Practice Midterm Exam #2

1. Evaluate the integral

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

2. Evaluate the integral

$$\int \frac{x}{\sqrt{1+x}+\sqrt{x}} dx.$$

3. Determine whether each of the improper integrals is convergent or divergent. Evaluate the integrals which are convergent

(a) $\int_{-1}^{1} \frac{x+1}{\sqrt[3]{x^4}} dx.$

(b) $\int_{2}^{\infty} \frac{x}{x^2-1} dx.$

4. Determine how large must we choose n to evaluate $\int_0^{3/4} \ln(\cos x) dx$ with an error less than 0.0004 using midpoint approximation.

5. Find the arclength of the curve $y = \frac{x^3}{6} + \frac{1}{2x}$, $1 \leq x \leq 2$.