

1. Fórmulas de Derivadas

1.1. Formas básicas y propiedades de las derivadas

$$1. \frac{d}{dx} c = 0$$

$$2. \frac{d}{dx} x = 1$$

$$3. \frac{d}{dx} (u + v - w) = \frac{d}{dx} u + \frac{d}{dx} v - \frac{d}{dx} w$$

$$4. \frac{d}{dx} (u \cdot v) = u' \cdot v + v' \cdot u$$

$$5. \frac{d}{dx} [c \cdot u] = c \cdot \frac{d}{dx} u$$

$$6. \frac{d}{dx} u^n = n \cdot u^{n-1} \cdot \frac{d}{dx} u$$

$$7. \frac{d}{dx} \sqrt{u} = \frac{\frac{d}{dx} u}{2 \cdot \sqrt{u}}$$

$$8. \frac{d}{dx} \frac{u}{v} = \frac{u' \cdot v - v' \cdot u}{v^2}$$

$$9. \frac{d}{dx} \frac{u}{c} = \frac{1}{c} \cdot \frac{d}{dx} u$$

$$10. \frac{d}{dx} \frac{c}{u} = \frac{-c \cdot \frac{d}{dx} u}{u^2}$$

1.2. Fórmulas de derivadas trigonométricas

$$11. \frac{d}{dx} \sin u = \cos u \cdot \frac{d}{dx} u$$

$$12. \frac{d}{dx} \cos u = -\sin u \cdot \frac{d}{dx} u$$

$$13. \frac{d}{dx} \tan u = \sec^2 u \cdot \frac{d}{dx} u$$

$$14. \frac{d}{dx} \cot u = -\csc^2 u \cdot \frac{d}{dx} u$$

$$15. \frac{d}{dx} \sec u = \sec u \cdot \tan u \cdot \frac{d}{dx} u$$

$$16. \frac{d}{dx} \csc u = -\csc u \cdot \cot u \cdot \frac{d}{dx} u$$

1.3. Fórmulas de derivadas trigonométricas inversas

$$17. \frac{d}{dx} \sin^{-1} u = \frac{\frac{d}{dx} u}{\sqrt{1-u^2}} \quad \left[-\frac{\pi}{2} < \sin^{-1} u < \frac{\pi}{2} \right]$$

$$18. \frac{d}{dx} \cos^{-1} u = -\frac{\frac{d}{dx} u}{\sqrt{1-u^2}} \quad \left[0 < \cos^{-1} u < \pi \right]$$

$$19. \frac{d}{dx} \tan^{-1} u = \frac{\frac{d}{dx} u}{1+u^2} \quad \left[-\frac{\pi}{2} < \tan^{-1} u < \frac{\pi}{2} \right]$$

$$20. \frac{d}{dx} \cot^{-1} u = -\frac{\frac{d}{dx}u}{1+u^2}$$

$$[0 < \cot^{-1} u < \pi]$$

$$21. \frac{d}{dx} \sec^{-1} u = \frac{\frac{d}{dx}u}{|u| \cdot \sqrt{u^2 - 1}}$$

$$22. \frac{d}{dx} \csc^{-1} u = -\frac{\frac{d}{dx}u}{|u| \cdot \sqrt{u^2 - 1}}$$

1.4. Fórmulas de derivadas exponenciales y logarítmicas

$$23. \frac{d}{dx} \ln u = \frac{\frac{d}{dx}u}{u} = \frac{d}{dx} \log_e u$$

$$24. \frac{d}{dx} e^u = e^u \cdot \frac{d}{dx}u$$

$$25. \frac{d}{dx} \log_a u = \frac{\frac{d}{dx}u}{u \cdot \ln a} = \frac{\log_a e}{u} \cdot \frac{d}{dx}u$$

$$26. \frac{d}{dx} u^v = \frac{d}{dx} e^{v \cdot \ln u} = e^{v \cdot \ln u} \frac{d}{dx} [v \cdot \ln u] = v \cdot u^{v-1} \frac{du}{dx} + u^v \cdot \ln u \frac{dv}{dx}$$

1.5. Fórmulas de derivadas hiperbólicas

$$27. \frac{d}{dx} \sinh u = \cosh u \cdot \frac{d}{dx}u$$

$$28. \frac{d}{dx} \cosh u = \sinh u \cdot \frac{d}{dx}u$$

$$29. \frac{d}{dx} \tanh u = \operatorname{sech}^2 u \cdot \frac{d}{dx}u$$

$$30. \frac{d}{dx} \coth u = -\operatorname{csch}^2 u \cdot \frac{d}{dx}u$$

$$31. \frac{d}{dx} \operatorname{sech} u = -\operatorname{sech} u \cdot \tanh u \cdot \frac{d}{dx}u$$

$$32. \frac{d}{dx} \operatorname{csch} u = -\operatorname{csch} u \cdot \coth u \cdot \frac{d}{dx}u$$

1.6. Fórmulas de derivadas hiperbólicas inversas

$$33. \frac{d}{dx} \sinh^{-1} u = \frac{1}{\sqrt{u^2 + 1}} \cdot \frac{d}{dx}u$$

$$34. \frac{d}{dx} \cosh^{-1} u = \frac{1}{\sqrt{u^2 - 1}} \cdot \frac{d}{dx}u$$

$$35. \frac{d}{dx} \tanh^{-1} u = \frac{1}{1 - u^2} \cdot \frac{d}{dx}u$$

$$36. \frac{d}{dx} \coth^{-1} u = \frac{1}{1 - u^2} \cdot \frac{d}{dx}u$$

$$37. \frac{d}{dx} \operatorname{sech}^{-1} u = \frac{-1}{u \cdot \sqrt{1 - u^2}} \cdot \frac{d}{dx}u$$

$$38. \frac{d}{dx} \operatorname{csch}^{-1} u = \frac{-1}{|u| \cdot \sqrt{1 + u^2}} \cdot \frac{d}{dx}u$$

1.7. Representación de las derivadas de orden superior

39. Segunda derivada

$$\frac{d^2 y}{dx^2} = f''(x) = y'' = \frac{d}{dx} \left(\frac{dy}{dx} \right)$$

40. Tercera derivada

$$\frac{d^3 y}{dx^3} = f'''(x) = y''' = \frac{d}{dx} \left(\frac{d^2 y}{dx^2} \right)$$

41. N-ésima derivada

$$\frac{d^n y}{dx^n} = f^n(x) = y^n = \frac{d}{dx} \left(\frac{d^{n-1} y}{dx^{n-1}} \right)$$