

Midterm #1: Section 3

Full Name: Signature.....

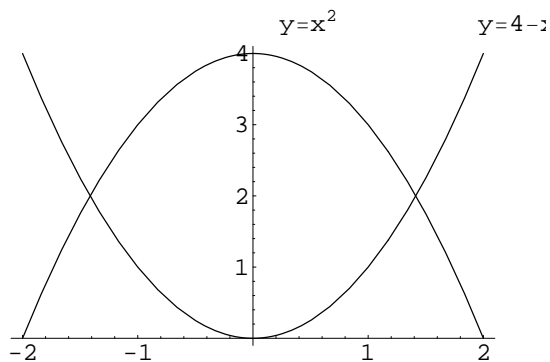
Note: You need to **SHOW** all your **WORK** in order to have full **CREDIT**.
The use of **CALCULATOR** is **prohibited** during the exam.

There are 8 problems on the Midterm.

Exercise 1. (25 points)

Find the volume of the solid obtained by rotating the region bounded by the curves

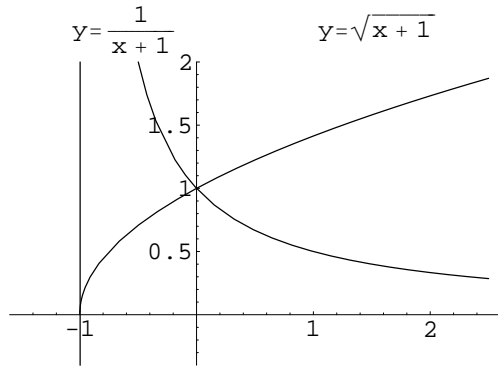
$$y = 4 - x^2, \quad y = x^2, \quad \text{about the } x\text{-axis}$$



Exercise 2. (25 points)

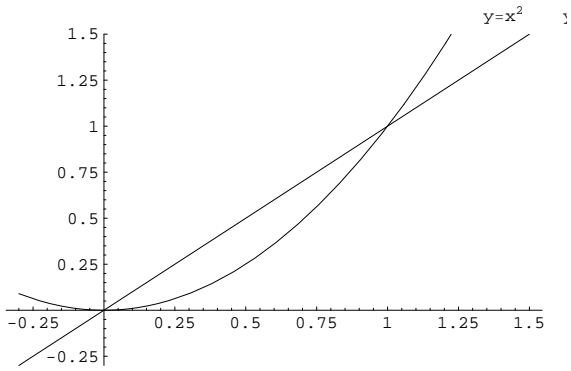
Find the area of the region bounded by the curves

$$y = \sqrt{x+1}, \quad y = \frac{1}{x+1}, \quad x = 0, \quad \text{and} \quad x = 1$$



Exercise 3. (30 points)

Find the volume of the solid obtained by rotating the region bounded by the curves $y = x^2$ and $y = x$ about the x -axis



Exercise 4. (20 points)

- Find the average value f_{ave} of the function $f(x) = \sqrt{x+2}$ in the interval $[2, 7]$

- Find c such that $f_{ave} = f(c)$

Exercise 5. (40 points)

Evaluate the integrals

1.

$$\mathbf{I} = \int \theta \sin 7\theta \, d\theta$$

2.

$$\mathbf{J} = \int \sec^2 \theta e^{\tan \theta} \, d\theta$$

Exercise 6. (40 points)

Evaluate the integrals

1.

$$\mathbf{K} = \int \cos^3 \theta \sqrt{\sin \theta} d\theta$$

2.

$$\mathbf{L} = \int \frac{x^5}{\sqrt{x^2 + 5}} dx$$

Exercise 7. (20 points)

Evaluate the integral

$$\mathbf{M} = \int_0^1 \frac{x+2}{(x+5)(x-1)} dx$$

Exercise 8. (*Bonus Problem*)

Evaluate the integral

$$\mathbf{B} = \int \frac{e^{4x}}{e^{4x} + 3e^{2x} + 2} dx$$