

Math 1B Practice MT1

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The actual midterm will probably be about 5-6 problems, but these should give you an idea of the types of questions to expect.

1. Determine whether each improper integral is convergent or divergent. Evaluate the convergent ones:

(a) $\int_2^{\infty} \frac{x^2 + 1}{\sqrt[3]{x^7 - 2x^2}} dx$

(b) $\int_1^2 \frac{dx}{x(\ln x)^{1/3}}$

(c) $\int_{-1}^1 \frac{x + 2}{x^{1/5}} dx$

2. $\int \frac{1}{x^2 - x - 6} dx$

3. How many subintervals (ie, how big an n) do you need to ensure that approximating $\int_1^2 \ln x dx$ using the trapezoid rule will give an error of less than 10^{-5} ? Simplify as much as possible, but you don't need to come up with an actual number.

4. Determine whether each of the following are convergent or divergent. Do not attempt to evaluate the convergent ones:

(a) $\int_{-\infty}^0 e^{x^3} dx$

(b) $\int_0^1 \frac{e^x}{\sqrt{x}}$

5. $\int \frac{x^2}{(\sqrt{9 - x^2})^3} dx$

6. Find the surface area of the paraboloid you get by rotating $y = \frac{x^2}{2}$ about the x-axis for $0 \leq x \leq 1$

7. $\int \frac{1}{1 + \sin x} dx$

8. $\int \sqrt{x} \ln x dx$

*Adapted from past midterms from various professors