

Instructions: You can work on the problems in any order. Please use just one side of each page and clearly number the problems. You do not need to write answers on the question sheet.

This exam is a tool to help me (and you) assess how well you are learning the course material. As such, you should report enough written detail for me to understand how you are thinking about each problem.

1. (a) State the definition of *the function f is integrable for the interval $[a, b]$* and *definite integral of f for $[a, b]$* (7 points)

(b) State the definition of *F is an antiderivative of f* . (7 points)

2. State the First Fundamental Theorem of Calculus. Include both the hypotheses and the conclusion. (10 points)

3. Use the definition of definite integral to compute the value of $\int_0^3 x^2 dx$. In other words, compute the value of this definite integral as the limit of a Riemann sum. (10 points)

4. For each of the following, evaluate the given indefinite integral. (8 points each)

(a) $\int (x + \cos x) dx$

(b) $\int (e^x + \sqrt{x}) dx$

5. For each of the following, evaluate the given definite integral. (10 points each)

(a) $\int_1^3 (x - x^2) dx$

(b) $\int_{-2\pi}^{2\pi} \cos x dx$