Fundamentals of Mathematics for Engineers Lab

ENGR 2194
Lab # 6 – Integrals in Engineering: Work and Stored Energy in a Spring
Real-World Example Related to Topic!

Many engineering disciplines (e.g., electrical, mechanical) commonly use:

- Integrals
- Area of a region
Today's Learning Objectives

- After today's lab, students will be able to:
  1. Understand that geometrically, an integral calculates area under a curve.
  2. Understand the work done on a spring.
Work and Spring Force

Work, $W$

$$W = \int_{0}^{x} F(x) \, dx$$

Spring force, $F(x)$

$$F(x) = kx$$
Lab Equipment

![Diagram of lab equipment with a spring and a box labeled 46 cm.](image)
Excel

- Cell referencing
- Graphing
Important Takeaways

- Essential to Engineers
  - Integrals
  - Area of a region
  - Data Analysis
    - Excel
Preview of Next Lab

- Excel Supplemental Instruction #2