

**ESCUELA POLITÉCNICA SUPERIOR. UNIVERSIDAD DE SEVILLA**

**EJERCICIOS DE DERIVADAS**

	$f(x)$	$f'(x)$
1.	$f(x) = \left(\frac{ax+b}{c}\right)^3$	$f'(x) = \frac{3a}{c} \left(\frac{ax+b}{c}\right)^2$
2.	$f(x) = \sqrt{1-x^2}$	$f'(x) = -x/\sqrt{1-x^2}$
3.	$f(x) = (a^{2/3} - x^{2/3})^{3/2}$	$f'(x) = -\left(\left(\frac{a}{x}\right)^{2/3} - 1\right)^{1/2}$
4.	$f(x) = (3 - 2\operatorname{sen} x)^5$	$f'(x) = -10\cos x(3 - 2\operatorname{sen} x)^4$
5.	$f(x) = \sqrt{xe^x + x}$	$f'(x) = \frac{e^x + xe^x + 1}{2\sqrt{xe^x + x}}$
6.	$f(x) = \operatorname{sen}(x^2 - 5x + 1) + \operatorname{tg}\frac{a}{x}$	$f'(x) = (2x - 5)\cos(x^2 - 5x + 1) - \frac{a}{x^2\cos^2(a/x)}$
7.	$f(x) = \frac{1 + \cos 2x}{1 - \cos 2x}$	$f'(x) = -2\frac{\cos x}{\operatorname{sen}^3 x}$
8.	$f(x) = -\frac{1}{20}\cos(5x^2) - \frac{1}{4}\cos x^2$	$f'(x) = x\cos 2x^2\operatorname{sen} 3x^2$
9.	$f(x) = \operatorname{arcsen} \frac{1}{x^2}$	$f'(x) = \frac{-2}{x\sqrt{x^4 - 1}}$
10.	$f(x) = \arccos \sqrt{x}$	$f'(x) = \frac{-1}{2\sqrt{x-x^2}}$
11.	$f(x) = \operatorname{arcctg} \frac{1+x}{1-x}$	$f'(x) = \frac{-1}{1+x^2}$

	$f(x)$	$f'(x)$
12.	$f(x) = 5e^{-x^2}$	$f'(x) = -10xe^{-x^2}$
13.	$f(x) = \frac{1}{5x^2}$	$f'(x) = -2x5^{-x^2}\log 5$
14.	$f(x) = \operatorname{arctg}(\log x) + \log(\operatorname{arctg} x)$	$f'(x) = \frac{1}{(1 + \log^2 x)} + \frac{1}{(1 + x^2)\operatorname{arctg} x}$
15.	$f(x) = \frac{-11}{2(x-2)^2} - \frac{4}{x-2}$	$f'(x) = \frac{4x+3}{(x-2)^3}$
16.	$f(x) = \frac{\sqrt{2x^2 - 2x + 1}}{x}$	$f'(x) = \frac{x-1}{x^2\sqrt{2x^2 - 2x + 1}}$
17.	$f(x) = \frac{x}{a^2\sqrt{a^2 + x^2}}$	$f'(x) = \frac{1}{\sqrt{(a^2 + x^2)^3}}$
18.	$f(x) = (a+x)\sqrt{a-x}$	$f'(x) = \frac{a-3x}{2\sqrt{a-x}}$
19.	$f(x) = \operatorname{tg}^2 5x$	$f'(x) = 10\operatorname{tg} 5x \sec^2 5x$
20.	$f(x) = \frac{1}{2}\operatorname{sen}(x^2)$	$f'(x) = x\cos x^2$
21.	$f(x) = \frac{1}{3}\operatorname{tg}^3 x - \operatorname{tg} x + x$	$f'(x) = \operatorname{tg}^4 x$
22.	$f(x) = \operatorname{arcsen} \frac{x^2 - 1}{x^2}$	$f'(x) = \frac{2}{x\sqrt{2x^2 - 1}}$
23.	$f(x) = \log(ax^2 + bx + c)$	$f'(x) = \frac{2ax + b}{ax^2 + bx + c}$
24.	$f(x) = \frac{1}{\log^2 x}$	$f'(x) = \frac{-2}{x\log^3 x}$
25.	$f(x) = \log \cos \frac{x-1}{x}$	$f'(x) = -\frac{1}{x^2}\operatorname{tg} \frac{x-1}{x}$

	$f(x)$	$f'(x)$
26.	$f(x) = \operatorname{tg}^2(\frac{x}{2})$	$f'(x) = \operatorname{tg}(\frac{x}{2}) + \operatorname{tg}^3(\frac{x}{2})$
27.	$f(x) = x \operatorname{sen} x + \cos x$	$f'(x) = x \cos x$
28.	$f(x) = (1 - \operatorname{sen} x) \operatorname{tg} x$	$f'(x) = -\cos x \operatorname{tg} x + (1 - \operatorname{sen} x) \sec^2 x$
29.	$f(x) = \log(x + 1 + \sqrt{x^2 + 2x + 1})$	$f'(x) = \frac{1}{x + 1}$
30.	$f(x) = \arcsen(2x\sqrt{1 - x^2})$	$f'(x) = \frac{2}{\sqrt{1 - x^2}}$
31.	$f(x) = \operatorname{arctg} \frac{1 + x}{1 - x} - \operatorname{arctg} x$	$f'(x) = 0$
32.	$f(x) = \sqrt{\frac{ax + b}{cx + d}}$	$f'(x) = \frac{(ad - cb)\sqrt{\frac{ax + b}{cx + d}}}{2(ax + b)(cx + d)}$
33.	$f(x) = \log \sqrt{\frac{1 + \operatorname{sen} x}{1 - \operatorname{sen} x}}$	$f'(x) = \sec x$
34.	$f(x) = \frac{1}{\sqrt{2}} \operatorname{arctg} \frac{3x + 1}{\sqrt{2}}$	$f'(x) = \frac{1}{3x^2 + 2x + 1}$
35.	$f(x) = (\frac{x^2}{2} - \frac{1}{4}) \arcsen x + \frac{x}{4} \sqrt{1 - x^2}$	$f'(x) = x \arcsen x$
36.	$f(x) = \sqrt{\log x + 1} + \log(\sqrt{x} + 1)$	$f'(x) = \frac{1}{2x\sqrt{\log x + 1}} + \frac{1}{2(\sqrt{x} + x)}$
37.	$f(x) = \log^2 x - \log(\log x)$	$f'(x) = \frac{2 \log x}{x} - \frac{1}{x \log x}$
38.	$f(x) = \log \frac{\sqrt{x^2 + a^2} + x}{\sqrt{x^2 + a^2} - x}$	$f'(x) = \frac{2}{\sqrt{x^2 + a^2}}$
39.	$f(x) = \frac{m}{2} \log(x^2 - a^2) + \frac{n}{2a} \log \frac{x - a}{x + a}$	$f'(x) = \frac{mx + n}{x^2 - a^2}$

	$f(x)$	$f'(x)$
40.	$f(x) = \sqrt{\frac{1}{x^2 - 2}}$	$f'(x) = \frac{-x}{(x^2 - 2)^{\frac{3}{2}}}$
41.	$f(x) = \sqrt{x} + \frac{\text{sen}^2(2x)}{4}$	$f'(x) = \cos 2x \text{ sen } 2x + \frac{1}{2\sqrt{x}} = \frac{1}{2\sqrt{x}} (\sqrt{x} \text{ sen } 4x + 1)$
42.	$f(x) = \cos \sqrt{x} + \sqrt{\cos x}$	$f'(x) = -\frac{\text{sen } x}{2\sqrt{\cos x}} - \frac{\text{sen } \sqrt{x}}{2\sqrt{x}}$
43.	$f(x) = \ln \left( \sqrt[3]{x^2 (x^2 - 2)^2} \right)$	$f'(x) = \frac{6x^2 - 4}{3x^3 - 6x}$
44.	$f(x) = \text{tg}(\arcsen x)$	$f'(x) = \frac{1}{\cos^2(\arcsen x)} \frac{1}{\sqrt{1 - x^2}}$
45.	$f(x) = \arctg(x^2 - 1)$	$f'(x) = \frac{2x}{x^4 - 2x^2 + 2}$
46.	$f(x) = x(\arcsen x)^2 - 2x + 2\sqrt{1 - x^2} \arcsen x$	$f'(x) = \arcsen^2 x$
47.	$f(x) = \sqrt{1 - x^2} - 2 \arcsen x$	$f'(x) = -\frac{x + 2}{\sqrt{1 - x^2}}.$
48.	$f(x) = \ln \sqrt{\frac{1 - \cos x}{1 + \cos x}}$	$f'(x) = \frac{1}{\text{sen } x}$
49.	$f(x) = \sqrt[3]{\text{sen}^2 x - x}$	$f'(x) = \frac{\text{sen } 2x - 1}{3(\text{sen}^2 x - x)^{\frac{2}{3}}}$
50.	$f(x) = x^3 \text{ sen}^2(7x - 1)$	$f'(x) = 3x^2 \text{ sen}^2(7x - 1) + 7x^3 \text{ sen}(14x - 2).$
51.	$f(x) = 3e^{3x} \text{ sen } 2x - 2e^{3x} \cos 2x$	$f'(x) = 13e^{3x} \text{ sen } 2x.$
52.	$f(x) = \sqrt[3]{x^2 + 1} \text{ tg } x^6$	$f'(x) = \frac{2x}{3\sqrt[3]{(x^2 + 1)^2}} \text{ tg } x^6 + 6x^5 \sqrt[3]{x^2 + 1} \sec^2 x^6.$