Written Homework #4

Due at start of class Monday, 12 February.

This Written Homework has problems from sections 7.2, 7.3, 7.4, and 7.5. It is also a "work sheet" to do during the recitation section on Tuesday 30 January. Please work on it with other students! The submitted version must be written by you. You must show your work for full credit.

1. Evaluate the integral:

$$\int_0^1 \sqrt{x - x^2} \, dx =$$

2. Find the volume obtained by rotating the region bounded by the curves about the given axis:

$$y = \sec x, \quad y = \cos x, \quad x = \pi/3, \quad \text{about } y = -1$$

3. Evaluate the integral:

$$\int \frac{dt}{t\sqrt{t^2 - 16}} =$$

4. A fuel storage tank has the shape of a cylinder with diameter 4 feet and length 6 feet. It is mounted so that the circular cross-sections are vertical. If the depth of fuel is 3 feet, what percentage of the total capacity is being used?

5. Evaluate the integral:

$$\int \frac{1}{(x+a)(x+b)}\, dx =$$

6. Evaluate the integral:

$$\int_1^2 \frac{x^3 + 4x^2 + x - 1}{x^3 + x^2}\, dx =$$

7. Evaluate the integral:

$$\int \frac{dx}{1 + e^x} =$$

8. Evaluate the integral:

$$\int \frac{x^5 + x - 1}{x^3 + 1} \, dx =$$