

EJERCICIOS

Calcular la derivada de las siguientes funciones, expresando el resultado de la forma mas simplificada posible:

$$1. y = \sqrt[3]{x^2 - 4x + 2}$$

$$2. y = (x^2 - 4x + 5)^4 + \sqrt{x^2 - 2x + 1}$$

$$3. y = \frac{e^x - e^{-x}}{2}$$

$$4. y = \frac{x^2 - 2x + 3}{x^2 - 1}$$

$$5. y = \sin(x-1)^2 - \sin^2(x-1)$$

$$6. y = \sin(\sqrt{e^{2x} - 1})$$

$$7. y = \cos\left(\frac{x-1}{x+1}\right) \cdot \sin(\sqrt{2x-1})$$

$$8. y = \operatorname{tg}\left(\frac{e^x - e^{-x}}{e^x + e^{-x}}\right)$$

$$9. y = \operatorname{tg} 3x + \operatorname{tg} x^3 + \operatorname{tg}^3 x$$

$$10. y = \arccos(\sqrt{x^3 - 2})$$

$$11. y = e^{3x} \cdot \sqrt{x^2 + 1}$$

$$12. y = \sqrt{\frac{x^2 - 1}{x^2 + 1}}$$

$$13. y = 10^{\sqrt{\frac{x-1}{x+1}}}$$

$$14. y = \frac{\operatorname{Ln}(x^2 - 1)}{x}$$

$$15. y = 5^{\sin(2x-2)} + \sqrt{\cos(2x-3)}$$

$$16. y = \sqrt{\sin(\ln(e^{x^2-1}))}$$

$$17. y = \operatorname{Ln}\left(\frac{1 + \sin x}{\operatorname{tg} x}\right)$$

$$18. y = \frac{x^2 \sin x}{2^x}$$

$$19. y = \sec(x-1) + \operatorname{cosec}(2x+3)$$

$$20. y = \operatorname{arcsen} \sqrt{1 - 4x^2}$$

$$21. y = \operatorname{arccos}\left(\frac{\sin x}{\cos x}\right)$$

$$22. y = \frac{5^x x^5}{\sqrt{5x}}$$

$$23. y = \cos(5x+3) \cdot \frac{4}{x^2 + x + 1}$$

$$24. y = \ln \sqrt{\frac{x - \sin x}{x + \sin x}}$$

$$25. y = \frac{1 - \sin^2 x}{1 + \sin^2 x}$$

$$26. y = \sin(\cos(\tan(\sqrt{e^{x^2-1}})))$$

$$27. y = \sqrt{\ln(\sin(\tan(10^{\sec x})))}$$

$$28. y = \arctan(\sin(10^{\sqrt{x^2-1}}))$$

$$29. y = x^{\cos x}$$

$$30. y = (\sin x)^{\sqrt{x}}$$

$$31. y = (\operatorname{arcsen} x)^{\cos x}$$

$$32. y = (\tan(x^2 - 1))^{e^x}$$

$$33. y = (\sqrt{x^2 - 1})^{\arctan x}$$

$$34. y = (\sec(2x - 3))^{\ln x}$$

$$35. y = (\ln x)^{\sec(x^2-1)}$$

$$36. y = (10^{\sqrt{x}})^{\tan x}$$

$$37. y = (\arctan(x^2 + 1))^{\cos 2x}$$

$$38. y = \frac{x^3 - 3}{x^2 + 4}$$

$$39. y = \operatorname{Ln} \frac{x^2 - 1}{x^2 + 3}$$

$$40. y = \operatorname{Ln} \frac{x+1}{x+3}$$

$$41. y = \sin^5 x$$

$$42. y = \sin x^5$$

$$43. y = (x^3 + 5)^{2/5}$$

$$44. y = \ln \sqrt{\frac{1 - \sin^2 x}{1 + \sin^2 x}}$$

$$45. y = \ln \sqrt{\frac{1 - \cos^2 x}{1 + \cos^2 x}}$$

(1)

Derivadas (Sin simplificar)

$$(1) y' = \frac{1}{3} (x^2 - 4x + 2)^{2/3} (2x - 4)$$

$$(2) y' = 4(x^2 - 4x + 5)^3 (2x - 4) + \frac{1}{2} (x^2 - 2x + 1)^{-1/2} (2x - 2)$$

$$(3) y' = \frac{1}{2} (e^x + e^{-x})$$

$$(4) y' = \frac{(2x - 2)(x^2 - 1) - 2x(x^2 - 2x + 3)}{(x^2 - 1)^2}$$

$$(5) y' = 2(x - 1) \cdot \cos(x - 1)^2 - 2 \operatorname{Sen}(x - 1) \cdot \cos(x - 1)$$

$$(6) y' = \frac{2e^{2x}}{2\sqrt{e^{2x} - 1}} \cdot \cos \sqrt{e^{2x} - 1}$$

$$(7) y' = -\frac{(x+1) - (x-1)}{(x+1)^2} \cdot \operatorname{Sen}\left(\frac{x-1}{x+1}\right) \cdot \operatorname{Sen} \sqrt{2x-1} + \cos\left(\frac{x-1}{x+1}\right) \cdot \frac{2}{2\sqrt{2x-1}} \cdot \cos \sqrt{2x-1}$$

$$(8) y' = \frac{(e^x + e^{-x})(e^x + e^{-x}) - (e^x - e^{-x})(e^x - e^{-x})}{(e^x + e^{-x})^2} \cdot \sec^2\left(\frac{e^x - e^{-x}}{e^x + e^{-x}}\right)$$

$$(9) y' = 3 \sec^2(3x) + 3x^2 \sec^2(x^3) + 3 \tan^2 x \cdot \sec^2 x$$

$$(10) y' = -\frac{3x^2}{2\sqrt{x^3 - 2}} \cdot \frac{1}{\sqrt{1 - (\sqrt{x^3 - 2})^2}}$$

$$(11) y' = 3e^{3x} \cdot \sqrt{x^2 + 1} + e^{3x} \cdot \frac{2x}{2\sqrt{x^2 + 1}}$$

$$(12) y' = \frac{1}{2\sqrt{\frac{x^2 - 1}{x^2 + 1}}} \cdot \frac{2x(x^2 + 1) - 2x(x^2 - 1)}{(x^2 + 1)^2}$$

$$(13) y' = \frac{1}{2\sqrt{\frac{x-1}{x+1}}} \cdot \frac{(x+1) - (x-1)}{(x+1)^2} \cdot \ln 10 \cdot 10^{\sqrt{\frac{x-1}{x+1}}}$$

$$(14) y' = \frac{\frac{2x}{x^2 - 1} \cdot x - \ln(x^2 - 1)}{x^2}$$

$$(15) y' = 2 \cos(2x - 2) \cdot \ln 5 \cdot 5^{2 \operatorname{Sen}(2x - 2)} + \frac{-2 \operatorname{Sen}(2x - 3)}{2 \sqrt{\cos(2x - 3)}}$$

$$(16) y' = \frac{1}{2\sqrt{\operatorname{Sen}(\ln(e^{x^2 - 1}))}} \cdot 2x e^{x^2 - 1} \cdot \frac{1}{e^{x^2 - 1}} \cdot \cos(\ln(e^{x^2 - 1}))$$

$$(32) \quad \ln y = e^x \cdot \ln(\tan(x^2-1)); \quad y' = \left[e^x \cdot \ln(\tan(x^2-1)) + \frac{2x \cdot \sec^2(x^2-1) \cdot e^x}{\tan(x^2-1)} \right] (\tan(x^2-1))^{e^x}$$

$$(33) \quad \ln y = \operatorname{Arctang} x \cdot \ln(\sqrt{x^2-1}) \Rightarrow y' = \left[\frac{\ln(\sqrt{x^2-1})}{1+x^2} + \frac{\operatorname{Arctg} x \cdot 2x}{\sqrt{x^2-1} \cdot 2\sqrt{x^2-1}} \right] (\sqrt{x^2-1})^{\operatorname{arctang} x}$$

$$(34) \quad \ln y = \ln x \cdot \ln(\sec(2x-3)); \quad y' = \left[\frac{\ln(\sec(2x-3))}{x} + \frac{\ln x \cdot 2 \cdot \sec(2x-3) \cdot \tan(2x-3)}{\sec(2x-3)} \right] y$$

$$(35) \quad \ln y = \sec(x^2-1) \cdot \ln(\ln x); \quad y' = \left[2x \cos(x^2-1) \cdot \ln(\ln x) + \frac{\sec(x^2-1)}{\ln x \cdot x} \right] (\ln x)^{\sec(x^2-1)}$$

$$(36) \quad \ln y = \tan x \cdot \ln(10^{\sqrt{x}}); \quad y' = \left[\sec^2 x \cdot \ln(10^{\sqrt{x}}) + \frac{\ln 10 \cdot 10^{\sqrt{x}} \cdot \frac{1}{2\sqrt{x}}}{10^{\sqrt{x}}} \right] (10^{\sqrt{x}})^{\tan x}$$

$$(37) \quad \ln y = \cos 2x \cdot \ln(\operatorname{arctg}(x^2+1)); \quad y' = \left[-2 \sin 2x \cdot \ln(\operatorname{arctg}(x^2+1)) + \frac{2x \cdot \cos 2x}{\operatorname{arctg}(x^2+1) \cdot (1+(x^2+1)^2)} \right] y$$

$$(38) \quad y' = \frac{3x^2(x^2+4) - 2x(x^3-3)}{(x^2+4)}; \quad (39) \quad y' = \frac{1}{\frac{x^2-1}{x^2+3}} \cdot \frac{2x(x^2+3) - 2x(x^2-1)}{(x^2+3)^2}$$

$$(40) \quad y' = \frac{1}{\frac{x+1}{x+3}} \cdot \frac{(x+3) - (x+1)}{(x+3)^2} \quad (41) \quad y' = 5 \sin^4 x \cdot \cos x$$

$$(42) \quad y' = 5x^4 \cdot \cos x^5 \quad (43) \quad y' = \frac{2}{5} (x^3+5)^{-3/5} \cdot 3x^2$$

$$(44) \quad y' = \frac{1}{\sqrt{\frac{1-2\sin^2 x}{1+2\sin^2 x}}} \cdot \frac{1}{2\sqrt{\frac{1-2\sin^2 x}{1+2\sin^2 x}}} \cdot \frac{-2 \sin x \cdot (\cos x (1+2\sin^2 x) - 2 \sin x \cos(1-2\sin^2 x))}{(1+2\sin^2 x)}$$

$$(45) \quad y' = \frac{1}{\sqrt{\frac{1-\cos^2 x}{1+\cos^2 x}}} \cdot \frac{1}{2\sqrt{\frac{1-\cos^2 x}{1+\cos^2 x}}} \cdot \frac{2 \cos x \cdot \sin x (1+\cos^2 x) + 2 (\cos x \sin x (1-\cos^2 x))}{(1+\cos^2 x)}$$