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. $y = (x2 - 4x + 5)^4 + \sqrt{x^2 - 2x + 1}$
3. $y = \dfrac{e^x - e^{-x}}{2}$
4. $y = \dfrac{x^2 - 2x + 3}{x^2 - 1}$
5. $y = \operatorname{sen}(x-1)^2 - \operatorname{sen}^2(x-1)$
6. $y = \operatorname{sen}(\sqrt{e^{2x} - 1})$
7. $y = \cos(\dfrac{x-1}{x+1}).\operatorname{sen}(\sqrt{2x-1})$
8. $y = \operatorname{tg}(\frac{e^x - e^{-x}}{e^x + e^{-x}})$
9. y = tg 3x + tg x^3 + tg^3 x
10. y = arcos ($\sqrt{x^3 - 2}$)
11. y = e^{3x}. $\sqrt{x^2 + 1}$
12. y = $\sqrt{\dfrac{x^2 - 1}{x^2 + 1}}$
13. $y = 10^{\sqrt{\frac{x-1}{x+1}}}$
14. $y = \dfrac{Ln(x^2 - 1)}{x}$
15. $y = 5^{\operatorname{sen}(2x-2)} + \sqrt{\cos(2x-3)}$
16. $y = \sqrt{\operatorname{sen}(\ln(e^{x^2-1}))}$
17. $y = Ln(\dfrac{1 + \operatorname{sen} x}{\operatorname{tg} x})$
18. $y = \dfrac{x^2 \operatorname{sen} x}{2^x}$
19. $y = \sec(x-1) + \operatorname{cos}ec(2x+3)$
20. $y = \operatorname{arcsen}\sqrt{1 - 4x^2}$
21. $y = ar\cos(\dfrac{\operatorname{sen} x}{\cos x})$
22. $y = \dfrac{5^x x^5}{\sqrt{5x}}$
23. $y = \cos(5x+3)\dfrac{4}{x^2 + x + 1}$
24. $y = \ln\sqrt{\dfrac{x - \operatorname{sen} x}{x + \operatorname{sen} x}}$
25. $y = \dfrac{1 - \operatorname{sen}^2 x}{1 + \operatorname{sen}^2 x}$
26. $y = \operatorname{sen}(\cos(tan(\sqrt{e^{x^2-1}})))$
27. $y = \sqrt{\ln(\operatorname{sen}(tan(10^{\sec x})))}$
28. $y = arctan(\operatorname{sen}(10^{\sqrt{x^2-1}}))$
29. $y = x^{COSX}$
30. $y = (\operatorname{sen} x)^{\sqrt{x}}$
31. $y = (\operatorname{arcsen} x)^{\cos x}$
32. $y = (tan(x^2 - 1))^{e^x}$
33. $y = (\sqrt{x^2 - 1})^{arctanx}$
34. $y = (\sec(2x-3))^{\ln x}$
35. $y = (\ln x)^{\operatorname{sen}(x^2-1)}$
36. $y = (10^{\sqrt{x}})^{tanx}$
37. $y = (arctan(x^2 + 1))^{\cos 2x}$
38. $y = \dfrac{x^3 - 3}{x^2 + 4}$
39. $y = Ln\dfrac{x^2 - 1}{x^2 + 3}$
40. $y = Ln\dfrac{x+1}{x+3}$
41. $y = \operatorname{sen}^5 x$
42. $y = \operatorname{sen} x^5$
43. $y = (x^3 + 5)^{2/5}$
44. $y = \ln\sqrt{\dfrac{1 - \operatorname{sen}^2 x}{1 + \operatorname{sen}^2 x}}$
45. $y = \ln\sqrt{\dfrac{1 - \cos^2 x}{1 + \cos^2 x}}$

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

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

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

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

(9) $y' = 3\,\mathrm{Sec}^2(3x) + 3x^2\,\mathrm{Sec}^2(x^3) + 3\,\mathrm{Tang}^2 x \cdot \mathrm{Sec}^2 x$

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

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

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

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

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

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

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

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

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

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

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

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

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

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