 112 DUE DATE: Monday, November 21 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. Find the volume of the solid formed by revolving the region bounded by the graphs of the given equations about the x-axis:

(a)
$$y = \sqrt{x} + 1, y = 0, x = 0, x = 9$$

- (b) $y = \frac{1}{x}, y = 0, x = 1, x = 3$
- 2. Use the disk method to verify the following:
 - (a) 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.
 - (b) The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.
- 3. Find the volume of the solid of revolution formed by revolving the region trapped between the graphs of $y = x^2$ and $y = x^3$ around the x-axis.
- 4. Use substitution to evaluate the following indefinite and definite integrals:

(a)
$$\int \frac{e^{3x}}{1-e^{3x}} dx$$

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

(c)
$$\int x^2 \sqrt[3]{x+1} dx$$

(d)
$$\int_2^4 \sqrt{4x+1} dx$$

(e)
$$\int_0^4 \frac{x}{(x+4)^2} dx$$

- 5. Look at the graphs on page 395 of your books.
 - (a) $y = -x\sqrt{x+2}, y = 0$
 - (b) $y = \frac{1}{1+\sqrt{x}}, y = 0, x = 0, x = 4$
- 6. Use integration by parts to compute the following integrals:
 - (a) $\int x e^{-x} dx$ (b) $\int x^2 e^x dx$
- 7. Use integration by parts to compute the following integrals:
 - (a) $\int \ln{(x^2)} dx$
 - (b) $\int x^{2005} \ln x dx$
- 8. Use partial fraction expansions to compute the integrals:

(a)
$$\int \frac{3}{x^2 + x - 2} dx$$

(b) $\int_0^1 \frac{3}{2x^2 + 5x + 2} dx$