Math 3B - Summer Session B
Exam 1 Topics

Listed below are topics that may appear on Exam 1. Due to time constraints, not all topics may be tested.

1. Antiderivatives

2. Approximate the area under a curve using left and right endpoint Riemann sums
   Example: Use the right endpoint Riemann sum approximation with 4 subintervals to approximate the area under the curve $f(x) = x^2 + 2$ between $x = 1$ and $x = 3$

3. Find the area under the curve using the definition of the integral as a limit of a Riemann sum (no credit will be given for a direct computation of definite integrals using the FTC).
   Example: Find the area under the curve $f(x) = x^2 + 2$ between $x = 1$ and $x = 3$ using the following definition of the definite integral: $\int_a^b f(x) \, dx = \lim_{n \to \infty} \sum_{i=1}^{n} f(x_i) \Delta x$.

4. Fundamental Theorem of Calculus Part 1 and Part 2
   Examples: (a) Find $\frac{d}{dx} \int_1^e \sqrt{1-t^2} \, dt$  
   (b) Evaluate $\int_2^3 e^x - 3x^2 \, dx$

5. Definite and Indefinite Integrals (see examples from class).

6. Using the Net Change Theorem to find displacement of a particle and total distance traveled.
   Example: The velocity of a particle moving along a line is given by $v(t) = t^3 - 2t^2$ meters per second. (1) Find the displacement of the particle and (2) the total distance traveled by the particle during the time interval $0 \leq t \leq 3$.

7. Using U-substitutions to compute Definite and Indefinite Integrals (see examples from class).

8. Find the Area between two curves
   Example: Sketch the region enclosed by the curves $y = x^2$ and $y = \sqrt{x}$ and find the area of the region.