Math 113-008, Exam 2
7-9 October 2010
D. G. Wright

Name _____
Row _____

1. (80%) Evaluate the following integrals. If an improper integral diverges, so state. Show your work.

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

   Answer: _____

   (b) $\displaystyle\int \sin 2x \sin 3x\,dx$

   Answer: _____

   (c) $\displaystyle\int_0^{\pi/4} \tan^2 x \sec^4 x\,dx$

   Answer: _____

   (d) $\displaystyle\int_0^2 \frac{x^2}{\sqrt{4-x^2}}\,dx$

   Answer: _____

(e) $\displaystyle\int_0^4 \sqrt{4x - x^2}\, dx$

Answer: _____

(f) $\displaystyle\int \frac{4x}{(x-1)^2(x+1)}\, dx$

Answer: _____

(g) $\displaystyle\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$

Answer: _____

(h) $\displaystyle\int_0^{\infty} \frac{\sqrt{x}}{1+x}\, dx$

Answer: _____

2. (6%) Use the integral definition of $\ln x$ from Appendix G and Simpson's Rule with $n = 4$ to approimate $\ln 5$. You do not need to simplify your expression for the answer.

3. (8%) Find the length of the curve $y = x^2 - \frac{1}{8}\ln x$ for $1 \leq x \leq 3$.

4. (6%) Write out the form of the partial fraction decomposition of the function

$$\frac{x^3 + x^2 + 1}{x(x-1)(x^2+x+1)(x^2+1)^2}$$

Do not evaluate the constants.