

EJERCICIOS DE DERIVADAS

<u>FUNCIÓN</u>	<u>DERIVADA</u>
1.- $y=3$	$y'=0$
2.- $y=x+5$	$y'=1$
3.- $y=x^7$	$y'=7x^6$
4.- $y=x^6-x^3$	$y'=6x^5-3x^2$
5.- $y=2x^4$	$y'=8x^3$
6.- $y=ax+b$	$y'=a$
7.- $y=5x-2$	$y'=5$
8.- $y=a^5$	$y'=0$
9.- $y=ax^2+bx+c$	$y'=2ax+b$
10.- $y=x(x-1)$	$y'=2x-1$
11.- $y=(x+1)(x-1)$	$y'=2x$
12.- $y=ax^3+bx^2+cx+d$	$y'=3ax^2+2bx+c$
13.- $y=x^3-x^2+4x-5$	$y'=3x^2-2x+4$
14.- $y=x^4-4x^3+5x^2$	$y'=4x^3-12x^2+10x$
15.- $y=2x^3+3x^2-6x+5$	$y'=6x^2+6x-6$
16.- $y=(x+1)(x^2-x+3)$	$y'=3x^2+2$
17.- $y=x(x-1)^2$	$y'=3x^2-4x+1$
18.- $y=a(x-1)^2$	$y'=2a(x-1)$
19.- $y=a(a-1)^2$	$y'=0$
20.- $y=x^{-2}$	$y'=\frac{-2}{x^3}$
21.- $y=\frac{1}{x+1}$	$y'=\frac{-1}{(x+1)^2}$
22.- $y=\frac{x^2-3}{x^3+x}$	$y'=\frac{-x^4+10x^2+3}{(x^3+x)^2}$
23.- $y=\frac{x+1}{x}$	$y'=\frac{-1}{x^2}$
24.- $y=\frac{x(x+1)(x-1)}{3x^2-3}$	$y'=\frac{3x^4-6x^2+3}{(3x^2-3)^2}$
25.- $y=\frac{x(x+2)^2}{x^2+4x+4}$	$y'=1$
26.- $y=\sqrt{3x-2}$	$y'=\frac{3}{2\sqrt{3x-2}}$

27.- $y = \sqrt{2x-1}$

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

28.- $y = \sqrt{x^2+1}$

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

29.- $y = \sqrt{\frac{1-x}{1+x}}$

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

30.- $y = \frac{1-x}{\sqrt{1-x^2}}$

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

31.- $y = e^{4x}$

$$y' = 4e^{4x}$$

32.- $y = 5^{2x}$

$$y' = 2 \cdot 5^{2x} \cdot \ln 5$$

33.- $y = e^{3-x^2}$

$$y' = -2xe^{3-x^2}$$

34.- $y = \frac{e^x + e^{-x}}{2}$

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

35.- $y = x^3 \cdot 2^x \cdot e^x$

$$y' = x^2 \cdot 2^x \cdot e^x (3 + x \ln 2 + x)$$

36.- $y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

$$y' = \frac{4}{(e^x + e^{-x})^2}$$

37.- $y = a^{x^2+x+1}$

$$y' = (2x+1) \cdot a^{x^2+x+1} \cdot \ln a$$

38.- $y = \ln(x^2+1)$

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

39.- $y = \ln(ax^2+bx+c)$

$$y' = \frac{2ax+b}{ax^2+bx+c}$$

40.- $y = \ln^5 3x$

$$y' = \frac{5 \ln^4 3x}{x}$$

41.- $y = x^5 \ln x$

$$y' = x^4 (5 \ln x + 1)$$

42.- $y = x^2 \ln(2-x)$

$$y' = x \left(2 \ln(2-x) - \frac{x}{2-x} \right)$$

43.- $y = \frac{\ln x}{x}$

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

44.- $y = \lg_3(1+x^2)$

$$y' = \frac{2x}{1+x^2} \log_3 e$$

45.- $y = \ln(x-5)$

$$y' = \frac{1}{x-5}$$

46.- $y = \lg_a(3x^2+5)$

$$y' = \frac{6x}{3x^2+5} \lg_a e$$

47.- $y = x \cdot \ln x - x$

$$y' = \ln x$$

48.- $y = \ln \sqrt{1+x^2}$

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

$$49.- \quad y = \ln \sqrt{\frac{1-x}{1+x}} \qquad y' = \frac{-1}{1-x^2}$$

$$50.- \quad y = \ln \frac{x^2+1}{x^2-1} \qquad y' = \frac{-4x}{x^4-1}$$

$$51.- \quad y = \operatorname{sen} 2x \qquad y' = 2 \cos x$$

$$52.- \quad y = \cos(2x+1) \qquad y' = -2 \operatorname{sen}(2x+1)$$

$$53.- \quad y = \operatorname{tg}(x^2+x+1) \qquad y' = (2x+1) \sec^2(x^2+x+1)$$

$$54.- \quad y = \operatorname{tg} \sqrt{x} \qquad y' = \frac{1}{2\sqrt{x}} \sec^2 \sqrt{x}$$

$$55.- \quad y = \sec(3x^2+4x-1) \qquad y' = (6x+4) \sec(3x^2+4x-1) \operatorname{tg}(3x^2+4x-1)$$

$$56.- \quad y = \operatorname{cosec} \frac{x}{a} \qquad y' = \frac{-1}{a} \operatorname{cosec} \frac{x}{a} \operatorname{ctg} \frac{x}{a}$$

$$57.- \quad y = \sqrt{\operatorname{sen} 3x} \qquad y' = \frac{3 \cos 3x}{2\sqrt{\operatorname{sen} 3x}}$$

$$58.- \quad y = \operatorname{sen}^{2/3} x \qquad y' = \frac{2}{3} \operatorname{sen}^{-1/3} x \cdot \cos x = \frac{2 \cos x}{3\sqrt[3]{\operatorname{sen} x}}$$

$$59.- \quad y = x \cos x \qquad y' = \cos x - x \operatorname{sen} x$$

$$60.- \quad y = \ln \operatorname{sen} x \qquad y' = \operatorname{ctg} x$$

$$61.- \quad y = \operatorname{sen} x \cdot \cos 2x \qquad y' = \cos x \cdot \cos 2x - 2 \operatorname{sen} x \cdot \operatorname{sen} 2x$$

$$62.- \quad y = e^x \operatorname{tg} x \qquad y' = e^x (\operatorname{tg} x + \sec^2 x) = e^x (\operatorname{tg}^2 x + \operatorname{tg} x + 1)$$

$$63.- \quad y = \operatorname{arcsen} 2x \qquad y' = \frac{2}{\sqrt{1-4x^2}}$$

$$64.- \quad y = \operatorname{arcsen} \sqrt{x} \qquad y' = \frac{1}{2\sqrt{1-x}\sqrt{x}} = \frac{1}{2\sqrt{x-x^2}}$$

$$65.- \quad y = \arccos(x^2+1) \qquad y' = \frac{-2x}{\sqrt{1-(x^2+1)^2}}$$

$$66.- \quad y = \frac{1}{3} \operatorname{tg}^3 x - \operatorname{tg} x + x \qquad y' = \operatorname{tg}^2 x \cdot \sec^2 x - \sec^2 x + 1$$

$$67.- \quad y = \operatorname{arctg} \frac{1+x}{1-x} \qquad y' = \frac{1}{1+x^2}$$

$$68.- \quad y = \left(\frac{1-\operatorname{sen} x}{1+\operatorname{sen} x} \right)^2 \qquad y' = \frac{-4(1-\operatorname{sen} x) \cos x}{(1+\operatorname{sen} x)^3}$$

$$69.- \quad y = \ln \operatorname{tg} x \qquad y' = \frac{1}{\operatorname{sen} x \cos x}$$

$$70.- \quad y = \ln \sqrt{\frac{1+\cos x}{1-\cos x}} \qquad y' = -\operatorname{cosec} x$$

$$71.- \quad y = \ln \sqrt{\operatorname{sen} x} \qquad y' = \operatorname{ctg} 2x$$

74.- $y = \text{sen}(\text{sen } 2x)$

$$y' = 2 \cos 2x \cdot \cos(\text{sen } 2x)$$

75.- $y = \text{sen}(\ln(3x+5))$

$$y' = \frac{3}{3x+5} \cos(\ln(3x+5))$$

76.- $y = \arcsen(\cos x - x)$

$$y' = \frac{-\text{sen } x - 1}{\sqrt{1 - (\cos x - x)^2}}$$

77.- $y = \ln(x + \ln x)$

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

78.- $y = \arcsen\left(\frac{1}{1+x^2}\right)$

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

79.- $y = \lg\left(\frac{\lg x}{x}\right)$

$$y' = \frac{\log e - \log x}{x \log x} \log e$$

80.- $y = \ln^{1/2} \text{sen } 2x$

$$y' = \frac{\text{ctg } 2x}{\sqrt{\ln \text{sen } 2x}}$$

81.- $y = x^2 \cos 3x$

$$y' = 2x \cos 3x - 3x^2 \text{sen } 3x$$

82.- $y = x^{x+1}$

$$y' = \left[\ln x + \frac{x+1}{x} \right] x^{x+1}$$

83.- $y = \left(1 + \frac{1}{x}\right)^x$

$$y' = \left[\ln \frac{x+1}{x} - \frac{1}{x-1} \right] \left(1 + \frac{1}{x}\right)^x$$

84.- $y = (x^5)^{x^2+1}$

$$y' = \left[10x \ln x + \frac{5x^2+5}{x} \right] (x^5)^{x^2+1}$$

85.- $y = x^{e^x}$

$$y' = \left[e^x \ln x + \frac{e^x}{x} \right] x^{e^x}$$

86.- $y = (3x+1)^{2x+3}$

$$y' = \left[2 \ln(3x+1) + \frac{6x+9}{3x+1} \right] (3x+1)^{2x+3}$$

87.- $y = (\text{sen } x)^x$

$$y' = [\ln(\text{sen } x) + x \text{ctg } x] (\text{sen } x)^x$$

88.- $y = x^{\text{sen}(2x-9)}$

$$y' = \left[2 \cos(2x-9) \ln x + \frac{\text{sen}(2x-9)}{x} \right] x^{\text{sen}(2x-9)}$$

89.- $y = (\text{sen } x)^{\cos x}$

$$y' = [-\text{sen } x \ln(\text{sen } x) + \cos x \text{ctg } x] (\text{sen } x)^{\cos x}$$

90.- $y = (\ln x)^{\ln x}$

$$y' = \frac{1}{x} [\ln(\ln x) + 1] (\ln x)^{\ln x}$$

91.- $y = (x^2-1)^{\text{sen } x}$

$$y' = \left[\cos x \ln(x^2-1) + \frac{2x \text{sen } x}{x^2-1} \right] (x^2-1)^{\text{sen } x}$$

REGLAS DE DERIVACIÓN

A. Suma y resta.	$y = u + v \rightarrow y' = u' + v'$	$y = u - v \rightarrow y' = u' - v'$
B. Producto y cociente.	$y = u \cdot v \rightarrow y' = u' \cdot v + u \cdot v'$	$y = \frac{u}{v} \rightarrow y' = \frac{u' \cdot v - u \cdot v'}{v^2}$
C. Producto por un n°	$y = a \cdot u \rightarrow y' = a \cdot u'$	
D. Composición	$y = [g(f(x))] \rightarrow y' = g'(f(x)) \cdot f'(x)$	
TIPOS	FORMAS	
	SIMPLES	COMPUESTAS
1. Tipo Potencial	$y = x^n \rightarrow y' = n x^{n-1}$ $y = k \rightarrow y' = 0$ $y = \sqrt{x} \rightarrow y' = \frac{1}{2\sqrt{x}}$	$y = u^n \rightarrow y' = n u^{n-1} u'$ $y = \sqrt{u} \rightarrow y' = \frac{u'}{2\sqrt{u}}$
2. Tipo logarítmico	$y = \ln x \rightarrow y' = \frac{1}{x}$ $y = \lg_a x \rightarrow y' = \frac{1}{x} \lg_a e$	$y = \ln u \rightarrow y' = \frac{u'}{u}$ $y = \lg_a u \rightarrow y' = \frac{u'}{u} \lg_a e$
3. Tipo exponencial	$y = e^x \rightarrow y' = e^x$ $y = a^x \rightarrow y' = a^x \ln a$	$y = e^u \rightarrow y' = e^u \cdot u'$ $y = a^u \rightarrow y' = a^u \cdot u' \cdot \ln a$
4. Tipo circular	$y = \sin x \rightarrow y' = \cos x$ $y = \cos x \rightarrow y' = -\sin x$ $y = \operatorname{tg} x \rightarrow y' = 1 + \operatorname{tg}^2 x = \sec^2 x$ $y = \operatorname{cosec} x \rightarrow y' = -\operatorname{cosec} x \cdot \operatorname{ctg} x$ $y = \sec x \rightarrow y' = \sec x \cdot \operatorname{tg} x$ $y = \operatorname{ctg} x \rightarrow y' = -\operatorname{cosec}^2 x$	$y = \sin u \rightarrow y' = \cos u \cdot u'$ $y = \cos u \rightarrow y' = -\sin u \cdot u'$ $y = \operatorname{tg} u \rightarrow y' = (1 + \operatorname{tg}^2 u) \cdot u' = \sec^2 u \cdot u'$ $y = \operatorname{cosec} u \rightarrow y' = -\operatorname{cosec} u \cdot \operatorname{ctg} u \cdot u'$ $y = \sec u \rightarrow y' = \sec u \cdot \operatorname{tg} u \cdot u'$ $y = \operatorname{ctg} u \rightarrow y' = -\operatorname{cosec}^2 u \cdot u'$
5. Tipo funciones arco	$y = \arcsen x \rightarrow y' = \frac{1}{\sqrt{1-x^2}}$ $y = \arccos x \rightarrow y' = \frac{-1}{\sqrt{1-x^2}}$ $y = \operatorname{arctg} x \rightarrow y' = \frac{1}{1+x^2}$ $y = \operatorname{arccosec} x \rightarrow y' = \frac{-1}{x\sqrt{x^2-1}}$ $y = \operatorname{arcsec} x \rightarrow y' = \frac{1}{x\sqrt{x^2-1}}$ $y = \operatorname{arcctg} x \rightarrow y' = \frac{-1}{1+x^2}$	$y = \arcsen u \rightarrow y' = \frac{u'}{\sqrt{1-u^2}}$ $y = \arccos u \rightarrow y' = \frac{-u'}{\sqrt{1-u^2}}$ $y = \operatorname{arctg} u \rightarrow y' = \frac{u'}{1+u^2}$ $y = \operatorname{arccosec} u \rightarrow y' = \frac{-u'}{u\sqrt{u^2-1}}$ $y = \operatorname{arcsec} u \rightarrow y' = \frac{u'}{u\sqrt{u^2-1}}$ $y = \operatorname{arcctg} u \rightarrow y' = \frac{-u'}{1+u^2}$