Integral Cheat sheet

Common Functions

Equation	Antiderivative
0	C
k	$kx + C$
$kf(x)\,dx$	$k\int f(x)\,dx$
$\int [f(x) \pm g(x)]\,dx$	$\int f(x)\,dx \pm \int g(x)\,dx$
e^x	$e^x + C$
a^x	$(\frac{1}{\ln(a)})a^x + C$
$\frac{1}{x}$	$\ln\lvert x\rvert + C$

Trigonometric Integrals

$$\int sin = -cos + C \qquad \int cos = sin + C$$

$$\int tan = -\ln|cos| + C \qquad \int cot = \ln|sin| + C$$

$$\int sec = \ln|sec + tan| + C \qquad \int csc = -\ln|csc + cot| + C$$

Abnormal Trigonometric Integrals

$$\int sec^2 = tan + C \qquad \int sec * tan = sec + C$$

$$\int csc^2 = -cot + C \qquad \int csc * cot = -csc + C$$

Inverse Trigonometric Integrals (a is positive)

$$\int \frac{1}{\sqrt{a^2 - x^2}} = \arcsin(\frac{x}{a}) + C$$

$$\int \frac{1}{a^2 + x^2} = \frac{1}{a}\arctan(\frac{x}{a}) + C$$

$$\int \frac{1}{x\sqrt{x^2 - a^2}} = \frac{1}{a}\text{arcsec}(\frac{|x|}{a}) + C$$

Derivative Rules

Power Rule

$$dx(x^n) = n * x^{n-1}$$

Product Rule

$$dx(f(x) * g(x)) = f'(x)g(x) + g'(x)f(x)$$

Quotient Rule

$$dx(\frac{f(x)}{g(x)}) = \frac{f'(x)g(x) - g'(x)f(x)}{(g(x))^2}$$

Chain Rule

$$dxf(g(x)) = f'(g(x)) * g'(x)$$

Nested Chain Rule

$$\begin{aligned} dxf(g(h(x))) = & f'(g(h(x))) \\ & * g'(h(x)) \\ & * h'(x) \end{aligned}$$

Other things to note

$$ln(\frac{x}{y}) = ln(x) - ln(y) \qquad ln(xy) = ln(x) + ln(y) \qquad ln(x^y) = y * ln(x)$$