

Homework 2 MATH 242-011, Due Monday March 2

You are not suppose to use calculators. Show all your work. Write on one side of the paper.

- **PART I.** Areas between curves (Section 6.1)

1. Sketch the region enclosed by the given curves. Find the area of the region.

$$y = \sqrt{x}, \quad y = \frac{x}{2}, \quad x = 6.$$

2. Sketch the region enclosed by the given curves. Find the area of the region.

$$x = 1 - y^2, \quad x = y^2 - 1.$$

3. Find a number b such that the line $y = b$ divides the region bounded by curves $y = x^2$ and $y = 4$ into two regions with equal area.

- **PART II.** Volumes of solid of revolutions (Section 6.2)

Find the volum of the solid obtained by rotating the region bounded by the given curves about the specific line. Sketch the region.

1. $y = 1 - x^2$, $y = 0$, about the x -axis
2. $y = x^3$, $y = x$, $x \geq 0$, about the x -axis
3. $y = \ln x$, $y = 1$, $y = 2$, $x = 0$, about the y -axis
4. $x = 2\sqrt{y}$, $x = 0$, $y = 9$, about the y -axis
5. $y = e^{-x}$, $y = 1$, $x = 2$, about $y = 2$
6. $y = x^2$, $x = y^2$, about $x = -1$

- **PART III.** Volumes by Cylindrical Shells (Section 6.3)

From the text book do

Section 6.3 Exercises 1, 2, 5, 8, 17

- **PART IV.** Average of a Function (Section 6.3)

1. Find the average value of the function on the given interval
 - (a) $f(x) = 4x - x^2$, $[0, 4]$
 - (b) $f(t) = te^{-t^2}$, $[0, 5]$
 - (c) $h(u) = (3 - 2u)^{-1}$, $[-1, 1]$
2. Find the average value of f on the given interval. Find c such that $f_{ave} = f(c)$.
 - (a) $f(x) = (x - 2)^2$, $[2, 5]$
 - (b) $g(x) = \sqrt{x - 1}$, $[0, 4]$
3. Find the number b such that the average value of $f(x) = 2 + 6x - 3x^2$ on the interval $[0, b]$ is equal to 3.