



Differential and Integral Calculus 1

MS-A0111

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NOTE¹

The due date is published on the course pages. Homework can be submitted only digitally. Instructions on labeling the answer sheets can be found on the course pages.

PROBLEM 1 Approximate the integral

$$\int_0^4 7x^3 + 5x^2 + 9x + 5 dx$$

Using a) Trapezoidal, b) Midpoint Rule, with $n = 5$ quadrature points. Estimate the errors and comment on their relative accuracy.

PROBLEM 2 Find the integral

$$\int \frac{1}{x^2 - 18x + 81} dx.$$

PROBLEM 3 Compute the definite integral

$$\int_1^e \frac{1}{x(x^9 + 1)} dx$$

using substitution $u = x^9$.

PROBLEM 4 Compute the definite integral using integration by parts

$$\int_0^{\pi/4} \sin^3(x) dx.$$

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PROBLEM 5 Find the integral

$$\int e^{5x} x \sin(2x) dx.$$