Derivation rules

1. $\frac{d}{dx}x = 1$	2. $\frac{d}{dx}cf(x) = cf'(x)$	3. $\frac{d}{dx}\left(f(x) + g(x)\right) = f' + g'$
4. $\frac{d}{dx}\left(f(x)g(x)\right) = f'g + fg'$	5. $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f'g - fg'}{g^2}$	6. $\frac{d}{dx}f(g(x)) = \frac{df}{dg}\frac{dg}{dx}$
7. $\frac{d}{dx}u^n = nu^{n-1}\frac{du}{dx}$	8. $\frac{d}{dx}e^u = e^u\frac{du}{dx}$	9. $\frac{d}{dx}\ln\lvert u\rvert = \frac{1}{u}\frac{du}{dx}$
10. $\frac{d}{dx}\sin(u) = \cos(u)\frac{du}{dx}$	11. $\frac{d}{dx}\cos(u) = -\sin(u)\frac{du}{dx}$	12. $\frac{d}{dx}\tan(u) = \sec^2(u)\frac{du}{dx}$
13. $\frac{d}{dx}\csc(u) = -\csc(u)\cot(u)\frac{du}{dx}$	14. $\frac{d}{dx}\sec(u) = \sec(u)\tan(u)\frac{du}{dx}$	15. $\frac{d}{dx}\cot(u) = -\csc^2(u)\frac{du}{dx}$
16. $\frac{d}{dx}\arcsin(u) = \frac{1}{\sqrt{1-u^2}}\frac{du}{dx}$	17. $\frac{d}{dx}\arccos(u) = \frac{-1}{\sqrt{1-u^2}}\frac{du}{dx}$	18. $\frac{d}{dx}\arctan(u) = \frac{1}{1+u^2}\frac{du}{dx}$

Integration rules

1. $\int \frac{df(x)}{dx}dx = f(x) + k$	2. $\int cf(x)dx = c\int f(x)dx$	3. $\int (f+g)\,dx = \int f dx + \int g dx$
4. $\int x^n dx = \frac{x^{n+1}}{n+1} + k, \quad n \neq -1$	5. $\int \frac{dx}{x} = \ln\lvert x\rvert + k$	6. $\int e^x dx = e^x + k$
7. $\int \sin(x)dx = -\cos(x) + k$	8. $\int \cos(x)dx = \sin(x) + k$	9. $\int \tan(x)dx = \ln\lvert\sec(x)\rvert + k$
10. $\int \cot(x)dx = \ln\lvert\sin(x)\rvert + k$	11. $\int \sec^2(x)dx = \tan(x) + k$	12. $\int \csc^2(x) = -\cot(x) + k$

13. $\int \csc(x)dx = -\ln\lvert\csc(x) + \cot(x)\rvert + k$	14. $\int \sec(x)dx = \ln\lvert\sec(x) + \tan(x)\rvert + k$
15. $\int \sec(x)\tan(x)dx = \sec(x) + k$	16. $\int \csc(x)\cot(x)dx = -\csc(x) + k$
17. $\int \frac{dx}{\sqrt{a^2-x^2}} = \arcsin\left(\frac{x}{a}\right) + c$	18. $\int \frac{dx}{a^2+x^2} = \frac{1}{a}\arctan\left(\frac{x}{a}\right) + c$
19. $\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \ln\left\lvert x + \sqrt{x^2 \pm a^2}\right\rvert + k$	20. $\int udv = uv - \int vdu$

Trigonometric identities

1. $\sin^2(x) + \cos^2(x) = 1$	2. $\sin(x)\sin(y) = \frac{1}{2}(\cos(x-y) - \cos(x+y))$	3. $\tan(x) = \frac{\sin(x)}{\cos(x)}$
4. $\sec^2(x) - \tan^2(x) = 1$	5. $\sin(x)\cos(y) = \frac{1}{2}(\sin(x+y) + \sin(x-y))$	6. $\csc(x) = \frac{1}{\sin(x)}$
7. $\csc^2(x) - \cot^2(x) = 1$	8. $\cos(x)\cos(y) = \frac{1}{2}(\cos(x+y) + \cos(x-y))$	9. $\sec(x) = \frac{1}{\cos(x)}$
10. $\sin^2(x) = \frac{1}{2}(1 - \cos(2x))$	11. $\sin(x+y) = \sin(x)\cos(y) + \cos(x)\sin(y)$	12. $\cot(x) = \frac{\cos(x)}{\sin(x)}$
13. $\cos^2(x) = \frac{1}{2}(1 + \cos(2x))$	14. $\sin(x-y) = \sin(x)\cos(y) - \cos(x)\sin(y)$	15. $\cot(x) = \frac{1}{\tan(x)}$
16. $\sin(2x) = 2\sin(x)\cos(x)$	17. $\cos(x+y) = \cos(x)\cos(y) - \sin(x)\sin(y)$	18. $\sin(-x) = -\sin(x)$
19. $\cos(2x) = \cos^2(x) - \sin^2(x)$	20. $\cos(x-y) = \cos(x)\cos(y) + \sin(x)\sin(y)$	21. $\cos(-x) = \cos(x)$