
SAMPLE EXAM I – MATH 136, SPRING 2008

- **Problem 1**

First make a substitution and then use integration by parts to evaluate the integral

$$\int_1^4 e^{\sqrt{x}} dx$$

- **Problem 2**

Evaluate the integral

$$\int \frac{\ln x}{x^2} dx$$

- **Problem 3**

Evaluate the integral

$$\int_0^1 x\sqrt{x^2 + 4} dx$$

- **Problem 4**

Evaluate the integral

$$\int \tan^2 x dx$$

- **Problem 5**

Write out the form of the partial fraction decomposition of the function which appears in the integral below. Do not determine the numerical values of the coefficients.

$$\int \frac{x^4}{x^4 - 1} dx.$$

Then evaluate this integral based on this decomposition.

- **Problem 6**

Evaluate the integral

$$\int_0^1 \frac{x - 1}{x^2 + 3x + 2} dx$$

- **Problem 7**

Determine which of the following integrals are improper and why?

$$(a) \int_1^3 \frac{1}{2x - 1} dx \quad (b) \int_{-\infty}^{\infty} \frac{\cos x}{1 + x^2} dx \quad (c) \int_0^{\pi} \frac{1}{\sin x} dx$$

- **Problem 8**

Evaluate the improper integral

$$\int_0^{\infty} \frac{1}{\sqrt{x}(1+x)} dx$$