

Exercicis de derivades - Solucions

1. $D(\ln(2x-1)) = \frac{2}{2x-1}$
2. $D(\ln(x^2-1)) = \frac{2x}{x^2-1}$
3. $D(e^{4x}) = 4e^{4x}$
4. $D(\log_3(7x+2)) = \frac{7 \log_3 e}{7x+2}$
5. $D(2^x) = 2^x \ln 2$
6. $D(5e^{x^2+3x}) = 5e^{x^2+3x}(2x+3)$
7. $D((x^3+1)(x^3-1)) = 3x^2(x^3-1) + (x^3+1)3x^2 = 6x^5$
8. $D(x^3e^x) = 3x^2e^x + x^3e^x$
9. $D(x \ln x) = \ln x + x \frac{1}{x} = \ln x + 1$
10. $D(e^x \operatorname{tg} x) = e^x \operatorname{tg} x + e^x(1 + \operatorname{tg}^2 x) = e^x(1 + \operatorname{tg} x + \operatorname{tg}^2 x)$
11. $D(\sin x \cdot \cos 2x) = \cos x \cos 2x - 2 \sin x \sin 2x$
12. $D\left(\frac{1}{x-1}\right) = \frac{-1}{(x-1)^2}$
13. $D\left(\frac{-x}{x+1}\right) = \frac{-1(x+1) + x}{(x+1)^2} = \frac{-1}{(x+1)^2}$
14. $D\left(\frac{3}{x^2-1}\right) = \frac{-3(2x)}{(x^2-1)^2} = \frac{-6x}{(x^2-1)^2}$
15. $D\left(\frac{x^2-3}{x^2+3}\right) = \frac{2x(x^2+3) - (x^2-3)2x}{(x^2+3)^2} = \frac{12x}{(x^2+3)^2}$
16. $D\left(\frac{\ln x}{x}\right) = \frac{\frac{1}{x}x - \ln x \cdot 1}{x^2} = \frac{1 - \ln x}{x^2}$
17. $D(5x^3 - 3x^2 + 4) = 15x^2 - 6x$
18. $D((x+1)^3) = 3(x+1)^2$
19. $D(\sqrt[3]{x^2+3}) = \frac{2x}{3\sqrt[3]{(x^2+3)^2}}$
20. $D(x^2 \ln x) = 2x \ln x + x^2 \frac{1}{x} = 2x \ln x + x$
21. $D\left(\frac{x}{\ln x}\right) = \frac{1 \ln x - x \frac{1}{x}}{(\ln x)^2} = \frac{\ln x - 1}{(\ln x)^2}$
22. $D(\sin 2x) = 2 \cos 2x$

23. $D((\sin x)^5) = 5(\sin x)^4 \cos x$
24. $D(e^x \sin x) = e^x \sin x + e^x \cos x$
25. $D(\cos(3x+1)) = -3 \sin(3x+1)$
26. $D(e^{7x^2}) = e^{7x^2} \cdot 14x$
27. $D(e^{\sin 2x}) = e^{\sin 2x} 2 \cos 2x$
28. $D(e^x + \ln x) = e^x + \frac{1}{x}$
29. $D(\sin(x^2 - 5x + 7)) = \cos(x^2 - 5x + 7) \cdot (2x - 5)$
30. $D(\sin(3x+1) \cdot \cos(3x+1)) = 3 \cos(3x+1) \cdot \cos(3x+1) - \sin(3x+1) \cdot 3 \sin(3x+1) =$
 $= 3 \cos^2(3x+1) - 3 \sin^2(3x+1)$
31. $D\left(\frac{\log x^2}{x}\right) = \frac{\frac{2x \log e}{x^2} - \log x^2}{x^2} = \frac{2x \log e - x^2 \log x^2}{x^4} = \frac{2 \log e - x \log x^2}{x^3}$
32. $D(\sqrt{1+2x}) = \frac{2}{2\sqrt{1+2x}} = \frac{1}{\sqrt{1+2x}}$
33. $D(xe^{2x+1}) = e^{2x+1} + x \cdot 2e^{2x+1} = (2x+1)e^{2x+1}$
34. $D\left(\frac{1}{7x+1}\right) = \frac{-7}{(7x+1)^2}$
35. $D\left(\frac{2}{(x+3)^3}\right) = \frac{-6}{(x+3)^4}$
36. $D\left(\frac{x^3}{2} + \frac{3}{2}x^2 - \frac{x}{2}\right) = \frac{3}{2}x^2 + 3x - \frac{1}{2}$
37. $D\left(\frac{1}{\sqrt{x-4}}\right) = \frac{-1}{2\sqrt{(x-4)^3}}$
38. $D\left(\frac{e^x + e^{-x}}{2}\right) = \frac{e^x - e^{-x}}{2}$
39. $D\left(\frac{x^3}{(x-1)^2}\right) = \frac{3x^2(x-1)^2 - x^3(x-1)}{(x-1)^4} = \frac{3x^2(x-1) - x^3}{(x-1)^3} = \frac{2x^3 - 3x^2}{(x-1)^3}$
40. $D\left(\sqrt{\frac{x^3}{x^2-4}}\right) = \frac{\frac{3x^2(x^2-4) - x^3 \cdot 2x}{(x^2-4)^2}}{2\sqrt{\frac{x^3}{x^2-4}}} = \frac{x^4 - 12x^2}{2\sqrt{x^3(x^2-4)^3}}$
41. $D(\tan^3 x^2) = 3 \tan^2 x^2 \cdot (1 + \tan^2 x^2) \cdot 2x = 3x(\tan^2 x^2 + \tan^4 x^2)$
42. $D(\sqrt{\sin x}) = \frac{\cos x}{2\sqrt{\sin x}}$
43. $D(7^{x+1} e^{-x}) = 7^{x+1} \ln 7 \cdot e^{-x} - 7^{x+1} e^{-x} = 7^{x+1} e^{-x} (\ln 7 - 1)$

$$44. D(\ln 3x + e^{\sqrt{x}}) = \frac{1}{3x} \cdot 3 + e^{\sqrt{x}} \frac{1}{2\sqrt{x}} = \frac{1}{x} + \frac{e^{\sqrt{x}}}{2\sqrt{x}}$$

$$45. D(e^{2x} \cdot \tan x) = 2e^{2x} \tan x + e^{2x}(1 + \tan^2 x) = e^{2x}(1 + 2 \tan x + \tan^2 x)$$

$$46. D\left(\log \frac{x^2}{3-x}\right) = \frac{\frac{2x(3-x) - x^2(-1)}{(3-x)^2}}{\frac{x^2}{3-x}} = \frac{6x - x^2}{x^2(3-x)} = \frac{6-x}{x(3-x)}$$

$$47. D(\sqrt{\ln x}) = \frac{1}{2\sqrt{\ln x}} \cdot \frac{1}{x} = \frac{1}{2x\sqrt{\ln x}}$$

$$48. D(\sqrt{x^2+1}) = \frac{2x}{2\sqrt{x^2+1}}$$

$$49. D((x^2-3)^2) = 2(x^2-3)(2x) = 4x^3 - 12x$$

$$50. D\left(\left(\frac{x}{1+x^2}\right)^2\right) = 2 \frac{x}{1+x^2} \cdot \frac{1 \cdot (1+x^2) - x \cdot 2x}{(1+x^2)^2} = \frac{2x(1-x^2)}{(1+x^2)^3}$$