

(Chapter 5,6) Derivative & Integral Rules Reference Sheet

Derivative Rules:

Power Rule:

$$\frac{d}{dx} x^n = nx^{n-1}$$

Trig Derivatives:

$$\frac{d}{dx} \sin u = \cos u * u'$$

$$\frac{d}{dx} \cos u = -\sin u * u'$$

$$\frac{d}{dx} \tan u = \sec^2 u * u'$$

$$\frac{d}{dx} \cot u = -\csc^2 u * u'$$

$$\frac{d}{dx} \sec u = \sec u \tan u * u'$$

$$\frac{d}{dx} \csc u = -\csc u \cot u * u'$$

$$\frac{d}{dx} e^u = e^u * u'$$

$$\frac{d}{dx} \ln u = \frac{u'}{u}$$

$$\frac{d}{dx} a^u = \ln a * a^u * u'$$

$$\frac{d}{dx} \log_a u = \frac{1}{\ln a} * \frac{u'}{u}$$

Integral Rules:

Power Rule:

$$\int u^n du = \frac{u^{n+1}}{n+1} + C$$

Trig Integrals:

$$\int \sin u du = -\cos u + C$$

$$\int \cos u du = \sin u + C$$

$$\int \sec^2 u du = \tan u + C$$

$$\int \sec u \tan u du = \sec u + C$$

$$\int \csc^2 u du = -\cot u + C$$

$$\int \csc u \cot u du = -\csc u + C$$

$$\int \frac{1}{u} du = \ln|u| + C$$

$$\int e^u du = e^u + C$$

$$\int a^u du = \left(\frac{1}{\ln a} \right) a^u + C$$

More Trig Integral Rules:

$$\int \tan u du = -\ln|\cos u| + C$$

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

$$\int \cot u du = \ln|\sin u| + C$$

$$\int \csc u du = -\ln|\csc u + \cot u| + C$$

Arc-Trig Integral Rules

$$17. \int \frac{du}{a^2 + u^2} = \frac{1}{a} \arctan \frac{u}{a} + C$$

$$16. \int \frac{du}{\sqrt{a^2 - u^2}} = \arcsin \frac{u}{a} + C$$

$$18. \int \frac{du}{u \sqrt{u^2 - a^2}} = \frac{1}{a} \operatorname{arcsec} \frac{|u|}{a} + C$$

Arc-Trig derivative Rules

$$19. \frac{d}{dx} [\arcsin u] = \frac{u'}{\sqrt{1-u^2}}$$

$$20. \frac{d}{dx} [\arccos u] = \frac{-u'}{\sqrt{1-u^2}}$$

$$21. \frac{d}{dx} [\arctan u] = \frac{u'}{1+u^2}$$

$$22. \frac{d}{dx} [\operatorname{arccot} u] = \frac{-u'}{1+u^2}$$

$$23. \frac{d}{dx} [\operatorname{arcsec} u] = \frac{u'}{|u| \sqrt{u^2 - 1}}$$

$$24. \frac{d}{dx} [\operatorname{arccsc} u] = \frac{-u'}{|u| \sqrt{u^2 - 1}}$$