Math 230 **EXAM 2 REVIEW** **Spring 2003**

Basic trig identities will be the only formulas provided for you. Definite integrals must be completely evaluated for full credit.

L'Hospital's Rule: know when to apply it and in order to receive full credit, all verification of conditions must be shown. You must also be able to state the conditions necessary for application of the rule.

Examples:

$$\lim_{x\to 0}\frac{x+\tan 2x}{x-\tan 2x} \qquad \lim_{x\to\infty}\frac{(\ln x)^3}{x^2} \qquad \lim_{x\to 0}\frac{\sin x}{x^3}$$

$$\lim_{x\to 0}\frac{\sin x}{e^x} \qquad \lim_{x\to\infty}\frac{\ln x}{x} \qquad \lim_{x\to 0}\frac{e^x-1}{\sin x}$$

Inverse Trig Functions: No integral or differentiation formulas will be provided to you.

$$\int_0^{1/2}\frac{dx}{\sqrt{1-x^2}} \qquad \int\frac{x+9}{x^2+9}dx \qquad \int\frac{\tan^{-1}x}{1+x^2}dx$$

$$\int_1^{\sqrt{3}}\frac{6}{1+x^2}dx \qquad \int\frac{e^{2x}}{\sqrt{1-e^{4x}}}dx \qquad \int\frac{e^x}{e^{2x}+1}dx$$

Integration by parts: $\int udv = uv - \int vdu$

$$\int e^{-x}x^3dx \qquad \int x\cos xdx \qquad \int x5^xdx$$

$$\int_{x^3}^{\tan^{-1}x}dx \qquad \int(\ln x)^2dx \qquad \int x^5e^{x^2}dx$$

Trigonometric Integrals:

$$\int_0^{\pi/2}\cos^2 xdx \qquad \int\tan^4 xdx \qquad \int_0^{\pi/4}\sec^6 xdx$$

$$\int\sin^6 x\cos^3 xdx \qquad \int\cos^4 xdx \qquad \int\frac{\sec^2 x}{\cot x}dx$$

Trig substitution:

$$\int_0^3\frac{dx}{\sqrt{9+x^2}} \qquad \int_0^1\sqrt{x^2+1}dx \qquad \int\frac{dx}{\sqrt{x^2-6x+13}}$$

$$\int\frac{dx}{\sqrt{9x^2+6x-8}} \qquad \int e^t\sqrt{9-e^{2t}}dt \qquad \int\sqrt{e^{2t}-9}dt$$

$$\int_0^3 x\sqrt{9-x^2}dx$$

Partial fractions: you will be asked to express a complicated rational function in partial fraction terms without solving for the constants or evaluating the integral. You will also be asked to solve one completely.

Express the following in a partial fraction decomposition without solving for the terms.

1. $\dfrac{4x^2-2x+9}{x^3(x+1)^2(x-1)(x^2+2)(x^2+3)^3}$

2. $\dfrac{6x^2-x+13}{x^2(x-1)(x+3)^2(x^2+7)(x^2+x+1)^3}$

Solve the following completely:

$$\int\frac{x^3+x^2-12x+1}{x^2+x-12}dx \qquad \int\frac{x^3-2x^2+x+1}{x^4+5x^2+4}dx$$

$$\int\frac{1}{x^3+x^2-2x}dx \qquad \int\frac{x^2+1}{x^2-x}dx$$