Mini-test for Ch 8.4, 8.7 *Math 104, Spring 2009*

You must show your work. No credit is given if no supporting work is shown. No partial credit is given.

1. Calculate the indefinite integral

$$F(x) = \int \frac{x-1}{x^3+x^2}\,dx.$$

The solution is a function of the form

$$F(x) = A\ln|x| + B\ln|x+1| + \frac{C}{x} + \text{ constant term.}$$

What is the value of the coefficient A in this formula?

A.) $A = 0$ B.) $A = \frac{1}{2}$ C.) $A = -\frac{1}{2}$ D.) $A = 1$ E.) $A = -1$ F.) $A = 2$

2. Find the value of the definite integral

$$\int_0^{1/2} \frac{x^3 + x^2}{x - 1}\, dx.$$

A.) $\frac{25}{24} - \ln 2$ B.) $\frac{27}{24} - \ln 2$ C.) $\frac{31}{24} - \ln 2$ D.) $\frac{25}{24} - \ln 4$ E.) $\frac{27}{24} - \ln 4$ F.) $\frac{31}{24} - \ln 4$

3. Suppose that you wish to approximate the value of an integral $\int_a^b f(x)dx$ using Simpsons rule with n subintervals between a and b. By what factor does the upper bound of the error estimate of this approximation decrease if you then calculate a new approximation using $2n$ (twice as many) subintervals?

   A.) It stays the same B.) 2 C.) 4 D.) 6 E.) 8 F.) 16