

25 MAIN FORMULAS OF DERIVATIVES

1. $\frac{d}{dx}(c) = 0$ (c is a constant)	14. $\frac{d}{dx}(\sin x) = \cos x$
2. $\frac{d}{dx}(x) = 1$	15. $\frac{d}{dx}(\cos x) = -\sin x$
3. $\frac{d}{dx}(x^n) = nx^{n-1}$ (n is a real number)	16. $\frac{d}{dx}(\tan x) = \sec^2 x$
4. $\frac{d}{dx}(kf(x)) = kf'(x)$ (k is a constant)	17. $\frac{d}{dx}(\cot x) = -\csc^2 x$
5. $\frac{d}{dx}(f(x) + g(x)) = f'(x) + g'(x)$	18. $\frac{d}{dx}(\sec x) = \sec x \tan x$
6. $\frac{d}{dx}(f(x) - g(x)) = f'(x) - g'(x)$	19. $\frac{d}{dx}(\csc x) = -\csc x \cot x$
7. $\frac{d}{dx}(f(x)g(x)) = f'(x)g(x) + f(x)g'(x)$ (Product Rule)	20. $\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$ ($ x < 1$)
8. $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$ (Quotient Rule)	21. $\frac{d}{dx}(\arccos x) = -\frac{1}{\sqrt{1-x^2}}$ ($ x < 1$)
9. $\frac{d}{dx}(f(g(x))) = f'(g(x)) \cdot g'(x)$ (Chain Rule)	22. $\frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$
10. $\frac{d}{dx}(e^x) = e^x$	23. $\frac{d}{dx}(\operatorname{arccot} x) = -\frac{1}{1+x^2}$
11. $\frac{d}{dx}(a^x) = a^x \ln a$ ($a > 0, a \neq 1$)	24. $\frac{d}{dx}(x) = \begin{cases} 1, & x > 0 \\ -1, & x < 0 \end{cases}$ ($x \neq 0$)
12. $\frac{d}{dx}(\ln x) = \frac{1}{x}$ ($x > 0$)	25. $\frac{d}{dx}(\sqrt{x}) = \frac{1}{2\sqrt{x}}$ ($x > 0$)
13. $\frac{d}{dx}(\log_a x) = \frac{1}{x \ln a}$ ($a > 0, a \neq 1, x > 0$)	