

DERIVATIVES AND INTEGRALS TO MEMORIZE

Basic Differentiation Rules

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

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

$$\frac{d}{dx} [\log_a u] = \frac{u'}{(\ln a)u}$$

$$\frac{d}{dx} [a^u] = (\ln a) a^u u'$$

$$\frac{d}{dx} [\sin u] = (\cos u) u'$$

$$\frac{d}{dx} [\cos u] = -(\sin u) u'$$

$$\frac{d}{dx} [\tan u] = (\sec^2 u) u'$$

$$\frac{d}{dx} [\cot u] = -(\csc^2 u) u'$$

$$\frac{d}{dx} [\sec u] = (\sec u \tan u) u'$$

$$\frac{d}{dx} [\csc u] = -(\csc u \cot u) u'$$

Basic Integral Formulas

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

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

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

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

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

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

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

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

DERIVATIVES AND INTEGRALS YOU WILL BE GIVEN

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

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

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

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

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

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

$$\frac{d}{dx} [\sinh u] = (\cosh u)u'$$

$$\frac{d}{dx} [\cosh u] = (\sinh u)u'$$

$$\frac{d}{dx} [\tanh u] = (\operatorname{sech}^2 u)u'$$

$$\frac{d}{dx} [\coth u] = -(\operatorname{csch}^2 u)u'$$

$$\frac{d}{dx} [\operatorname{sech} u] = -(\operatorname{sech} u \tanh u)u'$$

$$\frac{d}{dx} [\operatorname{csch} u] = -(\operatorname{csch} u \coth u)u'$$

$$\frac{d}{dx} [\sinh^{-1} u] = \frac{u'}{\sqrt{u^2+1}}$$

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

$$\frac{d}{dx} [\tanh^{-1} u] = \frac{u'}{1-u^2}$$

$$\frac{d}{dx} [\coth^{-1} u] = \frac{-u'}{1-u^2}$$

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

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

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

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

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

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

$$\int \cosh u \, du = \sinh u + C$$

$$\int \sinh u \, du = \cosh u + C$$

$$\int \operatorname{sech}^2 u \, du = \tanh u + C$$

$$\int \operatorname{csch}^2 u \, du = -\coth u + C$$

$$\int \operatorname{sech} u \tanh u \, du = \operatorname{sech} u + C$$

$$\int \operatorname{csch} u \coth u \, du = -\operatorname{csch} u + C$$

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

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

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

$$\int \frac{du}{\sqrt{u^2 \pm a^2}} = \ln\left(u + \sqrt{u^2 \pm a^2}\right) + C$$

$$\int \frac{du}{u\sqrt{a^2 \pm u^2}} = -\frac{1}{a} \ln \frac{a + \sqrt{a^2 \pm u^2}}{|u|} + C$$

$$\int \frac{du}{a^2-u^2} = \frac{1}{2a} \ln \left| \frac{a+u}{a-u} \right| + C$$