MATH 1132 – Calculus II February 14, 2019

Practice Exam 1

No calculators. Show your work. Clearly mark each answer.

1. (20 points) Find the area of the region enclosed by the curves

$$y = x^2 \quad \text{and} \quad y = x + 2.$$

Sketch the area.

2. (20 points) Find the volume of the solid obtained by rotating the region bounded by curves

$$y = e^x,\ x = 0,\ x = 1,\ y = 0,$$

about $y = -1$ line. Sketch the region.

3. (10 points) Using integration by part, evaluate the following integrals:

(a)

$$\int \ln^2 x \, dx$$

(b)

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

4. (10 points) Using a trigonometric substitution, evaluate the following integral:

$$\int \frac{1}{(16 + x^2)^{3/2}} \, dx$$

5. (10 points) Evaluate the following integral:

$$\int \sin^2(x) \sin(2x) \, dx$$

6. (20 points) Using partial fractions, evaluate the following integrals:

(a)

$$\int \frac{2}{x(x-2)(x+1)} \, dx$$

(b)

$$\int \frac{x}{(x+1)(x^2+4)} \, dx$$

7. (10 points) Evaluate the following improper integral

$$\int_1^\infty \frac{dx}{(x+1)^2}.$$