MT222: Calculus II

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03/21/2025

Prooblem 1

Use Midpoint Rule with the value $n = 5$ to approximate the integral (no need to simplify your answer):

$$\int_0^1 \sqrt{x+1}\, dx$$

Problem 2 (a)

Evaluate the integrals:

$$\int_0^1 (x^e + e^x)\, dx$$

Problem 2 (b)

Evaluate the integrals:

$$\int_{-2}^{1} \frac{1}{x^4}\, dx$$

Problem 2 (c)

Evaluate the integrals:

$$\int 4x^3 e^{x^4} \, dx$$

Problem 2 (d)

Evaluate the integrals:

$$\int_1^2 \frac{e^{1/x}}{x^2}\, dx$$

Problem 2 (e)

Evaluate the integrals:

$$\int \sin^3\theta \cos^4\theta \; d\theta$$

Problem 3

Sketch the region enclosed by the given curves, then find the area of the region.

$$y = \sin x,\ y = x,\ x = \pi/2,\ x = \pi.$$

Problem 4

Use the washer or cylindrical shell method to find the volume of the solid obtained by rotating the region bounded by the curves $y^2 = x$ and $x = 2y$ about the $y-$axis.

Problem 5

Find the average value of the following function on the interval $[-1, 1]$.

$$f(x) = \frac{x^2}{(x^3 + 3)^2}$$

Problem 6

Evaluate the following integral using integration by parts.

$$\int t^2 \sin \beta t \; dt,$$

where β is a constant.