Calculus III Formula Sheet

Here are some potentially useful formulas.

$$\frac{d}{dx}[\sinh x] = \cosh x \qquad \frac{d}{dx}[\cosh x] = \sinh x$$

$$\frac{d}{dx}[\tanh x] = \operatorname{sech}^2 x \qquad \frac{d}{dx}[\operatorname{sech} x] = -\operatorname{sech} x \tanh x$$

$$\frac{d}{dx}[\arcsin x] = \frac{1}{\sqrt{1-x^2}} \qquad \frac{d}{dx}[\arccos x] = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}[\arctan x] = \frac{1}{1+x^2} \qquad \frac{d}{dx}[\operatorname{arcsec} x] = \frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}[\sinh^{-1} x] = \frac{1}{\sqrt{1+x^2}} \qquad \frac{d}{dx}[\cosh^{-1} x] = \frac{1}{\sqrt{x^2-1}}$$

$$\frac{d}{dx}[\tanh^{-1} x] = \frac{1}{1-x^2} \qquad \frac{d}{dx}[\operatorname{sech}^{-1} x] = \frac{-1}{x\sqrt{1-x^2}}$$

$$\frac{d}{dx}[b^x] = b^x \ln b \qquad \log_b(x) = \frac{1}{x \ln b}$$

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

$$\int \sinh u \; du = \cosh u + C \qquad \int \cosh u \; du = \sinh u + C$$

$$\int \operatorname{sech}^2 u \; du = \tanh u + C \qquad \int \operatorname{sech} u \tanh u \; du = -\operatorname{sech} u + C$$

$$\int \frac{1}{\sqrt{a^2-u^2}} \; du = \arcsin\frac{u}{a} + C \qquad \int \frac{1}{u^2+a^2} \; du = \frac{1}{a}\arctan\frac{u}{a} + C$$

$$\int \frac{1}{u\sqrt{u^2-a^2}} \; du = \frac{1}{a}\operatorname{arcsec}\frac{u}{a} + C \qquad \int \frac{1}{\sqrt{u^2+a^2}} \; du = \sinh^{-1}\frac{u}{a} + C$$

$$\int \frac{1}{\sqrt{u^2-a^2}} \; du = \cosh^{-1}\frac{u}{a} + C \qquad \int \frac{1}{a^2-u^2} \; du = \frac{1}{a}\tanh^{-1}\frac{u}{a} + C$$

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