MAT132 Midterm I
Spring 2010

Print your name, ID number and section number on your answer sheet.

Do each of the following 6 problems. Show some work or give an explanation when you are asked to do so. It is not necessary to "simplify" your answers.

Please do not use calculators or any other electronic devices, notes or books during the exam time.

1. (30 points) Compute the following indefinite integrals.

   (a) $\int (x^2 + \frac{1}{(x+2)^3} - \sin(x))dx$

   (b) (show some work) $\int \cot(x)dx$

   (c) (show some work) $\int \sin^3(-2x)dx$

2. (20 points) Let R denote the region in the plane bounded by the 4 curves $x = -1$, $x = 1$, $y = 0$, and $y = \frac{x+1}{(x+2)(x+4)}$.

   (a) Express the area of R as a definite integral.

   (b) (show some work) Evaluate the definite integral of part (a).

3. (20 points) A particle is moving along the x-axis; its speed at any time $t \geq 0$ is given in terms of t by the formula $\frac{\ln(t+1)}{(t+1)^2}$.

   (a) Express the total distance traveled by the particle during the time interval $1 \leq t \leq 3$ as a definite integral.

   (b) (show some work) Evaluate the definite integral of part (a).

4. (30 points) For each of the following improper integrals, determine whether it converges or not. If the integral converges, then determine its value.

   (a) (show some work) $\int_0^\infty e^{-x}dx$

   (b) (show some work) $\int_{-1}^1 \frac{1}{(x-1)^2}dx$