

## DERIVADAS (Soluciones)

1.  $f(x) = \frac{3}{2}x^3 + \frac{2}{5}x^2 - \frac{4}{7}x - 5$  Solución:  $f'(x) = \frac{9}{2}x^2 + \frac{4}{5}x - \frac{4}{7}$
2.  $f(x) = x \cdot (x + 2)$   $f'(x) = 2x + 2$
3.  $f(x) = x^2 \cdot (7 - 2x)$   $f'(x) = -6x^2 + 14x$
4.  $f(x) = (2x - 5) \cdot (4 - 3x)$   $f'(x) = -12x + 23$
5.  $f(x) = (-x^4 - 2) \cdot (5x - 7x^2)$   $f'(x) = 42x^5 - 25x^4 + 28x - 10$
6.  $f(x) = (3x^4 - 3x^2 + 5)^4$   $f'(x) = (3x^4 - 3x^2 + 5)^3 \cdot (48x^3 - 24x)$
7.  $f(x) = (1 - 2x + 3x^2 - 4x^3)^5$   $f'(x) = (1 - 2x + 3x^2 - 4x^3)^4 \cdot (-60x^2 + 30x - 10)$
8.  $f(x) = \frac{2x + 5}{3}$   $f'(x) = \frac{2}{3}$
9.  $f(x) = \frac{2}{x - 3}$   $f'(x) = \frac{-2}{(x - 3)^2}$
10.  $f(x) = \frac{4}{x^2}$   $f'(x) = \frac{-8}{x^3}$
11.  $f(x) = \frac{2x - 3}{3 - x}$   $f'(x) = \frac{3}{(3 - x)^3}$
12.  $f(x) = 6x^5 - 3x^4$   $f'(x) = 30x^4 - 12x^3$
13.  $f(x) = (3 - 4x - 5x^2)^4$   $f'(x) = (3 - 4x - 5x^2)^3 \cdot (-16 - 40x)$
14.  $f(x) = \frac{x^8}{9} - \frac{x^5}{3}$   $f'(x) = \frac{8x^7}{9} - \frac{5x^4}{3}$
15.  $f(x) = (x^2 - 1)^3 \cdot (2x^2 - 3x + 2)^3$   $f'(x) = (x^2 - 1)^2 \cdot (2x^2 - 3x + 2)^2 \cdot (16x^3 - 21x^2 + 8x + 3)$
16.  $f(x) = \frac{x^2 + 5}{x^2 + 6}$   $f'(x) = \frac{2x}{(x^2 + 6)^2}$
17.  $f(x) = \frac{x^4 - 3x^2 + 7x}{2x + 5}$   $f'(x) = \frac{6x^4 + 20x^3 - 6x^2 - 30x + 35}{(2x + 5)^2}$
18.  $f(x) = \frac{(2x + 3)^3}{(3x^2 - 2x + 6)^2}$   $f'(x) = \frac{(2x + 3)^2 \cdot (-6x^2 - 40x + 48)}{(3x^2 - 2x + 6)^3}$
19.  $f(x) = \sqrt{x}$   $f'(x) = \frac{1}{2\sqrt{x}}$
20.  $f(x) = \frac{1 + x}{1 - x}$   $f'(x) = \frac{2}{(1 - x)^2}$
21.  $f(x) = \sqrt[4]{x - 5}$   $f'(x) = \frac{1}{4\sqrt[4]{(x - 5)^3}}$
22.  $f(x) = \sqrt{3x} - \sqrt{3 - x}$   $f'(x) = \frac{3}{2\sqrt{3x}} + \frac{1}{2\sqrt{3 - x}}$



$$23. f(x) = \frac{2x^3 - 3x^2 - 2x - 4}{2x^2 - 3x + 6}$$

$$24. f(x) = \frac{2x - 5x^2 + x^3}{(2x - 8) \cdot (3x - 4)}$$

$$25. f(x) = 2\sqrt[5]{x^4 - 1}$$

$$26. f(x) = x^2 + \sqrt{x^3 - 2}$$

$$27. f(x) = \sqrt{2x} + \sqrt[3]{x} - \frac{1}{x}$$

$$28. f(x) = \text{sen}(5x - 3)$$

$$29. f(x) = \cos 3^x$$

$$30. f(x) = \text{Ln}(7x + 2)$$

$$31. f(x) = \cos(4 - 9x^2)$$

$$32. f(x) = \sqrt{\frac{1-x}{1+x}}$$

$$33. f(x) = x \cdot \sqrt{3x^2 - 1}$$

$$34. f(x) = \sqrt[3]{\text{Ln } x}$$

$$35. f(x) = \text{sen} \frac{3}{x^2}$$

$$36. f(x) = \sqrt[4]{2^x}$$

$$37. f(x) = \cos \sqrt[5]{3x}$$

$$38. f(x) = \text{Ln}(x^2 + 7)$$

$$39. f(x) = \frac{x^2 + 1}{x^2 - 1}$$

$$40. f(x) = x \cdot e^x$$

$$41. f(x) = \text{Ln} \left( \frac{2 - 5x^2}{4} \right)$$

$$42. f(x) = \sqrt[3]{x^5}$$

$$43. f(x) = e^{(3x^4 - 5x)^2}$$

Solución:

$$f'(x) = \frac{4x^4 - 12x^3 + 49x^2 - 20x - 24}{(2x^2 - 3x + 6)^2}$$

$$f'(x) = \frac{32 - 160x + 122x^2 - 32x^3 + 3x^4}{(2x - 8)^2 \cdot (3x - 4)^2}$$

$$f'(x) = \frac{8}{5} \cdot x^3 \cdot (x^4 - 1)^{-\frac{4}{5}}$$

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

$$f'(x) = \frac{1}{\sqrt{2x}} + \frac{1}{3 \cdot \sqrt[3]{x^2}} + \frac{1}{x^2}$$

$$f'(x) = 5 \cdot \cos(5x - 3)$$

$$f'(x) = -\text{sen } 3^x \cdot 3^x \cdot \text{Ln } 3$$

$$f'(x) = \frac{7}{7x + 2}$$

$$f'(x) = 18 \cdot x \cdot \text{sen}(4 - 9x^2)$$

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

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

$$f'(x) = \frac{1}{3x} \cdot (\text{Ln } x)^{-\frac{2}{3}}$$

$$f'(x) = \cos \frac{3}{x^2} \cdot \left( \frac{-6}{x^3} \right)$$

$$f'(x) = 2^{\frac{x}{4}} \cdot \text{Ln } 2 \cdot (1/4)$$

$$f'(x) = -\text{sen} \sqrt[5]{3x} \cdot (3x)^{-\frac{4}{5}} \cdot (3/5)$$

$$f'(x) = \frac{2x}{x^2 + 7}$$

$$f'(x) = \frac{-4x}{(x^2 - 1)^2}$$

$$f'(x) = (x + 1) \cdot e^x$$

$$f'(x) = \frac{-40x}{2 - 5x^2}$$

$$f'(x) = \frac{5}{3} \cdot x^{\frac{2}{3}}$$

$$f'(x) = e^{(3x^4 - 5x)^2} \cdot (3x^4 - 5x) \cdot (24x^3 - 10)$$



$$44. f(x) = \frac{1-3x}{x} + (5x-2)^3$$

$$45. f(x) = \frac{x^2 - 3x}{2x-5}$$

$$46. f(x) = 3^{5x^2-4x}$$

$$47. f(x) = 3^{5x} + e^x$$

$$48. f(x) = 2x^{-3} - 3x^{-1}$$

$$49. f(x) = (x^2 + 2) \cdot \text{Ln}(x^2 + 2)$$

$$50. f(x) = \frac{1-3x}{x} + (5x-2)^3$$

$$51. f(x) = \frac{(3x^5 + 4)^3}{5x^3 - x}$$

$$52. f(x) = \text{sen}(x^2 - 1) + \cos 3x$$

$$53. f(x) = \text{Ln}\left(\frac{x}{x-1}\right)$$

$$54. f(x) = \sqrt{\text{sen}(3x^4 - 2x)}$$

$$55. f(x) = \frac{1}{\text{sen } 3x}$$

$$56. f(x) = (\cos 2x)^3 - e^{2x-1}$$

$$57. f(x) = \frac{e^{x-1}}{\text{sen } x}$$

$$58. f(x) = \sqrt[3]{\text{Ln}(x^2 - 1)}$$

$$59. f(x) = \sqrt[3]{2x-1}$$

$$60. f(x) = \frac{2+3x}{1+\sqrt{x}}$$

$$61. f(x) = \frac{e^x - 1}{e^x + 1}$$

$$62. f(x) = (3x-1) \cdot 2^{x-1}$$

$$63. f(x) = \log_2(x^3 - 2x + 1)$$

$$64. f(x) = \log \frac{x}{x-1}$$

Solución:

$$f'(x) = \frac{-1}{x^2} + 15 \cdot (5x-2)^2$$

$$f'(x) = \frac{2x^2 - 10x + 15}{(2x-5)^2}$$

$$f'(x) = 3^{5x^2-4x} \cdot (10x-4)$$

$$f'(x) = 3^{5x} \cdot 5 \cdot \text{Ln } 3 + e^x$$

$$f'(x) = -6x^{-4} + 3x^{-2}$$

$$f'(x) = 2x \cdot [1 + \text{Ln}(x^2 + 2)]$$

$$f'(x) = \frac{-1}{x^2} + 15 \cdot (5x-2)^2$$

$$f'(x) = \frac{(3x^5 + 4)^2 \cdot (180x^7 - 42x^5 - 60x^2 + 4)}{(5x^3 - x)^2}$$

$$f'(x) = 2 \cdot x \cdot \cos(x^2 - 1) - 3 \cdot \text{sen } 3x$$

$$f'(x) = \frac{-1}{x \cdot (x-1)}$$

$$f'(x) = \frac{(6x^3 - 2) \cdot \cos(3x^4 - 2x)}{\sqrt{\text{sen}(3x^4 - 2x)}}$$

$$f'(x) = \frac{-3 \cdot \cos 3x}{(\text{sen } 3x)^2}$$

$$f'(x) = -6 \cdot \text{sen } 2x \cdot (\cos 2x)^2 - 2 \cdot e^{2x-1}$$

$$f'(x) = \frac{e^{x-1} \cdot (\text{sen } x - \cos x)}{(\text{sen } x)^2}$$

$$f'(x) = \frac{2 \cdot x}{x^2 - 1} \cdot (\text{Ln}(x^2 - 1))^{-\frac{2}{3}}$$

$$f'(x) = \frac{2}{3} \cdot (2x-1)^{-\frac{2}{3}}$$

$$f'(x) = \frac{6 \cdot \sqrt{x} + 3x - 2}{2 \cdot \sqrt{x} \cdot (1 + \sqrt{x})^2}$$

$$f'(x) = \frac{2 \cdot e^x}{(e^x + 1)^2}$$

$$f'(x) = (3 + 3 \cdot \text{Ln } 2 \cdot x - \text{Ln } 2) \cdot 2^{x-1}$$

$$f'(x) = \frac{3x^2 - 2}{\text{Ln } 2 \cdot (x^3 - 2x + 1)}$$

$$f'(x) = \frac{-1}{\text{Ln } 10 \cdot x \cdot (x-1)}$$

