

Soluciones de los ejercicios de derivación

1. $\frac{1 - \cos(2x)}{\sqrt{2x - \sin(2x)}}$
2. $\frac{-\cos x \sin x}{2(\cos^2 x + 1)^{3/4}}$
3. $\ln x$
4. $\frac{\sqrt{x} + 1}{2\sqrt{x^2 + 2x\sqrt{x}}}$
5. $\frac{4a^2x}{a^4 - x^4}$
6. $-2 \cot^2 x \operatorname{cosec} x$
7. $\frac{2}{x - ax^5}$
8. $e^{-x/2} + e^{x/2}$
9. $\frac{e^{\sqrt{x}}(\sqrt{x} + 1)}{2\sqrt{x}}$
10. $\frac{1}{a} e^{\frac{x}{a}} \left(\cos\left(\frac{x}{a}\right) - \sin\left(\frac{x}{a}\right) \right)$
11. $-2e^{-x} \sin x$
12. $\frac{-x}{x + 1}$
13. $\frac{-2 \ln(a) a^{-2t}}{1 + a^{-2t}}$
14. $\frac{\cos x}{\sqrt{\sin^2 x + 1}}$
15. $\frac{\cot(2x)}{1 - \sin(2x)}$
16. $\cot(2x)$
17. $\sec x \tan\left(\frac{x}{2}\right)$
18. $2(x \cot x + \ln(\sin x)) \sin^{2x} x$
19. $\frac{-x}{\sqrt{x^2 + ax}}$
20. $\frac{8}{5 \cos(2t) + 3}$
21. $\frac{1 - x}{\sqrt{1 - x^2}}$
22. $\frac{x^2}{x^2 + 1}$
23. $2\sqrt{1 - x^2}$
24. $\frac{3e^{3x}}{\sqrt{1 - e^{6x}}}$
25. $\frac{(3x^2 - 5)^{\frac{1-x}{x}} (6x^2 + (5 - 3x^2) \ln(3x^2 - 5))}{x^2}$
26. $\frac{11x + 16}{(x - 1)(x + 2)^2}$
27. $\frac{-2}{x^4 - 1}$
28. $x \left(\frac{1}{x^2 + 1} - \frac{a}{a^2 + x^2} \right) + \arctan x$
29. $2e^x \sqrt{1 - e^{2x}}$
30. $\frac{-1 + 2e^{2x} + e^{4x}}{(1 + e^{2x})(1 + e^{4x})}$
31. $\frac{x}{\sqrt{x^2 - 4x}}$
32. $\frac{\sin x + 1}{x - \cos x}$
33. $\sec^2\left(\frac{x}{5}\right)$
34. $\frac{-2\sqrt{x} - 1}{6(\sqrt{x} + 1)x \sqrt[3]{x + \sqrt{x}}}$
35. $e^{\cos x} (\cos x - \sin^2 x)$
36. $\frac{e^{-x^2}(1 - 2x^2 \ln x)}{x}$
37. $\frac{5(x - 1)(x + 1)^9}{x^6}$
38. $\frac{-1}{x^2 + 1}$
39. $2e^{2x+3}x^2$
40. $2 \sec(2x) \tan(2x)$
41. $\frac{x^2 + 1}{x^4 + x^2 + 1}$
42. $\frac{-2 \operatorname{cosec}^2 x (x \cos x + \sin x)}{x^2}$
43. $\frac{1}{6} \sin\left(\frac{x}{3}\right) \left(4 \cos\left(\frac{x}{3}\right) \cot\left(\frac{x}{2}\right) - 3 \operatorname{cosec}^2\left(\frac{x}{2}\right) \sin\left(\frac{x}{3}\right) \right)$
44. $\frac{-2\sqrt[9]{2}(31x^5 + 18)}{27x^5(2x^5 + 1)^{8/9}}$
45. $\frac{x^4 + 1}{x^6 + 1}$
46. $\frac{\cos x}{2\sqrt{(1 - \sin(x)) \sin(x)}}$
47. $\frac{x \arcsin x}{\sqrt{1 - x^2}}$
48. $\frac{-\sin\left(\frac{1}{2} \arcsin x\right)}{2\sqrt{1 - x^2}}$
49. $\frac{\sqrt{x}(4\sqrt{x + \sqrt{x}} + 2) + 1}{8\sqrt{x}\sqrt{x + \sqrt{x}}\sqrt{x + \sqrt{x + \sqrt{x}}}}$

$$50. \frac{(\ln x - 2) \sin\left(\frac{2-2\ln x}{x}\right)}{x^2}$$

$$51. \frac{-1}{(x^2 + 2x + 2) \arctan\left(\frac{1}{x+1}\right)}$$

$$52. \frac{x^2 + 4x - 6}{(x - 3)^5}$$

$$53. \cos^2 x \sin^3 x$$

$$54. \frac{5\sqrt{1-x^2} \cos x + e^x \sqrt{1-x^2} - 4}{\sqrt{1-x^2}(-4 \arcsin x + e^x + 5 \sin x)}$$

$$55. (3x^2 - 5)^{x-3}(6(x-2)x + (3x^2 - 5) \ln(3x^2 - 5))$$

$$56. x \cos x - \frac{x}{2}$$

$$57. \frac{-1}{\sqrt{x^2 - 1}}$$

$$58. \frac{x + 2}{2\sqrt{x + 3}(\sqrt{x + 3} + 1)^{2/3}}$$

$$59. \frac{(9\sqrt{x} + 8)x}{4\sqrt{\sqrt{x} + 1}}$$

$$60. \frac{-\cos x \sin x}{(\sin^2 x + 1)^{3/2}}$$

$$61. \frac{\cot x \ln(\cos x) + \ln(\sin x) \tan x}{\ln^2(\cos x)}$$

$$62. \frac{1 - x}{\sqrt{1 - x^2}}$$

$$63. \ln(10) 10^{x \tan x} (x \sec^2 x + \tan x)$$

$$64. \frac{-x^2 - x + 1}{(x + 1)\sqrt{1 - x^2}}$$

$$65. \frac{x^2}{1 - x^4}$$

$$66. \frac{\ln(2) 2^{\frac{x}{\ln x}} (\ln x - 1)}{\ln^2 x}$$

$$67. \frac{a - x}{\sqrt{a^2 - x^2}}$$

$$68. \frac{x^2}{(x^2 - 1)^{3/2}}$$

$$69. (a^2 + 1)e^{ax} \sin x$$

$$70. 9x^2 \arcsin x$$

$$71. \frac{e^{-\sqrt{x}}}{4(1 + e^{-\sqrt{x}})^{3/2} \sqrt{x}}$$

$$72. \frac{x}{\sqrt{-x^2 + 4x + 2}}$$

$$73. \frac{1}{\sqrt{1 + 4e^x + e^{2x}}}$$

$$74. \frac{e^{\arctan(\sqrt{\ln(2x+3)+1})}}{(2x+3)\sqrt{\ln(2x+3)+1}(\ln+3)+2)}$$

$$75. \operatorname{cosec}^2 x \ln(\sin x + 1)$$

$$76. \frac{e^{x^2+x}(2x + e^{2x}(2x - 1) + 1)}{(1 + e^{2x})^2}$$

$$77. \frac{4(6x + \sqrt{1 - 4x^2})}{12x^2 + 2x\sqrt{1 - 4x^2} - 3}$$

$$78. \frac{2(3x^2 + 12x + 2)}{(x + 2)^5}$$

$$79. \frac{-1}{2\sqrt{x^2 - x}}$$

$$80. \frac{4e^{2x}}{1 - e^{8x}}$$

$$81. \left(x(x+1) \cot\left(\frac{x^2}{2}\right) + \ln\left(\sin\left(\frac{x^2}{2}\right)\right) \right) \sin^{x+1}\left(\frac{x^2}{2}\right)$$

$$82. x^5(x^3 + 1)^{2/3}$$

$$83. \frac{1}{\sqrt{1 + e^x}}$$

$$84. \frac{-a^{\sqrt{\cos x}}(\sqrt{\cos x} \ln(a) + 1) \sin x}{2\sqrt{\cos x}}$$

$$85. 2 \cos(\ln x)$$

$$86. \frac{x + 1}{x^2 + 1} + \frac{2}{3x^3}$$

$$87. \frac{-e^{\sqrt{\frac{1-x}{x+1}}}}{(x+1)\sqrt{1-x^2}}$$

$$88. -\frac{2x}{(x^2 + 1)^2} - \frac{1}{(x + 2)^2}$$

$$89. -\frac{4}{3} e^{1-\sin^4(\frac{x}{3})} \cos(\frac{x}{3}) \sin^3(\frac{x}{3})$$

$$90. \frac{x|x| + 1}{|x| \sqrt{x^2 + 1}}$$

$$91. -2 \cos(\cos(2x)) \sin(2x)$$

$$92. (3x^2 + 1)^{\cos(x^2)-1} (6x \cos(x^2) - 2(3x^3 + x) \ln(3x^2 + 1) \sin(x^2))$$

$$93. 9x^2 \arcsin x$$

$$94. \arcsin^2 x$$