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Integration Table

1. $\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad n \neq -1$	6. $\int \tan ax dx = -\frac{1}{a} \ln \cos ax + C$	11. $\int \csc^2 ax dx = -\frac{1}{a} \cot ax + C$
2. $\int e^{ax} dx = \frac{e^{ax}}{a} + C$	7. $\int \cot ax dx = \frac{1}{a} \ln \sin ax + C$	12. $\int \frac{f'}{\sqrt{a^2 - f^2}} dx = \sin^{-1} \frac{f}{a} + C$
3. $\int a^x dx = \frac{a^x}{\ln a} + C$	8. $\int \sec ax dx = \frac{1}{a} \ln \sec ax + \tan ax + C$	13. $\int \frac{f'}{a^2 + f^2} dx = \frac{1}{a} \tan^{-1} \frac{f}{a} + C$
4. $\int \cos ax dx = \frac{\sin ax}{a} + C$	9. $\int \csc ax dx = \frac{1}{a} \ln \csc ax - \cot ax + C$	14. $\int \frac{f'}{f} dx = \ln f + C$
5. $\int \sin ax dx = -\frac{\cos ax}{a} + C$	10. $\int \sec^2 ax dx = \frac{1}{a} \tan ax + C$	Note: f is a function of $x \Rightarrow f(x)$

Differentiation Table

$g(x)$	$g'(x)$	$g(x)$	$g'(x)$	$g(x)$	$g'(x)$
1. \sqrt{f}	$\frac{f'}{2\sqrt{f}}$	5. $\csc(f)$	$-f' \csc(f) \cot(f)$	9. $\cot^{-1}(f)$	$-\frac{f'}{1+f^2}$
2. $\tan(f)$	$f' \sec^2(f)$	6. $\sin^{-1}(f)$	$\frac{f'}{\sqrt{1-f^2}}$	10. $\sec^{-1}(f)$	$\frac{f'}{ f \sqrt{f^2-1}}$
3. $\cot(f)$	$-f' \csc^2(f)$	7. $\cos^{-1}(f)$	$-\frac{f'}{\sqrt{1-f^2}}$	11. $\csc^{-1}(f)$	$-\frac{f'}{ f \sqrt{f^2-1}}$
4. $\sec(f)$	$f' \sec(f) \tan(f)$	8. $\tan^{-1}(f)$	$\frac{f'}{1+f^2}$	Note: f is a function of $x \Rightarrow f(x)$	

Trigonometry

Fundamental Identities	Product Identities	Trigonometric Substitution	
$\cos^2 x + \sin^2 x = 1$ $\sec^2 x = \tan^2 x + 1$ $\csc^2 x = \cot^2 x + 1$ $\frac{1}{\cos x} = \sec x$ $\frac{\sin x}{\cos x} = \tan x$ $\cos(-x) = \cos x$	$\sin A \cos B = \frac{1}{2} [\sin(A-B) + \sin(A+B)]$ $\sin A \sin B = \frac{1}{2} [\cos(A-B) - \cos(A+B)]$ $\cos A \cos B = \frac{1}{2} [\cos(A-B) + \cos(A+B)]$	Expression	Substitution
		$\sqrt{a^2 - x^2}$	$x = a \sin \theta$
		$\sqrt{a^2 + x^2}$	$x = a \tan \theta$
		$\sqrt{x^2 - a^2}$	$x = a \sec \theta$
Double Angle Formulas	Trigonometric Unit Circle	Trig. Right Triangle	
$\sin 2x = 2 \sin x \cos x$ $\cos 2x = \cos^2 x - \sin^2 x = 2 \cos^2 x - 1$			
Half Angle Formulas		$\cos \theta = \frac{A}{C}$ $\tan \theta = \frac{B}{A}$ $\sec \theta = \frac{C}{A}$	$\sin \theta = \frac{B}{C}$ $\cot \theta = \frac{A}{B}$ $\csc \theta = \frac{C}{B}$
$\cos^2 x = \frac{1}{2} + \frac{1}{2} \cos 2x$ $\sin^2 x = \frac{1}{2} - \frac{1}{2} \cos 2x$			

Binomial Theorem

$(x + y)^2 = x^2 + 2xy + y^2$ $(x - y)^2 = x^2 - 2xy + y^2$	$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$ $(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$
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