THINGS TO KNOW FOR THE MATH-125 FINAL EXAM
on Monday, December 13, 1999 at 5:00pm

1. DERIVATIVES OF ELEMENTARY FUNCTIONS

The following are the formulas for derivatives of elementary functions that you should know for the Final Exam.

1.1: Power Functions.

$$\frac{d}{dx}u^p = p\,u^{p-1}\frac{du}{dx}$$

1.2: Exponential Functions.

$$\frac{d}{dx}e^u = e^u\frac{du}{dx} \qquad\qquad \frac{d}{dx}a^u = \ln(a)\,a^u\frac{du}{dx}$$

1.3: Logarithmic Functions.

$$\frac{d}{dx}\ln(u) = \frac{1}{u}\,\frac{du}{dx} \qquad\qquad \frac{d}{dx}\log_a(u) = \frac{1}{\ln(a)}\,\frac{1}{u}\,\frac{du}{dx}$$

1.4: Trigonometric Functions.

$$\frac{d}{dx}\sin(u) = \cos(u)\frac{du}{dx} \qquad\qquad \frac{d}{dx}\cos(u) = -\sin(u)\frac{du}{dx}$$

$$\frac{d}{dx}\tan(u) = \sec^2(u)\frac{du}{dx} \qquad \text{or} \qquad \frac{d}{dx}\tan(u) = \frac{1}{\cos^2(u)}\frac{du}{dx}$$

1.5: Hyperbolic Functions.

$$\frac{d}{dx}\sinh(u) = \cosh(u)\frac{du}{dx} \qquad\qquad \frac{d}{dx}\cosh(u) = \sinh(u)\frac{du}{dx}$$

$$\frac{d}{dx}\tanh(u) = \operatorname{sech}^2(u)\frac{du}{dx} \qquad \text{or} \qquad \frac{d}{dx}\tanh(u) = \frac{1}{\cosh^2(u)}\frac{du}{dx}$$

1.6: Inverse Trigonometric Functions.

$$\frac{d}{dx}\sin^{-1}(u) = \frac{1}{\sqrt{1-u^2}}\frac{du}{dx} \qquad\qquad \frac{d}{dx}\tan^{-1}(u) = \frac{1}{1+u^2}\frac{du}{dx}$$

2. INDEFINITE INTEGRALS WITH ELEMENTARY FORMS

The following are the formulas for indefinite integrals with elementary forms that you should know for the Final Exam.

2.1: Power Functions.

$$\int u^p\,du = \begin{cases} \dfrac{1}{p+1}u^{p+1} + C & \text{for } p \neq -1 \\ \ln(|u|) + C & \text{for } p = -1 \end{cases}$$

2.2: Exponential Functions.

$$\int e^u\,du = e^u + C \qquad \int a^u\,du = \frac{1}{\ln(a)}\,a^u + C$$

2.3: Trigonometric Functions.

$$\int \cos(u)\,du = \sin(u) + C \qquad \int \sin(u)\,du = -\cos(u) + C$$

$$\int \sec^2(u)\,du = \tan(u) + C \qquad \int \frac{1}{\cos^2(u)}\,du = \tan(u) + C$$

2.4: Hyperbolic Functions.

$$\int \cosh(u)\,du = \sinh(u) + C \qquad \int \sinh(u)\,du = \cosh(u) + C$$

$$\int \operatorname{sech}^2(u)\,du = \tanh(u) + C \qquad \int \frac{1}{\cosh^2(u)}\,du = \tanh(u) + C$$

2.5: Algebraic Functions.

$$\int \frac{1}{\sqrt{1-u^2}}\,du = \sin^{-1}(u) + C \qquad \int \frac{1}{1+u^2}\,du = \tan^{-1}(u) + C$$

3. CALCULATORS

Be sure the program ‘ALLSUMS’ is working on your calculator, and that you know how to use it. Also be sure your calculator is functional for the Final Exam. CHECK THAT THE BATTERIES ARE NOT LOW!