Math 173 Spring 2008 Ch 8 Handout

Here are some integrals to practice on. Before computing any of the integrals, decide which methods will be used: substitution, integration by parts, partial fractions, trig substitution.

Compute the following integrals. If the integral is improper, determine whether it converges or diverges. If an improper integral converges, find its value.

1. $\int_0^1 x^3(x^4-1)^5\,dx$

2. $\int \frac{2}{\sqrt{9-4x^2}}\,dx$

3. $\int \frac{x}{9-4x^2}\,dx$

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

5. $\int_0^1 x^2 e^{2x}dx$

6. $\int_0^{\pi/2} e^{\cos x}\sin x\,dx$

7. $\int_{1/2}^1 \cos(\pi x)\sin^3(\pi x)\,dx$

8. $\int \frac{1+\sqrt{t}}{\sqrt{t}}\,dt$

9. $\int xe^{-4x}dx$

10. $\int_0^\infty xe^{-4x}\,dx$

11. $\int_0^e \frac{\ln x}{x}\,dx$

12. $\int_0^{\pi/4} \cos 2x\sqrt{\sin 2x}\ dx$

13. Prove the formula $\int \tan x\ dx = -\ln|\cos x| + C$. Hint: $\tan x = \dfrac{\sin x}{\cos x}$

14. Find the area of the region bounded by the curve $y = \dfrac{x}{x^2 - 1}$ and the x-axis between $x = 0$ and $x = \dfrac{1}{2}$ using three different methods: substitution, partial fractions, and trig substitution.