## Ejercicios de derivadas:

1. $f(x) = (1 + 3x^4)^5$
2. $f(x) = (1 + x + x^2)^3$
3. $f(x) = \frac{1}{(x^2 - 1)^4}$
4. $f(x) = \frac{1}{x - 1} + \frac{2}{(x - 1)^2} + \frac{3}{(x - 1)^3}$
5. $f(x) = \sqrt{1 - x^2}$
6. $f(x) = \sqrt[3]{2 + 5x^2}$
7. $f(x) = \frac{1}{\sqrt[3]{(x^3 - 2)^2}}$
8. $f(x) = (5x^3 + 1)^3 \cdot (x^2 + x + 1)^4$
9. $f(x) = (5 - 3\cos x)^4$
10. $f(x) = \operatorname{sen} x + \operatorname{sen}^2 x + \operatorname{sen}^3 x$
11. $f(x) = \frac{1}{\operatorname{arc\,tg} x}$
12. $f(x) = \operatorname{sen}^3 x - \cos^3 x$
13. $f(x) = \frac{1}{3\cos^3 x} - \frac{1}{\cos x}$
14. $f(x) = \operatorname{sen}(x^2)$
15. $f(x) = (1 + \operatorname{sen} 5x)^4$
16. $f(x) = \sqrt{x\, e^x + x}$
17. $f(x) = \sqrt[3]{2^x + x}$
18. $f(x) = \operatorname{Ln}(\operatorname{Tn} x)$
19. $f(x) = \operatorname{Arc}\cos\sqrt{x}$
20. $f(x) = \operatorname{Arc\,sen}\left(\frac{1}{x^2}\right)$
21. $f(x) = \frac{1 + \cos 2x}{1 - \cos 2x}$
22. $f(x) = \operatorname{Arc\,tg}\left(\frac{1}{x}\right)$
23. $f(x) = \operatorname{Arc\,tg}(e^x)$
24. $f(x) = \operatorname{Arc\,sen}\left(\frac{x^2 - 1}{x^2}\right)$
25. $f(x) = \operatorname{Ln}(\operatorname{sen} x)$
26. $f(x) = \operatorname{sen}^3 x \cdot \cos^3 x$
27. $f(x) = \frac{1 + \operatorname{sen}^2 x}{1 + \cos^2 x}$
28. $f(x) = x^2 \cdot e^{x^3}$
29. $f(x) = e^{\sqrt{x^2 + 1}}$
30. $f(x) = \left[\frac{x^2 + x + 1}{x^3 - 6}\right]^5$
31. $f(x) = \left[\frac{\operatorname{sen} x + \cos x}{\operatorname{sen} x - \cos x}\right]^3$
32. $f(x) = x \cdot e^{-1/x^2}$
33. $f(x) = \sec(x^2) + \operatorname{cosec}(x^2)$
34. $f(x) = \frac{1 - \cos(x^2)}{1 + \cos(x^2)}$
35. $f(x) = (1 + e^{\operatorname{sen} x})^3$
36. $f(x) = \operatorname{Ln}(\sqrt{1 + e^x} - 1) - \operatorname{Ln}(\sqrt{1 + e^x} + 1)$
37. $f(x) = \operatorname{Ln}\frac{x}{\sqrt{x^2 + 9}}$
38. $f(x) = \operatorname{Ln}\sqrt{\frac{1 - \cos x}{1 + \cos x}}$
39. $f(x) = \operatorname{Arc\,tg}(x^2 - 1)$
40. $f(x) = \operatorname{Arc\,tg}\left(\frac{1 - x^2}{1 + x^2}\right)$

41. $f(x) = \operatorname{Arc\,sen}(1 - x) + \sqrt{2x - x^2}$
42. $f(x) = \frac{\operatorname{Arc}\cos x}{\sqrt{1 - x^2}}$
43. $f(x) = \operatorname{Ln}\left(\cos\frac{x - 1}{x}\right)$
44. $f(x) = \sqrt{x^2 + 1} - \operatorname{Ln}\frac{1 + \sqrt{x^2 + 1}}{x}$
45. $f(x) = \operatorname{Ln}\frac{1 + \sqrt{\operatorname{sen} x}}{1 - \sqrt{\operatorname{sen} x}}$
46. $f(x) = \operatorname{Ln}(\operatorname{Ln}(\operatorname{Ln}(\operatorname{Ln} x)))$
47. $f(x) = (x^2)^x$
48. $f(x) = x^{(x^2)}$
49. $f(x) = x^{\operatorname{sen} x}$
50. $f(x) = x^{\cos x}$
51. $f(x) = (\cos x)^{\operatorname{sen} x}$
52. $f(x) = (1 + x)^{\frac{1}{x}}$

## Soluciones de los ejercicios de derivadas

1. $60x^3(1+3x^4)$
2. $3(2x+1)(1+x+x^2)^2$
3. $-8x(x^2-1)^{-5}$
4. $-(x-1)^{-2}-4(x-1)^{-3}-9(x-1)^{-4}$
5. $\frac{-x}{\sqrt{1-x^2}}$
6. $\frac{10x}{3\sqrt[3]{(2+5x^2)^2}}$
7. $-2x^2(x^3-2)^{-5/3}$
8. $45x^2(5x^3+1)^2(x^2+x+1)^4 +$
   $+ 4(2x+1)(5x^3+1)^3(x^2+x+1)^3$
9. $12\operatorname{sen} x\,(5-3\cos x)^3$
10. $\cos x\,(1+2\operatorname{sen} x+3\operatorname{sen}^2 x)$
11. $\frac{-1}{(1+x^2)(\operatorname{Arctg} x)^2}$
12. $3\operatorname{sen} x\cos x(\operatorname{sen} x+\cos x)$
13. $\operatorname{sen} x\left[\frac{1}{\cos^4 x}-\frac{1}{\cos^2 x}\right]$
14. $2x\cos(x^2)$
15. $20\cos 5x\,(1+\operatorname{sen} 5x)^3$
16. $\frac{e^x+xe^x+1}{2\sqrt{xe^x+1}}$
17. $\frac{2^x \operatorname{Ln} 2+1}{3\sqrt[3]{(2^x+x)^2}}$
18. $\frac{1}{x\operatorname{Ln} x}$
19. $\frac{-1}{2\sqrt{x-x^2}}$
20. $\frac{-2}{x\sqrt{x^4-1}}$
21. $\frac{-4\operatorname{sen} 2x}{(1-\cos 2x)^2}$
22. $\frac{-1}{1+x^2}$
23. $\frac{e^x}{1+e^{2x}}$
24. $\frac{2}{x\sqrt{2x^2-1}}$
25. $\cot x$
26. $3\operatorname{sen}^2 x\cos^2 x\,(\cos^2 x-\operatorname{sen}^2 x)$
27. $\frac{6\operatorname{sen} x\cos x}{(1+\cos^2 x)^2}$
28. $xe^{x^3}(2+3x^3)$
29. $\frac{x\,e^{\sqrt{x^2+1}}}{\sqrt{x^2+1}}$
30. $5\cdot\left(\frac{x^2+x+1}{x^3-6}\right)^4\cdot$
    $\cdot\frac{-x^4-2x^3-3x^2-12x-6}{(x^3-6)^2}$
31. $\frac{-6}{1-2\operatorname{sen} x\cos x}\cdot\left(\frac{\operatorname{sen} x+\cos x}{\operatorname{sen} x-\cos x}\right)^2$
32. $e^{-1/x^2}\left(1+\frac{2}{x^2}\right)$
33. $2x(\operatorname{tg}(x^2)\sec(x^2)-\cot(x^2)\operatorname{cosec}(x^2))$
34. $\frac{4x\operatorname{sen} x^2}{(1+\cos(x^2))^2}$
35. $3e^{\operatorname{sen} x}\cos x\,(1+e^{\operatorname{sen} x})^2$
36. $\frac{1}{\sqrt{1+e^x}}$
37. $\frac{9}{x(x^2+9)}$
38. $\operatorname{cosec} x$
39. $\frac{2x}{x^4-2x^2+2}$
40. $\frac{-2x}{1+x^4}$
41. $\frac{-x}{\sqrt{2x-x^2}}$
42. $\frac{x\operatorname{Arc}\cos x-\sqrt{1-x^2}}{(1-x^2)\sqrt{1-x^2}}$
43. $\frac{1}{x^2}\cdot\operatorname{tg}\left(\frac{x-1}{x}\right)$
44. $\frac{x^2+1+\sqrt{x^2+1}}{x(1+\sqrt{x^2+1})}=\frac{\sqrt{1+x^2}}{x}$
45. $\frac{\cos x}{\sqrt{\operatorname{sen} x}\,(1-\operatorname{sen} x)}$
46. $\frac{1}{(\operatorname{Ln}(\operatorname{Ln}(\operatorname{Ln} x)))(\operatorname{Ln}(\operatorname{Ln} x))(\operatorname{Ln} x)x}$
45. $2x^{2x}(\operatorname{Ln} x+1)$
48. $x^{x^2+1}(2\operatorname{Ln} x+1)$
49. $x^{\operatorname{sen} x}\left(\cos x\operatorname{Ln} x+\frac{\operatorname{sen} x}{x}\right)$
50. $x^{\cos x}\left(-\operatorname{sen} x\operatorname{Ln} x+\frac{\cos x}{x}\right)$
51. $(\cos x)^{\cos x}\cdot\left(\cos x\operatorname{Ln}(\cos x)-\frac{\operatorname{sen}^2 x}{x}\right)$
52. $(1+x)^{\frac{1}{x}}\cdot\left(\frac{-\operatorname{Ln}(1+x)}{x^2}+\frac{1}{x(1+x)}\right)$

*** Las soluciones están simplificadas al máximo