MATH 141 – CALCULUS II
THIRD MIDTERM EXAM

Instructions. Answer each question on a separate answer sheet. Show all your work. Be sure your name, section number, and problem number are on each answer sheet, and that you have copied and signed the honor pledge on the first answer sheet. You may *not* use calculators, notes, or any other form of assistance on this exam.

(1) (20 pts) Evaluate the definite integral

$$\int_{3\sqrt{2}}^{6} \frac{dx}{x^2\sqrt{x^2-9}}$$

(2) (20 pts each) Evaluate the indefinite integrals

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

(b) $\displaystyle\int \frac{x+1}{x^3-2x^2+x}\,dx$

(3) (10 pts each) State whether the following improper integrals converge. If they converge, evaluate the integral. Justify your answers.

(a) $\displaystyle\int_0^{\infty} e^x \sin x\,dx$

(b) $\displaystyle\int_2^{\infty} \frac{dx}{x(\ln x)^3}\,dx$

(4) (10 pts each) Calculate the following limits:

(a) $\displaystyle\lim_{n\to\infty} \frac{5n^2+1}{4-2n-3n^2}$

(b) $\displaystyle\lim_{n\to\infty} \left(\sqrt{n^2+n+1}-n\right)$

Date: Apr 8, 2011.