## HOMEWORK 8 - MATH 112 DUE DATE: Monday, April 5 **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. ind the volume of the solid formed by revolving the region bounded by the graphs of the equations about the x axis:
  - (a)  $y = \sqrt{x}, y = 0$  and x = 4
  - (b)  $y = 2x^2, y = 0$  and x = 2
  - (c)  $y = x^2$  and  $y = 4x x^2$
- 2. Find the volume of the solid formed by revolving the region bounded by the graphs of the equations about the y-axis.
  - (a)  $y = \sqrt{16 x^2}, y = 0$  and  $0 \le x \le 4$

(b) 
$$x = y(y-1), x = 0$$

- 3. Use the Disk Method to verify that
  - (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 its height.
  - (b) the volume of a sphere of radius r is  $\frac{4}{3}\pi r^3$ .
- 4. Use integration by substitution to evaluate the indefinite integrals:
  - (a)  $\int \frac{4}{(1-t)^3} dt$
  - (b)  $\int \frac{2y^3}{y^4+1} dy$
  - (c)  $\int \frac{4e^{2x}}{1+e^{2x}} dx$
  - (d)  $\int \frac{e^{\sqrt{x+1}}}{\sqrt{x+1}} dx$

  - (e)  $\int te^{t^2+1}t$
  - (f)  $\int y^2 \sqrt[3]{y+1} dy$
- 5. Evaluate the definite integrals:
  - (a)  $\int_{2}^{4} \sqrt{4x+1} dx$
  - (b)  $\int_0^1 x(x+5)^4 dx$
- 6. (a) Find the area of the region bounded by  $y = \frac{1}{1+\sqrt{x}}$ , y = 0, x = 0 and x = 4.
  - (b) Find the volume of the solid generated by revolving the region bounded by the graph of  $y = x\sqrt{1-x^2}$  about the x-axis.

- 7. Use integration by parts to evaluate the indefinite integrals:
  - (a)  $\int x e^{-x} dx$
  - (b)  $\int x^2 e^{2x} dx$
  - (c)  $\int \ln{(x^2)} dx$
- 8. Use integration by parts to evaluate the definite integrals:

  - (a)  $\int_0^2 \frac{x^2}{e^x} dx$ (b)  $\int_0^1 \ln (1+2x) dx$