

## Problemas de Derivadas

<u>Funciones a derivar</u>	<u>Soluciones</u>
1) $y = x^2 + 3x - 2$	$y' = 2x + 3$
2) $y = -ax^2 + b$	$y' = -2ax$
3) $y = \frac{-x + 3}{2}$	$y' = -\frac{1}{2}$
4) $y = \frac{6x^8 - 3}{5}$	$y' = \frac{48x^7}{5}$
5) $y = mx + n$	$y' = m$
6) $y = (4 + 3x)x$	$y' = 4 + 6x$
7) $y = (3 + 2x)(3 - 2x)$	$y' = -8x$
8) $y = (ax^2 + bx + c)(ax - b)$	$y' = 3a^2x^2 - b^2 + ac$
9) $y = (-2x^2 + x - 1)\left(\frac{x-2}{2}\right)$	$y' = -3x^2 + 5x - \frac{3}{2}$
10) $y = (3x - 4)^4$	$y' = 12(3x - 4)^3$
11) $y = (2x^5 - 3)^6$	$y' = 60x^4(2x^5 - 3)^5$
12) $y = (2x + 3)^2$	$y' = 8x + 12$
13) $y = (4 - 5x)^3$	$y' = -15(4 - 5x)^2$
14) $y = 2(7x^3 - 3x)^6$	$y' = (252x^2 - 36)(7x^3 - 3x)^5$
15) $y = (2x - 3)^3(3x + 1)^2$	$y' = 6(2x - 3)^2(3x + 1)(5x - 2)$
16) $y = \frac{a}{x^n}$	$y' = -\frac{na}{x^{n+1}}$
17) $y = \frac{1}{x^4} + \frac{1}{x^3} + \frac{1}{x^2}$	$y' = -\frac{4}{x^5} - \frac{3}{x^4} - \frac{2}{x^3}$
18) $y = -\frac{2}{3}x^{-3}$	$y' = 2x^{-4}$
19) $y = \frac{a}{x^2} - \frac{b}{x} + c$	$y' = -\frac{2a}{x^3} + \frac{b}{x^2}$
20) $y = \frac{3 - 4x}{5 + 2x}$	$y' = -\frac{26}{(2x + 5)^2}$
21) $y = \frac{ax + b}{cx + d}$	$y' = \frac{ad - bc}{(cx + d)^2}$
22) $y = \frac{x^2 + 1}{x + 1}$	$y' = \frac{x^2 + 2x - 1}{(x + 1)^2}$
23) $y = \frac{x + 2}{x^2 + x + 1}$	$y' = \frac{-x^2 - 4x - 1}{(x^2 + x + 1)^2}$
24) $y = \frac{1 - x^2}{2 + x^2}$	$y' = \frac{-6x}{(x^2 + 2)^2}$
25) $y = \frac{x}{x^2 - 1}$	$y' = -\frac{x^2 + 1}{(x^2 - 1)^2}$
26) $y = \frac{3x^2 - 12}{(x - 1)^2}$	$y' = \frac{-6x + 24}{(x - 1)^3}$
27) $y = \frac{1}{a + x} + \frac{1}{a - x}$	$y' = \frac{1}{(x - a)^2} - \frac{1}{(x + a)^2}$

<u>Funciones a derivar</u>	<u>Soluciones</u>
28) $y = \frac{x^3 - 1}{x^3 + 1}$	$y' = \frac{6x^2}{(x^3 + 1)^2}$
29) $y = \sqrt{2 - x}$	$y' = -\frac{1}{2\sqrt{2 - x}}$
30) $y = 3\sqrt{x^2 - 3}$	$y' = \frac{3x}{\sqrt{x^2 - 3}}$
31) $y = 2x\sqrt{5x}$	$y' = 3\sqrt{5x}$
32) $y = \frac{2}{\sqrt{1 + x}}$	$y' = -\frac{1}{\sqrt{(x + 1)^3}}$
33) $y = \sqrt{2x^2 + 1}$	$y' = \frac{2x}{\sqrt{2x^2 + 1}}$
34) $y = \sqrt[3]{4a + 7x}$	$y' = \frac{7}{3\sqrt[3]{(4a + 7x)^2}}$
35) $y = (x - \sqrt{1 - x^2})^2$	$y' = \frac{4x^2 - 2}{\sqrt{1 - x^2}}$
36) $y = x\sqrt{a + x}$	$y' = \frac{2a + 3x}{2\sqrt{a + x}}$
37) $y = (x + \sqrt{x})^2$	$y' = 2x + 1 + 3\sqrt{x}$
38) $y = 2\sqrt[5]{x^4 - 1}$	$y' = \frac{8x^3}{5\sqrt[5]{(x^4 - 1)^4}}$
39) $y = x^3e^x + x^2e^x$	$y' = e^x(x^3 + 4x^2 + 2x)$
40) $y = e^x + e^{-x}$	$y' = e^x - e^{-x}$
41) $y = (x + 1)e^{2x + 1}$	$y' = e^{2x + 1}(2x + 3)$
42) $y = e^{2\sin x}$	$y' = 2e^{2\sin x} \cos x$
43) $y = e^{3\sin 4x}$	$y' = 12e^{3\sin 4x} \cos 4x$
44) $y = a^{\sqrt{x}}$	$y' = \frac{a^{\sqrt{x}} \ln a}{2\sqrt{x}}$
45) $y = \frac{2^x + 3^{-x}}{2}$	$y' = \frac{2^x \ln 2 - 3^{-x} \ln 3}{2}$
46) $y = x^3e^{-3x}$	$y' = 3x^2e^{-3x}(1 - x)$
47) $y = a^{nx}$	$y' = na^{nx} \ln a$
48) $y = 10^{\sqrt{x}}$	$y' = \frac{10^{\sqrt{x}} \ln 10}{2\sqrt{x}}$
49) $y = \ln \sqrt{\frac{x}{a}}$	$y' = \frac{1}{2x}$
50) $y = (1 - x)\ln(1 - x)$	$y' = -1 - \ln(1 - x)$
51) $y = \ln \frac{x + a}{x - a}$	$y' = \frac{1}{x + a} - \frac{1}{x - a}$

Funciones a derivar    Soluciones

- 52)  $y = \ln\left(1 + \frac{a}{x}\right)$      $y' = \frac{1}{x+a} - \frac{1}{x}$
- 53)  $y = \ln\sqrt[3]{x^2}$      $y' = \frac{2}{3x}$
- 54)  $y = \ln(x\sqrt{x+1})$      $y' = \frac{1}{2x+2} + \frac{1}{x}$
- 55)  $y = \ln\sqrt[4]{1-2x^2}$      $y' = \frac{x}{2x^2-1}$
- 56)  $y = \ln(2x+3)^{1/2}$      $y' = \frac{1}{2x+3}$
- 57)  $y = \ln\frac{e^x-1}{e^x+1}$      $y' = \frac{2e^x}{e^{2x}-1}$
- 58)  $y = \ln\frac{(x-5)^3}{(x+1)^2}$      $y' = \frac{3}{x-5} - \frac{2}{x+1}$
- 59)  $y = \ln\sqrt[4]{\frac{(2x^2-3)^3}{x^2-5}}$      $y' = \frac{3x}{2x^2-3} - \frac{x}{2(x^2-5)}$
- 60)  $y = \log_a(3x^2+5)$      $y' = \frac{6x}{3x^2+5} \cdot \frac{1}{\ln a}$
- 61)  $y = \log\sqrt{\frac{1+x}{1-x}}$      $y' = \frac{1}{1-x^2} \cdot \frac{1}{\ln 10}$
- 62)  $y = \ln\sqrt[3]{\frac{3x}{x+2}}$      $y' = \frac{2}{3x(x+2)}$
- 63)  $y = \frac{\ln x}{\sqrt{x}}$      $y' = \frac{2-\ln x}{2x\sqrt{x}} = \frac{\sqrt{x}(2-\ln x)}{2x^2}$
- 64)  $y = \ln\frac{x}{\sqrt{x^2+a^2}}$      $y' = \frac{a^2}{x(x^2+a^2)}$
- 65)  $y = \ln\frac{(x-2)^3}{\sqrt{2x-1}}$      $y' = \frac{5x-1}{(x-2)(2x-1)}$
- 66)  $y = \ln(x+\sqrt{x^2-1})$      $y' = \frac{1}{\sqrt{x^2-1}}$
- 67)  $y = \sin 2x$      $y' = 2 \cos 2x$
- 68)  $y = x \cos 2x$      $y' = \cos 2x - 2x \sin 2x$
- 69)  $y = \operatorname{tg} \sqrt{x}$      $y' = \frac{1}{2\sqrt{x} \cos^2 \sqrt{x}} = \frac{1}{2\sqrt{x}}(1 + \operatorname{tg}^2 \sqrt{x})$
- 70)  $y = \sin^3 3x$      $y' = 9 \sin^2 3x \cos 3x$
- 71)  $y = 4 \cos^5(2x-1)$      $y' = -40 \cos^4(2x-1) \cdot \sin(2x-1)$
- 72)  $y = \operatorname{cotg} 4x^2$      $y' = -\frac{8x}{\sin^2 4x^2} = -8x(1 + \operatorname{cotg}^2 4x^2)$

Funciones a derivar    Soluciones

- 73)  $y = \frac{\sin x}{1 + \cos x}$      $y' = \frac{1}{1 + \cos x}$
- 74)  $y = \frac{\cos x}{1 - \sin x}$      $y' = \frac{1}{1 - \sin x}$
- 75)  $y = \sin^4 x - \cos^4 x$      $y' = 4 \sin^3 x \cos x + 4 \cos^3 x \sin x = 4 \sin x \cos x = 2 \sin 2x$
- 76)  $y = \arcsen 2x$      $y' = \frac{2}{\sqrt{1-4x^2}}$
- 77)  $y = \arccos \sqrt{x}$      $y' = \frac{-1}{2\sqrt{x-x^2}}$
- 78)  $y = \operatorname{arctg}(x^2+1)$      $y' = \frac{2x}{x^4+2x^2+2}$
- 79)  $y = \operatorname{arctg}(e^{-2x})$      $y' = \frac{-2e^{-2x}}{1+e^{-4x}}$
- 80)  $y = \operatorname{arctg}(\ln x)$      $y' = \frac{1}{x(1+\ln^2 x)}$
- 81)  $y = \frac{\sin^2 x - \cos x}{\operatorname{tg} x}$   
 $y' = \frac{2 \sin^2 x \cos^2 x + \sin^2 x \cos x - \sin^2 x + \cos x}{\sin^2 x}$
- 82)  $y = \cos^2 3x^2$      $y' = -6x \sin 6x^2$
- 83)  $y = x^a a^x e^x$      $y' = x^a a^x e^x \left( \frac{a}{x} + \ln a + 1 \right)$
- 84)  $y = \sqrt{x + \sqrt{x^2-1}}$      $y' = \frac{\sqrt{x + \sqrt{x^2-1}}}{2\sqrt{x^2-1}}$
- 85)  $y = \frac{x+1}{x-1} + \frac{x}{\sqrt{x^2-1}}$      $y' = \frac{-2}{(x-1)^2} - \frac{1}{\sqrt{(x^2-1)^3}}$
- 86)  $y = (2x+1)^3 \sqrt{x^2-1}$      $y' = 6(2x+1)^2 \sqrt{x^2-1} + \frac{(2x+1)^3 x}{\sqrt{x^2-1}} = \frac{(2x+1)^2(8x^2+x-6)}{\sqrt{x^2-1}}$
- 87)  $y = (3x+1)^{2x-3}$      $y' = (3x+1)^{2x-3} \cdot \left[ 2 \ln(3x+1) + \frac{3(2x-3)}{3x+1} \right]$
- 88)  $y = x^{1/x}$      $y' = x^{1/x} \left( \frac{1-\ln x}{x^2} \right)$
- 89)  $y = \sqrt[3]{(x+1)^2}$      $y' = \sqrt[3]{(x+1)^2} \cdot \frac{2x-2(x+1)\ln(x+1)}{x^2(x+1)}$
- 90)  $y = 2x^{3x}$      $y' = 6x^{3x}(1+\ln x)$
- 91)  $y = 2x^{\cos x}$      $y' = 2x^{\cos x-1}(\cos x - x \sin x \ln x)$