

MATH 213: MIDTERM1 (FALL 2005)

Name: _____

Section: _____ TA: _____

Score:

Problem 1. _____

Problem 2. _____

Problem 3. _____

Problem 4. _____

Problem 5. _____

Total: _____

Instruction: Show all work. No work = no credit, even if you have a correct answer. References and calculator are not allowed.

Problem 1 (20 points): Consider the definite integral $\int_0^3 (x^2 + 1)dx$.

(a) (10 points) Find its exact value by the fundamental theorem of calculus.

(b) (5 points) Approximate it by the midpoint sum with $n = 3$.

(c) (5 points) Approximate it by the trapezoidal rule with $n = 3$.

Problem 2 (10 points): Find the area between the x -axis and the graph of the function $y = x^3 - 1$ from $x = 0$ to $x = 2$.

Problem 3 (10 points): Using integration by parts or column integration to find $\int (3x + 2) \ln(5x) dx$.

Problem 4 (10 points): Find the average value of the function $f(x) = \frac{t^2+1}{t^3+3t+1}$ over the interval $[0, 2]$.

Problem 5 (20 points): Let $f(x) = 1000e^{0.2x}$ be the rate of flow of money in dollars per year. Assume a 10-year period of interest rate 10% compounded continuously. Compute the following: (You can leave the natural base e in your final answers.)

(a) The total money flow.

(b) The present value of the money flow.

(c) The accumulated amount of the money flow.