

# DERIVADAS

Derivar, y simplificar, las siguientes funciones

- 1)  $y = (x^2-1)(2-3x^2)$   $y' = -12x^3+10x$
- 2)  $y = (a+2x)(b-3x^2)$   $y' = -18x^2-6ax+2b$
- 3)  $y = (3x^2-1)(5x+2)-(x^2+1)(3x-4)$   $y' = 36x^2+20x-8$
- 4)  $y = (3x^4-3x^2+5)^4$   $y' = 1296x^{15}-4536x^{13}+12312x^{11}-19440x^9+24408x^7-19440x^5+30000x^3$
- 5)  $y = (2x-5)(3x^2-7x+2)(4x^3-3x^2+5x-8)$   $y' = 144x^5-670x^4+1092x^3-1050x^2+914x-362$
- 6)  $y = (x^2-1)^3(2x^2-3x+2)^3$   $y' = 96x^{11}-396x^{10}+540x^9+81x^8-1056x^7+1071x^6-765x^5+528x^4-27x^2-108x+36$
- 7)  $y = \frac{5x-8}{3}$   $y' = \frac{5}{3}$
- 8)  $y = \frac{2}{(3x-2)}$   $y' = \frac{-6}{(3x-2)^2}$
- 9)  $y = \frac{6}{x^3}$   $y' = \frac{-18}{x^4}$
- 10)  $y = \frac{2x-8}{3x+5}$   $y' = \frac{34}{(3x+5)^2}$
- 11)  $y = \frac{x^2(x^3-2x+10)}{5x^3+3x+12}$   $y' = \frac{2x(5x^6+6x^4+5x^3-6x^2-21x+120)}{(5x^3+3x+12)^2}$
- 12)  $y = \frac{(2x^3-3x)(6x-8)}{3x^2+4x+2}$   $y' = \frac{8(9x^5+12x^4-4x^3-30x^2-9x+16)}{(3x^2+4x+2)^2}$
- 13)  $y = \frac{(2x+3)^3}{(2x-4)(3x+4)}$   $y' = \frac{(2x+3)^2(3x^2-13x-21)}{(x-2)^2(3x+4)^2}$
- 14)  $y = \sqrt[3]{3x^2}$   $y' = \frac{2x}{\sqrt[3]{(3x^2)^2}}$
- 15)  $y = \sqrt[4]{2-x}$   $y' = \frac{-1}{4\sqrt[4]{(2-x)^3}}$

$$16) y = \sqrt{1-x} + \sqrt{1+x}$$

$$y' = \frac{-1}{2\sqrt{1-x}} + \frac{1}{2\sqrt{1+x}}$$

$$17) y = \sqrt[5]{5x^2 + 2x - 7}$$

$$y' = \frac{10x + 2}{5\sqrt[5]{(5x^2 + 2x - 7)^4}}$$

$$18) y = 2x + 1 - \sqrt{x^2 - x + 1}$$

$$y' = 2 - \frac{2x - 1}{2\sqrt{x^2 - x + 1}}$$

$$19) y = \sqrt{x+1} - \frac{1}{\sqrt{x+1}}$$

$$y' = \frac{x + 2}{2\sqrt{(x+1)^3}}$$

$$20) y = x\sqrt{3x^2 - 1}$$

$$y' = \frac{6x^2 - 1}{\sqrt{3x^2 - 1}}$$

$$21) y = \frac{\sqrt{x-4}}{x}$$

$$y' = \frac{-x + 8}{2x^2\sqrt{x-4}}$$

$$22) y = \frac{1+x}{\sqrt{1-x}}$$

$$y' = \frac{3-x}{2(1-x)\sqrt{1-x}}$$

$$23) y = \sqrt{\frac{1-x}{1+x}}$$

$$y' = \frac{-1}{\sqrt{(1+x)^3(1-x)}}$$

$$24) y = \frac{x^2 + 5x - 2}{\sqrt[3]{3x^2 - 2x + 5}}$$

$$y' = \frac{12x^2 + 5x^2 + 22x + 71}{3(3x^2 - 2x + 5)\sqrt[3]{3x^2 - 2x + 5}}$$

$$25) y = \ln(2a - x^3)$$

$$y' = \frac{-3x^2}{2a - x^3}$$

$$26) y = x \ln x$$

$$y' = 1 + \ln x$$

$$27) y = \frac{1}{x} \ln x$$

$$y' = \frac{1}{x^2} (1 - \ln x)$$

$$28) y = \ln(x-2)^2$$

$$y' = \frac{2}{x-2}$$

$$29) y = \ln \frac{1-x}{1+x}$$

$$y' = \frac{-2}{1-x^2}$$

$$30) y = \frac{1}{2\sqrt{2}} \ln \frac{2x - \sqrt{2}}{2x + \sqrt{2}}$$

$$y' = \frac{1}{2x^2 - 1}$$

$$31) y = \ln x^5$$

$$y' = \frac{5}{x}$$

32) $y = \ln x^n$	$y' = \frac{n}{x}$
33) $y = \ln \sqrt{x}$	$y' = \frac{1}{2x}$
34) $y = \sqrt{\ln x}$	$y' = \frac{1}{2x\sqrt{\ln x}}$
35) $y = \ln(\ln x^4)$	$y' = \frac{1}{x \ln x}$
36) $y = \log_a(2x^3 - x + 1)$	$y' = \frac{\log_a e}{2x^3 - x + 1} (6x^2 - 1)$
37) $y = \log \frac{1-x}{1+x}$	$y' = \frac{-2 \log e}{1-x^2}$
38) $y = \log(x\sqrt{1+x^2})$	$y' = \frac{(1+2x^2) \log e}{x(1+x^2)}$
39) $y = \log_5(1-2x)^3$	$y' = \frac{-6 \log_5 e}{1-2x}$
40) $y = 8^{3x^2-1}$	$y' = 6x8^{3x^2-1} \ln 8$
41) $y = 7^x - 4e^x$	$y' = 7^x \ln 7 - 4e^x$
42) $y = a^x x^4$	$y' = a^x \ln a x^4 + a^x 4x^3$
43) $y = e^x \ln x$	$y' = e^x \ln x + \frac{e^x}{x}$
44) $y = e^x(x-1)$	$y' = xe^x$
45) $y = \frac{a^x}{e^x}$	$y' = \frac{a^x(\ln a - 1)}{e^x}$
46) $y = \frac{e^x + 1}{e^x}$	$y' = \frac{-1}{e^x}$
47) $y = \ln \frac{x}{e^x}$	$y' = \frac{1-x}{x}$
48) $y = \ln \frac{e^x}{e^x - 1}$	$y' = \frac{-1}{e^x - 1}$
49) $y = \frac{1}{\sqrt{a^x}}$	$y' = \frac{-\ln a}{2\sqrt{a^x}}$
50) $y = \operatorname{sen}^2 x$	$y' = 2 \operatorname{sen} x \cos x$

51) $y = \text{sen}^2 2x$	$y' = 4\text{sen}2x\cos2x$
52) $y = \text{tg}(3x^2-1)$	$y' = 6x(1+\text{tg}^2(3x^2-1))$
53) $y = \cos(a-bx^n)$	$y' = \text{bnx}^{n-1}\text{sen}(a-bx^n)$
54) $y = \text{sen}^3 4x$	$y' = 12 \cos 4x \text{sen}^2 4x$
55) $y = \text{tg}^2 5x^3$	$y' = 30x^2 \text{tg} 5x^3 (1+\text{tg}^2 5x^3)$
56) $y = \frac{1}{4} \text{sen}^4 2x^3$	$y' = 6x^2 \text{sen}^3 2x^3 \cos 2x^3$
57) $y = \sqrt{\text{sen} 2x}$	$y' = \frac{\cos 2x}{\sqrt{\text{sen} 2x}}$
58) $y = \text{tg} \sqrt{2x}$	$y' = \frac{1 + \text{tg}^2 \sqrt{2x}}{\sqrt{2x}}$
59) $y = \text{cotg}^3 \sqrt{x}$	$y' = \frac{3}{2\sqrt{x}} \cot g^2 \sqrt{x} (-1 - \cot g^2 \sqrt{x})$
60) $y = \text{tg} x + \text{cotg} x$	$y' = \text{tg}^2 x - \text{ctg}^2 x$
61) $y = \text{sen} x \cos x$	$y' = \cos^2 x - \text{sen}^2 x$
62) $y = \text{sen} x - x \cos x$	$y' = x \text{sen} x$
63) $y = (\text{sen} x + \cos x)^2$	$y' = 2(\cos^2 x - \text{sen}^2 x)$
64) $y = x - \text{sen} x \cos x$	$y' = 2\text{sen}^2 x$
65) $y = \cos^3 x \text{sen} x$	$y' = -3\cos^2 x \text{sen}^2 x + \cos^4 x$
66) $y = \text{sen}(\ln x)$	$y' = \frac{\cos(\ln x)}{x}$
67) $y = \ln(\text{sen} x)$	$y' = \text{cotg} x$
68) $y = \ln x \text{sen} \sqrt{x}$	$y' = \frac{2\sqrt{x} \text{sen} \sqrt{x} + \ln x \cos \sqrt{x}}{2x\sqrt{x}}$
69) $y = \ln(\text{sen}(\ln x))$	$y' = \frac{\cot g(\ln x)}{x}$
70) $y = \ln \sqrt{\frac{1 - \cos x}{1 + \cos x}}$	$y' = \frac{1}{\text{sen} x}$
71) $y = \text{tg} e^x$	$y' = \frac{e^x}{\cos^2 e^x}$
72) $y = \text{arc sen} 2x$	$y' = \frac{2}{\sqrt{1-4x^2}}$

$$73) \quad y = \operatorname{arctg} 3x$$

$$y' = \frac{3}{1+9x^2}$$

$$74) \quad y = \operatorname{arc} \cos x^2$$

$$y' = \frac{-2x}{\sqrt{1-x^4}}$$

$$75) \quad y = \operatorname{arc} \operatorname{sen} \frac{x+1}{x-1}$$

$$y' = \frac{-1}{(x-1)\sqrt{-x}}$$

$$76) \quad y = \operatorname{arc} \cos \frac{3x^2-2}{5}$$

$$y' = \frac{-6x}{\sqrt{-9x^4+12x^2+21}}$$

$$77) \quad y = \operatorname{arc} \operatorname{tg} \frac{x-1}{1-x}$$

$$y' = 0$$

$$78) \quad y = \operatorname{arc} \operatorname{tg} \frac{2x}{1+x^2}$$

$$y' = \frac{2-2x^2}{x^4+6x^2+1}$$

$$79) \quad y = \operatorname{arc} \cos \frac{x^2-a^2}{x^2+a^2}$$

$$y' = \frac{-2a}{(x^2+a^2)}$$

$$80) \quad y = \operatorname{arc} \operatorname{sen} \frac{3x+2}{2x+3}$$

$$y' = \frac{5}{(2x+3)\sqrt{-5x^2+5}}$$