

1 Known Derivatives

1. $\frac{d}{dx} k = 0$
2. $\frac{d}{dx} x = 1$
3. $\frac{d}{dx} x^2 = 2x$
4. $\frac{d}{dx} x^3 = 3x^2$
5. $\frac{d}{dx} x^n = nx^{n-1}$
6. $\frac{d}{dx} e^x = e^x$
7. $\frac{d}{dx} e^{kx} = ke^{kx}$
8. $\frac{d}{dx} \ln(x) = \frac{d}{dx} \log_e(x) = \frac{1}{x}$
9. $\frac{d}{dx} \sin x = \cos x$
10. $\frac{d}{dx} \cos x = -\sin x$
11. $\frac{d}{dx} \cos kx = -k \sin kx$
12. $\frac{d}{dx} \tan x = \frac{d}{dx} \frac{\sin x}{\cos x} = \sec^2 x$
13. $\frac{d}{dx} \tan kx = k \sec^2 kx$
14. $\frac{d}{dx} \csc x = \frac{d}{dx} \frac{1}{\sin x} = -\csc x \cot x$
15. $\frac{d}{dx} \sec x = \frac{d}{dx} \frac{1}{\cos x} = \sec x \tan x$
16. $\frac{d}{dx} \cot x = \frac{\cos x}{\sin x} = -\csc^2 x$
17. $\frac{d}{dx} \arcsin x = \frac{1}{\sqrt{1-x^2}}$
18. $\frac{d}{dx} \arccos x = -\frac{1}{\sqrt{1-x^2}}$
19. $\frac{d}{dx} \arctan x = \frac{1}{1+x^2}$
20. $\frac{d}{dx} \operatorname{arcsec} x = \frac{1}{|x|\sqrt{x^2-1}}$
21. $\frac{d}{dx} \operatorname{arccsc} x = \frac{-1}{|x|\sqrt{x^2-1}}$
22. $\frac{d}{dx} \operatorname{arccot} x = \frac{-1}{1+x^2}$

2 Known Integrals

1. $\int [af(x) + bg(x)] dx = a \int f(x) dx + b \int g(x) dx + C$
2. $\int [f(x) + g(x)] dx = \int f(x) dx + \int g(x) dx + C$
3. $\int [f(x) - g(x)] dx = \int f(x) dx - \int g(x) dx + C$
4. $\int af(x) dx = a \int f(x) dx + C$
5. $\int u(x)v'(x) dx = u(x)v(x) - \int u'(x)v(x) dx + C$
6. $\int f(y(x))y'(x) dx = F(y(x))$
where $F(y) = \int f(y) dy$
7. $\int a dx = ax + C$
8. $\int x^a dx = \frac{x^{a+1}}{a+1} + C$ if $a \neq -1$
9. $\int \frac{1}{x} dx = \ln|x| + C$
10. $\int [g(x)^a g'(x)] dx = \frac{g(x)^{a+1}}{a+1} + C$ if $a \neq -1$
11. $\int \sin x dx = -\cos x + C$
12. $\int \cos x dx = \sin x + C$
13. $\int \tan x dx = \ln|\sec x| + C$
14. $\int g'(x) \sin g(x) dx = -\cos g(x) + C$
15. $\int \csc x dx = \ln|\csc x - \cot x| + C$
16. $\int \sec x dx = \ln|\sec x + \tan x| + C$
17. $\int \cot x dx = \ln|\sin x| + C$
18. $\int \sec^2 x dx = \tan x + C$
19. $\int \csc^2 x dx = -\cot x + C$
20. $\int \sec x \tan x dx = \sec x + C$
21. $\int \csc x \cot x dx = -\csc x + C$
22. $\int e^x dx = e^x + C$
23. $\int e^{g(x)} g'(x) dx = e^{g(x)} + C$

$$24. \int e^{ax} x \, dx = \frac{1}{a} e^{ax} + C$$

$$25. \int a^x \, dx = \frac{1}{\ln a} a^x + C$$

$$26. \int \ln x \, dx = x \ln x - x + C$$

$$27. \int \frac{1}{\sqrt{1-x^2}} \, dx = \arcsin x + C$$

$$28. \int \frac{g'(x)}{\sqrt{1-g(x)^2}} \, dx = \arcsin g(x) + C$$

$$29. \int \frac{1}{\sqrt{a^2-x^2}} \, dx = \arcsin \frac{x}{a} + C$$

$$30. \int \frac{1}{1+x^2} \, dx = \arctan x + C$$

$$31. \int \frac{g'(x)}{1+g(x)^2} \, dx = \arctan g(x) + C$$

$$32. \int \frac{1}{a^2+x^2} \, dx = \frac{1}{a} \arctan \frac{x}{a} + C$$

$$33. \int \frac{1}{x\sqrt{x^2-1}} \, dx = \operatorname{arcsec} x + C \text{ for } x > 1$$