Math 1B

Chapter 7 Pre-Test (Sec. 7.1 - 7.5)

Name _____

Note: The integrals presented here are for good practice on the variety of techniques of integration. It does not mean that other related types of problems are excluded from being on the test.

Integrals to be familiar with, but not required for memorization:

$\int \tan x \, dx = \ln|\sec x| + C$

$\int \cot x \, dx = \ln|\sin x| + C$

$\int \sec x \, dx = \ln|\sec x + \tan x| + C$

$\int \csc x \, dx = \ln|\csc x - \cot x| + C$

$\int \frac{1}{x^2 + a^2} \, dx = \frac{1}{a} \tan^{-1}\frac{x}{a} + C$

Evaluate each using integration by parts.

1. $\int x^2 e^x \, dx$

2. $\int x^{-3} \ln x \, dx$

3. $\int e^{-x} \sin x \, dx$

Evaluate each trigonometric integral.

4. $\int (\sec x + \tan x)^2 \, dx$

5. $\int \cos^3 x \, dx$

6. $\int \sec^4 x \, dx$

Evaluate each using trigonometric substitution.

7. $\int \frac{1}{x^2\sqrt{4 - x^2}} \, dx$

8. $\int \frac{\sqrt{x^2 - 1}}{x} \, dx$

Find the partial fraction decomposition of each.

9. $\frac{2 - x}{x^3 + x^2}$

10. $\frac{3x + 7}{x^3 - x^2 + 4x - 4}$

The partial fraction decomposition of $\frac{x+4}{x^3+4x}$ is $\frac{1}{x} + \frac{-x+1}{x^2+4}$ Use this to evaluate the following integral

11. $\int \frac{x+4}{x^3+4x}\,dx$

Here is #49 (altered slightly) from the Table of Integrals. Use a technique of integration to show that this is true.

12. $\int \frac{dx}{x(nx+k)} = \frac{1}{k}\ln\left|\frac{x}{nx+k}\right| + C$

Evaluate each using a familiar but unusual technique of integration.

13. $\int \frac{1}{2-\sqrt{x}}\,dx$