Calculus II (MATH-M216) Fall Semester 2025

Midterm Exam

Instructions: Solve the following problems. Make sure to show your work in order to receive credit.

1. Evaluate the following integral: $\int_0^3 u^2 e^{3u}\ du$.
2. Evaluate the following integral: $\int \cos^4(3t)\sin^3(3t)\,dt$.
3. Evaluate the following integral: $\int \sqrt{25-x^2}\ dx$.
4. Evaluate the following integral: $\int \frac{8}{z^2-10z}\ dz$.
5. Evaluate the following integral: $\int_{-\infty}^{\infty} |x|\ e^{-x^2}\ dx$.
6. Determine the arc length of the curve given by the graph of

$$x(y) = (9-3y)^{2/3},\ where\ 0 \le y \le 3.$$

7. Find the equation of the tangent line to the curve with the parametrization

$$x(t) = t^2 + 4t - 3,\ y(t) = t^2 + 3t - 5$$

at the point (2, -1).

8. Solve the following differential equation:

$$x\,y(x)\,y'(x) = x^2 - 1.$$

Good Luck!