

Calc II Midterm 2 Cheat Sheet

Inverse Trig Derivatives

$$D_x(\sin^{-1}(x/a)) = \frac{1}{\sqrt{a^2 - x^2}}$$

$$D_x\left(\frac{1}{a} \tan^{-1}(x/a)\right) = \frac{1}{a^2 + x^2}$$

$$D_x\left(\frac{1}{a} \sec^{-1}(|x|/a)\right) = \frac{1}{x\sqrt{x^2 - a^2}}$$

Inverse Hyperbolic Derivatives

$$D_x(\sinh^{-1}(x/a)) = \frac{1}{\sqrt{a^2 + x^2}}$$

$$D_x(\cosh^{-1}(x/a)) = \frac{1}{\sqrt{x^2 - a^2}}$$

$$D_x\left(\frac{1}{a} \tanh^{-1}(x/a)\right) = \frac{1}{a^2 - x^2}$$

Sum and Difference Formulas

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \sin \beta \cos \alpha$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$$

Product-to-Sum Formulas

$$\sin mx \cos nx = \frac{1}{2} [\sin(m+n)x + \sin(m-n)x]$$

$$\sin mx \sin nx = \frac{1}{2} [\cos(m+n)x - \cos(m-n)x]$$

$$\cos mx \cos nx = \frac{1}{2} [\cos(m+n)x + \cos(m-n)x]$$

Half-Angle Formulas

$$\sin(x) = \sqrt{\frac{1 - \cos(2x)}{2}}$$

$$\cos(x) = \sqrt{\frac{1 + \cos(2x)}{2}}$$

Double Angle Formulas

$$\sin(2\alpha) = 2 \sin \alpha \cos \alpha$$

$$\cos(2\alpha) = \cos^2 \alpha - \sin^2 \alpha$$

Other Useful Things

$$\int \sec u \, du = \ln |\sec u + \tan u| + C$$