

Derivative Formulas From Calc I

- 1) (The Power Rule) $D_x cx^n = ncx^{n-1}$
- 2) (The Product Rule) $D_x (fg) = fg' + gf'$
- 3) (The Quotient Rule) $D_x \left(\frac{f}{g} \right) = \frac{gf' - fg'}{g^2}$
- 4) (The Chain Rule) $D_x (g(x))^n = n(g(x))^{n-1} g'(x)$
- 5) Trig Functions:
 - $D_x \sin x = \cos x$
 - $D_x \cos x = -\sin x$
 - $D_x \tan x = \sec^2 x$
 - $D_x \sec x = \sec x \tan x$
 - $D_x \cot x = -\csc^2 x$
 - $D_x \csc x = -\csc x \cot x$
- 6) (Exponential Functions)
 - $D_x e^x = e^x$
 - $D_x e^{(stuff)} = e^{(stuff)} D_x (stuff)$
 - $D_x a^{(stuff)} = a^{(stuff)} \cdot D_x (stuff) \cdot \ln a$
- 7) (Log functions)
 - $D_x \ln x = \frac{1}{x}$
 - $D_x \ln(stuff) = \frac{1}{stuff} \cdot D_x (stuff)$
 - $D_x \log_b(stuff) = \frac{1}{stuff} \cdot D_x (stuff) \cdot \frac{1}{\ln b}$
- 8) (Inverse Trig functions)
 - $D_x \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$
 - $D_x \cos^{-1} x = -\frac{1}{\sqrt{1-x^2}}$
 - $D_x \tan^{-1} x = \frac{1}{1+x^2}$
 - $D_x \cot^{-1} x = -\frac{1}{1+x^2}$

Antiderivative Formulas From Calc I

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c; \quad n \neq -1 \quad \int \frac{1}{x} dx = \ln|x| + c$$

$$\int e^x dx = e^x + c$$

$$\int \cos x dx = \sin x + c$$

$$\int \sec^2 x dx = \tan x + c$$

$$\int \sec x \tan x dx = \sec x + c$$

$$\int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + c$$

$$\int (f(x) \pm g(x)) dx = \int f(x) dx \pm \int g(x) dx$$

$$\int a^x dx = \frac{a^x}{\ln a} + c$$

$$\int \sin x dx = -\cos x + c$$

$$\int \csc^2 x dx = -\cot x + c$$

$$\int \csc x \cot x dx = -\csc x + c$$

$$\int \frac{1}{1+x^2} dx = \tan^{-1} x + c$$

$$\int cf(x) dx = c \int f(x) dx$$