## Math 106-350/550 - Analytic Geometry & Calculus I

1st Semester, '06-'07

Summary of Differentiation Rules (up to first test)

General Rules k is a constant, u, v functions of x.

- (1) If k is a constant, then  $\frac{d}{dx}k = 0$ .
- (2) If n is a real number, then  $\frac{dx^n}{dx} = nx^{n-1}$ .
- (3)  $\frac{d(ku)}{dx} = k\frac{du}{dx}.$
- $(4) \frac{d(u+v)}{dx} = \frac{du}{dx} + \frac{dv}{dx}.$
- (5) (Product rule)  $\frac{d(u \cdot v)}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$ .
- (6) (Quotient rule)  $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} u\frac{dv}{dx}}{v^2}$ .

Specific Functions

- For a constant,  $\frac{da^x}{dx} = \ln a \cdot a^x$ . In particular  $\frac{de^x}{dx} = e^x$ .
- $\frac{d}{dx}\sin x = \cos x$ ,  $\frac{d}{dx}\cos x = -\sin x$ .
- $\frac{d}{dx}\tan x = \sec^2 x$ ,  $\frac{d}{dx}\cot x = -\csc^2 x$ ,  $\frac{d}{dx}\sec x = \sec x \tan x$ ,  $\frac{d}{dx}\csc x = -\csc x \cot x$ .