

SOLUCIÓN BOLETÍN DE DERIVADAS

1	$f(x) = 0$	$f'(x) = 0$
2	$f(x) = -7$	$f'(x) = 0$
3	$f(x) = -7x$	$f'(x) = -7$
4	$f(x) = -5x + 2$	$f'(x) = -5$
5	$f(x) = x^5 - x^3 + 3$	$f'(x) = 5x^4 - 3x^2$
6	$f(x) = 2x^7 - 3x^6 + 3x^3 - 4x^2 - 7$	$f'(x) = 14x^6 - 18x^5 + 9x^2 - 8x$
7	$f(x) = \frac{x-3}{2}$	$f(x) = \frac{x}{2} - \frac{3}{2}$ $f'(x) = \frac{1}{2}$
8	$f(x) = -\frac{x^3+x-1}{2}$	$f(x) = -\frac{x^3}{2} - \frac{x}{2} + \frac{1}{2}$ $f'(x) = -\frac{3x^2}{2} - \frac{1}{2}$
9	$f(x) = -\frac{3}{2}x^3 + \frac{2}{5}x^2 - 4$	$f'(x) = -\frac{9}{2}x^2 + \frac{4}{5}x$
10	$f(x) = \frac{3}{x^2}$	$f(x) = 3 \cdot x^{-2}$ $f'(x) = -6x^{-3} = -\frac{6}{x^3}$
11	$f(x) = -\frac{2}{x^3} + \frac{3}{x^2} - 4x$	$f(x) = -2 \cdot x^{-3} + 3 \cdot x^{-2} - 4x$ $f'(x) = +6 \cdot x^{-4} - 6 \cdot x^{-3} - 4$ $f'(x) = \frac{6}{x^4} - \frac{6}{x^3} - 4$

12	$f(x) = \frac{x^2-1}{(x+1)^2}$	$f(x) = \frac{(x+1) \cdot (x-1)}{(x+1) \cdot (x+1)}$ $f(x) = \frac{(x-1)}{(x+1)}$ $f'(x) = \frac{(x-1)' \cdot (x+1) - (x-1) \cdot (x+1)'}{(x+1)^2}$ $f'(x) = \frac{(x+1) \cdot (x-1)' - (x-1) \cdot (x+1)'}{(x+1)^2} = \frac{x+1-x-1}{(x+1)^2} = \frac{2}{(x+1)^2}$ $f'(x) = \frac{2}{(x+1)^2}$
13	$f(x) = \frac{5x^4-3x^3}{x^5}$	$f(x) = +5 \frac{x^4}{x^5} - 3 \frac{x^3}{x^5}$ $f'(x) = +5x^{4-5} - 3x^{3-5}$ $f(x) = +5x^{-1} - 3x^{-2}$ $f'(x) = -5x^{-2} + 6x^{-3}$ $f'(x) = -\frac{5}{x^2} + \frac{6}{x^3}$
14	$f(x) = \sqrt{x^3}$	$f(x) = x^{\frac{3}{2}}$ $f'(x) = \frac{3}{2}x^{\frac{3}{2}-\frac{2}{2}}$ $f'(x) = \frac{3}{2}x^{\frac{1}{2}}$ $f'(x) = \frac{3}{2}\sqrt{x}$

15	$f(x) = \frac{1}{\sqrt{x^3}}$ $f(x) = x^{-\frac{3}{2}}$ $f'(x) = -\frac{3}{2}x^{-\frac{3}{2}-\frac{2}{2}}$ $f'(x) = -\frac{3}{2}x^{-\frac{5}{2}}$ $f'(x) = -\frac{3}{2}\frac{1}{\sqrt{x^5}}$ $f'(x) = -\frac{3}{2}\frac{1}{x^2\sqrt{x}}$
16	$f(x) = \sqrt{x^3} - \sqrt[3]{x^5}$ $f(x) = x^{\frac{3}{2}} - x^{\frac{5}{3}}$ $f'(x) = \frac{3}{2} \cdot x^{\frac{3}{2}-\frac{2}{2}} - \frac{5}{3}x^{\frac{5}{3}-\frac{2}{3}}$ $f'(x) = \frac{3}{2} \cdot x^{\frac{1}{2}} - \frac{5}{3}x^{\frac{2}{3}}$ $f'(x) = \frac{3}{2} \cdot \sqrt{x} - \frac{5}{3}\sqrt[3]{x^2}$
17	$f(x) = -3\sqrt{x} - 2\sqrt[3]{x^2}$ $f(x) = -3x^{\frac{1}{2}} - 2x^{\frac{2}{3}}$ $f'(x) = -\frac{3}{2}x^{\frac{1}{2}-\frac{2}{2}} - \frac{4}{3}x^{\frac{2}{3}-\frac{2}{3}}$ $f'(x) = -\frac{3}{2} \cdot x^{-\frac{1}{2}} - \frac{4}{3}x^{-\frac{1}{3}}$ $f'(x) = -\frac{3}{2\sqrt{x}} - \frac{4}{3\sqrt[3]{x}}$

18	$f(x) = -\frac{2}{3}\sqrt{x^3} - \sqrt{15x} - \sqrt[3]{x^5}$ $f(x) = -\frac{2}{3} \cdot \frac{3}{2}x^{\frac{3}{2}-\frac{2}{2}} - \sqrt{15} \frac{1}{2}x^{\frac{1}{2}-\frac{2}{2}} - \frac{5}{3}x^{\frac{5}{3}-\frac{2}{3}}$ $f'(x) = -x^{\frac{1}{2}} - \sqrt{15} \frac{5}{3}x^{-\frac{1}{2}} - x^{\frac{2}{3}}$ $f'(x) = -\sqrt{x} - \frac{\sqrt{15}}{2\sqrt{x}} - \frac{5}{3}\sqrt[3]{x^2}$
19	$f(x) = -\frac{3}{2}\sqrt{x^3} - 2x^5 - 5x^2$ $f(x) = -\frac{3}{2} \cdot \frac{3}{2}x^{\frac{3}{2}-\frac{1}{2}} - 10x^4 - 10x$ $f'(x) = -\frac{9}{4}\sqrt{x} - 10x^4 - 10x$
20	$f(x) = \frac{\sqrt{x^3}\sqrt{x}}{\sqrt[2]{x}} = \frac{x^{\frac{3}{2}}x^{\frac{1}{2}}}{x^{\frac{1}{2}}} = \frac{x^{\frac{3}{2}+\frac{1}{2}}}{x^{\frac{1}{2}}} = \frac{x^2}{x^{\frac{1}{2}}}$ $f(x) = x^{2-\frac{1}{2}} = x^{\frac{3}{2}}$ $f'(x) = \frac{2}{6} \cdot x^{-\frac{4}{6}} = \frac{2}{6} \cdot x^{-\frac{2}{3}}$ $f'(x) = \frac{1}{3\sqrt[3]{x^2}}$

21	$f(x) = \frac{2\sqrt{x} + \sqrt[3]{x}}{\sqrt[2]{x}}$	$f(x) = \frac{2\sqrt{x} + \sqrt[3]{x}}{\sqrt[2]{x}} = \frac{2\sqrt{x}}{\sqrt[2]{x}} + \frac{\sqrt[3]{x}}{\sqrt[2]{x}}$ $f(x) = \frac{2x^{\frac{1}{2}}}{x^{\frac{1}{2}}} + \frac{x^{\frac{1}{3}}}{x^{\frac{1}{2}}}$ $f(x) = 2 + x^{-\frac{1}{6}}$ $f'(x) = -\frac{1}{6}x^{-\frac{7}{6}}$ $f'(x) = -\frac{1}{6x^{\frac{7}{6}}}$
22	$f(x) = (x^5 - x^3 + 3)^4$	$f'(x) = 4 \cdot (x^5 - x^3 + 3)^3 \cdot (5x^4 - 3x^2)$
23	$f(x) = (x^2 - 2)^2$	$f'(x) = 2 \cdot (x^2 - 2) \cdot (2x)$ $f'(x) = 4x \cdot (x^2 - 2)$ $f'(x) = 4x^3 - 8x$
24	$f(x) = (x - 1) \cdot (x + 1)^2$	$f'(x) = (x + 1)^2 + (x - 1) \cdot 2 \cdot (x + 1)$ $f'(x) = x^2 + 2x + 1 + 2x^2 - 2$ $f'(x) = 3x^2 + 2x - 1$
25	$f(x) = (x^5 - x^3 + 3)^4$	$f(x) = (x^5 - x^3 + 3)^4$ $f'(x) = 4 \cdot (x^5 - x^3 + 3)^3 \cdot (5x^4 - 3x^2)$

26	$f(x) = \sqrt{(x^5 - x^3 + 3)}$	$f(x) = ((x^5 - x^3 + 3))^{\frac{1}{2}}$ $f'(x) = \frac{1}{2} \cdot ((x^5 - x^3 + 3))^{-\frac{1}{2}} \cdot (5x^4 - 3x^2)$ $f'(x) = \frac{(5x^4 - 3x^2)}{2 \cdot \sqrt{x^5 - x^3 + 3}}$
27	$f(x) = \sqrt[5]{x^5 - x^3 + 3}$	$f(x) = ((x^5 - x^3 + 3))^{\frac{1}{5}}$ $f'(x) = \frac{1}{5} \cdot ((x^5 - x^3 + 3))^{-\frac{4}{5}} \cdot (5x^4 - 3x^2)$ $f'(x) = \frac{(5x^4 - 3x^2)}{5 \cdot \sqrt[5]{(x^5 - x^3 + 3)^4}}$
28	$f(x) = \frac{1}{\sqrt[5]{x^5 - x^3 + 3}}$	$f(x) = ((x^5 - x^3 + 3))^{-\frac{1}{5}}$ $f'(x) = -\frac{1}{5} \cdot ((x^5 - x^3 + 3))^{-\frac{6}{5}} \cdot (5x^4 - 3x^2)$ $f'(x) = -\frac{(5x^4 - 3x^2)}{5 \cdot \sqrt[5]{(x^5 - x^3 + 3)^6}} = -\frac{(5x^4 - 3x^2)}{5 \cdot (x^5 - x^3 + 3)^{\frac{6}{5}} \sqrt[5]{(x^5 - x^3 + 3)}}$

29	$f(x) = \sqrt[3]{\frac{x^5 - x^3 + 3}{x^2}}$	$f(x) = \left(\frac{x^5 - x^3 + 3}{x^2} \right)^{\frac{1}{3}}$ $f'(x) = \frac{1}{3 \sqrt[3]{\left(\frac{x^5 - x^3 + 3}{x^2} \right)^2}} \cdot \frac{(5x^4 - 3x^2) \cdot x^2 - (x^5 - x^3 + 3) \cdot 2x}{x^4}$ $= \frac{1}{3 \sqrt[3]{\left(\frac{x^5 - x^3 + 3}{x^2} \right)^2}} \cdot \frac{(3x^5 - x^3 - 6)}{x^3}$
30	$f(x) = \sqrt[5]{\frac{x^2 + x}{x + 1}}$	$f(x) = \sqrt[5]{\frac{x^2 + x}{x + 1}} = \sqrt[5]{\frac{x \cdot (x + 1)}{x + 1}} = \sqrt[5]{x}$ $f'(x) = \frac{1}{5 \sqrt[5]{x^4}}$
31	$f(x) = \sqrt{\frac{x^2 + 2x + 1}{x^2 - 1}}$	$f(x) = \sqrt{\frac{x^2 + 2x + 1}{x^2 - 1}} = \sqrt{\frac{(x + 1) \cdot (x + 1)}{(x + 1) \cdot (x - 1)}} = \sqrt{\frac{(x + 1)}{(x - 1)}}$ $f'(x) = \frac{1}{2 \sqrt{\frac{(x + 1)}{(x - 1)}}} \cdot \frac{x - 1 - x - 1}{(x - 1)^2} = \frac{1}{\sqrt{\frac{(x + 1)}{(x - 1)}}} \cdot \frac{1}{(x - 1)^2} = -\frac{1}{\sqrt{x^2 - 1} \cdot (x - 1)}$

32	$f(x) = \sqrt{\frac{x^2 - 1}{x^2 - 2x + 1}}$	$f(x) = \sqrt{\frac{x^2 - 1}{x^2 - 2x + 1}} = \sqrt{\frac{(x + 1) \cdot (x - 1)}{(x - 1) \cdot (x - 1)}} = \sqrt{\frac{(x + 1)}{(x - 1)}}$ $f'(x) = \frac{1}{2 \sqrt{\frac{(x + 1)}{(x - 1)}}} \cdot \frac{x - 1 - x - 1}{(x - 1)^2} = \frac{1}{\sqrt{\frac{(x + 1)}{(x - 1)}}} \cdot \frac{1}{(x - 1)^2} = -\frac{1}{\sqrt{x^2 - 1} \cdot (x - 1)}$
33	$f(x) = e^{x+1}$	$f'(x) = e^{x+1}$
34	$f(x) = -3 \cdot e^{x+1}$	$f'(x) = -3 \cdot e^{x+1}$
35	$f(x) = 7 \cdot e^{x^2+1}$	$f'(x) = 7 \cdot e^{x^2+1} \cdot 2x = 14x \cdot e^{x^2}$
36	$f(x) = -3 \cdot e^{x^2+x-1}$	$f'(x) = -3 \cdot (2x + 1) e^{x^2+x-1}$
37	$f(x) = \sqrt{e^x}$	$f'(x) = \frac{e^x}{2\sqrt{e^x}}$
38	$f(x) = \sqrt{3e^{x+1}}$	$f'(x) = \frac{3e^{x+1}}{2\sqrt{3e^{x+1}}}$
39	$f(x) = -\frac{2}{\sqrt{e^x}}$	$f(x) = -2 \cdot (e^x)^{-\frac{1}{2}}$ $f'(x) = -\frac{2}{2} \cdot (e^x)^{-\frac{3}{2}} \cdot e^x = -\frac{1}{\sqrt{e^x}}$
40	$f(x) = e^{x+1} - 3e^x + 2e^{x^3}$	$f'(x) = e^{x+1} - 3e^x + 6x^2 e^{x^3}$
41	$f(x) = 3^{2x+1}$	$f'(x) = 3^{2x+1} \cdot \ln 3 \cdot 2$
42	$f(x) = 7^{x-1}$	$f'(x) = 7^{x-1} \cdot \ln 7$

43	$f(x) = 7^{x^2-1}$	$f'(x) = 7^{x^2-1} \cdot \ln 7 \cdot 2x$
44	$f(x) = -\frac{1}{\sqrt{2^x}}$	$f(x) = -(2^x)^{-\frac{1}{2}}$ $f'(x) = \frac{1}{2}(2^x)^{-\frac{3}{2}} \ln 2 \cdot 2^x$ $f'(x) = \frac{\ln 2}{2\sqrt{2^x}}$
45	$f(x) = 2^{x+1} - 3 \cdot 5^x$	$f'(x) = 2^{x+1} \cdot \ln 2 - 3 \cdot (5^x \cdot \ln 5)$
46	$f(x) = (2^{x+1} - 3 \cdot 5^x)^3$	$f'(x) = 3 \cdot (2^{x+1} - 3 \cdot 5^x)^2 \cdot (2^{x+1} \cdot \ln 2 - 3 \cdot (5^x \cdot \ln 5))$
47	$f(x) = \sqrt{3^{x+1}}$	$f(x) = (3^{x+1})^{\frac{1}{2}}$ $f'(x) = \frac{1}{2} \cdot (3^{x+1})^{-\frac{1}{2}} \cdot 3^{x+1} \cdot \ln 3$ $f'(x) = \frac{3^{x+1} \ln 3}{2\sqrt{3^{x+1}}}$
48	$f(x) = 7^{\sqrt{x+1}}$	$f'(x) = 7^{\sqrt{x+1}} \cdot \ln 7 \cdot \frac{1}{2\sqrt{x+1}}$
49	$f(x) = \frac{e^{3x} + e^{x^2}}{3}$	$f'(x) = \frac{e^{3x} \cdot 3}{3} + \frac{e^{x^2} \cdot 2x}{3}$ $f'(x) = e^{3x} + \frac{e^{x^2} \cdot 2x}{3}$

50	$f(x) = \frac{7^{x^2}}{x^3}$	$f'(x) = \frac{7^{x^2} \cdot \ln 7 \cdot 2x \cdot x^3 - 7^{x^2} \cdot 3x^2}{x^6}$ $f'(x) = \frac{7^{x^2} \cdot (\ln 7 \cdot 2x^2 - 3)}{x^4}$
51	$f(x) = \frac{e^{x^2}}{x^3}$	$f'(x) = \frac{e^{x^2} \cdot 2x \cdot x^3 - e^{x^2} \cdot 3x^2}{x^6} = \frac{x^2(e^{x^2} \cdot 2x^2 - e^{x^2} \cdot 3)}{x^6} =$ $\frac{(e^{x^2} \cdot 2x^2 - e^{x^2} \cdot 3)}{x^4}$ $f'(x) = \frac{e^{x^2} \cdot (2x^2 - 3)}{x^4}$
52	$f(x) = \sqrt{\frac{7^{x^2}}{x^3}}$	$f'(x) = \frac{1}{2 \cdot \sqrt{\frac{7^{x^2}}{x^3}}} \cdot \frac{7^{x^2} \cdot \ln 7 \cdot 2x \cdot x^3 - 7^{x^2} \cdot 3x^2}{x^6}$
53	$f(x) = \ln(x+3)$	$f'(x) = \frac{1}{x+3}$
54	$f(x) = 7x + \ln(x-3)$	$f'(x) = 7 + \frac{1}{x-3}$
55	$f(x) = \ln(x^2 - 3x + 2)$	$f'(x) = \frac{1}{x^2 - 3x + 2} \cdot (2x - 3)$
56	$f(x) = \frac{1}{\ln(x-1)}$	$f'(x) = \frac{-\frac{1}{(x-1)}}{(\ln(x-1))^2} = -\frac{1}{(x-1)((\ln(x-1))^2)}$

57	$f(x) = \ln \sqrt{\frac{x^2-1}{x^2-2x+1}}$	$f(x) = \ln \sqrt{\frac{x^2-1}{x^2-2x+1}} =$ $\ln \sqrt{\frac{(x-1) \cdot (x+1)}{(x-1) \cdot (x-1)}} = \ln \sqrt{\frac{(x+1)}{(x-1)}}$ $f'(x) = \frac{1}{\sqrt{\frac{(x+1)}{(x-1)}}} \cdot \frac{1}{2} \cdot \frac{(x+1) \cdot 1 - (x-1) \cdot 1}{(x-1)^2} = ..$ $\frac{(x+1) \cdot (-2)}{(x-1) \cdot 2 \cdot (x-1)^2} = -\frac{1}{x^2-1}$ $f'(x) = -\frac{1}{x^2-1}$
58	$f(x) = \ln \left(\sqrt{(x^5 - x^3 + 3)} \right)$	$f'(x) = \frac{1}{\sqrt{(x^5 - x^3 + 3)}} \cdot \frac{1}{2\sqrt{(x^5 - x^3 + 3)}} (5x^4 - 3x^2)$ $f'(x) = \frac{5x^4 - 3x^2}{(x^5 - x^3 + 3)}$
59	$f(x) = \ln \left(\frac{e^x - 1}{e^x + 1} \right)$	$f'(x) = \frac{1}{\frac{e^x - 1}{e^x + 1}} \cdot \frac{e^x \cdot (e^x + 1) - e^x \cdot (e^x - 1)}{(e^x + 1)^2}$ $f'(x) = \frac{+2e^x}{e^{2x} - 1}$
60	$f(x) = \log_3(x + 2)$	$f'(x) = \frac{u'}{u} \log_a e$ $f'(x) = \frac{1}{x + 2} \log_3 e$
61	$f(x) = \log(x - 3)^2$	$f'(x) = \frac{2 \cdot (x-3)}{(x-3)^2 \cdot \ln 10}$
62	$f(x) = \sin(x + 1)$	$f'(x) = \cos(x + 1)$

63	$f(x) = \sin(2x^3 + 2x^2)^2$	$f'(x) = 2 \cdot \sin(2x^3 + 2x^2) \cdot \cos(2x^3 + 2x^2) (6x^2 + 4x)$
64	$f(x) = \sin(x + 1) + 5x$	$f'(x) = \cos(x + 1) + 5$
65	$f(x) = \sqrt{\sin(x + 1)}$	$f(x) = \sin(x + 1)^{\frac{1}{2}}$ $f'(x) = \frac{1}{2} \sin(x + 1)^{-\frac{1}{2}} \cdot \cos(x + 1)$ $f'(x) = \frac{\cos(x+1)}{2 \cdot \sqrt{\sin(x+1)}}$
66	$f(x) = \cos(3x + 3)$	$f'(x) = -\sin(3x + 3) \cdot 3$ $f'(x) = -3 \sin(3x + 3)$
67	$f(x) = \cos(3x^2 + 3x)$	$f'(x) = -\sin(3x^2 + 3x) \cdot (6x + 3)$ $f'(x) = -3 \cdot \sin(3x^2 + 3x) \cdot (3x + 1)$
68	$f(x) = \frac{1}{\sin(x+1)}$	$f'(x) = -\frac{\cos(x+1)}{(\sin(x+1))^2}$
69	$f(x) = \frac{1}{\cos x} + \frac{1}{\sin(x+1)}$	$f'(x) = \frac{\sin x}{(\cos x)^2} - \frac{\cos(x+1)}{(\sin(x+1))^2}$
70	$f(x) = \frac{1}{\sin x} - \frac{1}{\cos(x-1)}$	$f'(x) = \frac{-\cos x}{(\sin x)^2} - \frac{\sin(x+1)}{(\cos(x-1))^2}$
71	$f(x) = \sqrt[3]{\cos(3x + 3)}$	$f'(x) = \frac{1}{3 \sqrt[3]{(\cos(3x+3))^2}} \cdot -\sin(3x + 3) \cdot 3$ $f'(x) = -\frac{\sin(3x+3)}{3 \sqrt[3]{(\cos(3x+3))^2}}$

72	$f(x) = \frac{1}{\sin(x+1)} + (x^5 - x^3 + 3)^4$	$f'(x) = -\frac{\cos(x+1)}{(\sin(x+1))^2} + 4 \cdot (x^5 - x^3 + 3)^3 \cdot (5x^4 - 3x^2)$
73	$f(x) = \ln(x-1) + e^{x+1}$	$f'(x) = \frac{1}{x-1} + e^{x+1}$
74	$f(x) = e^{x-3} + \cos(x+1) - x^2$	$f'(x) = e^{x-3} - \sin(x+1) - 2x$
75	$f(x) = \tan(x-5)$	$f'(x) = \sec^2(x-5)$
76	$f(x) = \tan(x^3 + 3)$	$f'(x) = \sec^2(x^3 + 3) \cdot 3x^2$