SUMMARY OF DIFFERENTIABLE FORMULAS

Trigonometric Functions

$$\frac{d\,(\cos u)}{dx} = -\sin u \cdot \frac{du}{dx}$$
$$\frac{d\,(\sin u)}{dx} = \cos u \cdot \frac{du}{dx}$$
$$\frac{d\,(\tan u)}{dx} = sec^2\, u \cdot \frac{du}{dx}$$
$$\frac{d\,(\cot u)}{dx} = -csc^2\, u \cdot \frac{du}{dx}$$
$$\frac{d\,(\sec u)}{dx} = \sec u \tan u \cdot \frac{du}{dx}$$
$$\frac{d\,(\csc u)}{dx} = -\csc u \cot u \cdot \frac{du}{dx}$$

Inverse Trigonometric Functions

$$\frac{d\,(\text{Arc}\cos u)}{dx} = \frac{-1}{\sqrt{1-u^2}} \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{Arc}\sin u)}{dx} = \frac{1}{\sqrt{1-u^2}} \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{Arc}\tan u)}{dx} = \frac{1}{1+u^2} \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{Arc}\cot u)}{dx} = \frac{-1}{\sqrt{1-u^2}} \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{Arc}\sec u)}{dx} = \frac{1}{u\sqrt{u^2-1}} \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{Arc}\csc u)}{dx} = \frac{-1}{u\sqrt{u^2-1}} \cdot \frac{du}{dx}$$

Logarithmic Functions

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

Exponential Functions

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

Hyperbolic Functions

$$\frac{d\,(\cosh u)}{dx} = \sinh u \cdot \frac{du}{dx}$$
$$\frac{d\,(\sinh u)}{dx} = \cosh u \cdot \frac{du}{dx}$$
$$\frac{d\,(\tanh u)}{dx} = sech^2\, u \cdot \frac{du}{dx}$$
$$\frac{d\,(\coth u)}{dx} = -csch^2\, u \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{sech}\, u)}{dx} = -\text{sech}\, u \tanh u \cdot \frac{du}{dx}$$
$$\frac{d\,(\text{csch}\, u)}{dx} = -\text{csch}\, u \coth u \cdot \frac{du}{dx}$$

SUMMARY OF INTEGRATION FORMULAS

Integrals yielding Trigonometric Functions

$$\int \cos u\, du = \sin u + C$$
$$\int \sin u\, du = -\cos u + C$$
$$\int sec^2\, u\, du = \tan u + C$$
$$\int csc^2\, u\, du = -\cot u + C$$
$$\int \sec u \tan u\ du = \sec u + C$$
$$\int \csc u \cot u\ du = -\csc u + C$$

Inverse Trigonometric Functions

$$\int \frac{1}{\sqrt{a^2-u^2}} du = Arc\, sin\left(\frac{u}{a}\right) + C$$
$$\int \frac{1}{a^2+u^2} du = \frac{1}{a} Arc\, tan\left(\frac{u}{a}\right) + C$$
$$\int \frac{1}{u\sqrt{u^2-a^2}} du = \frac{1}{a} Arc\, sec\left(\frac{u}{a}\right) + C$$

Logarithmic Functions

$$\int \frac{1}{u} du = \ln|u| + C$$
$$\int \tan u\, du = \ln|\sec u| + C$$
$$\int \cot u\, du = \ln|\sin u| + C$$
$$\int \sec u\, du = \ln|\sec u + \tan u| + C$$
$$\int \csc u\, du = \ln|\csc u - \cot u| + C$$

Exponential Functions

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

Hyperbolic Functions

$$\int \cosh u\, du = \sinh u + C$$
$$\int \sinh u\, du = \cosh u + C$$
$$\int sech^2\, u\, du = \tanh u + C$$
$$\int csch^2\, u\, du = -\coth u + C$$
$$\int \text{sech}\, u \tanh u\ du = -\text{sech}\, u + C$$
$$\int \text{csch}\, u \coth u\ du = -\text{csch}\, u + C$$