



## Ejercicios

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**Nombre del tema: Derivadas**

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**Nombre de la materia: Biomatemáticas**

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# Derivadas

1.  $f(x) = 3x^2 - x + 5$

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

$$f'(x) = 6x - 1$$

2.  $g(t) = t - 3t^2 - 2t^4$

$$g'(t) = 1 - 2 \cdot 3t^{2-1} - 4 \cdot 2t^{4-1}$$

$$g'(t) = 1 - 6t - 8t^3$$

3.  $f(x) = (2x+3)(3x-2)$

$$f'(x) = (2)(3x-2) + (2x+3)(3)$$

$$f'(x) = 6x - 4 + 6x + 9$$

$$f'(x) = 12x + 5$$

4.  $g(x) = (2x^2-1)(x^3+2)$

$$g'(x) = (4x)(x^3+2) + (2x^2-1)(3x^2)$$

5.  $h(x) = (x+1)^2$

$$h'(x) = 2(x+1) \cdot (1)$$

$$h'(x) = 2(x+1)$$

$$h'(x) = 2x + 2$$

6.  $g(t) = (4t-7)^2$

$$g'(t) = 2(4t-7) \cdot (4)$$

$$g'(t) = (8t-14) \cdot (4)$$

$$g'(t) = 32t - 56$$

7.  $f(y) = y(2y-1)(2y+1)$

$$f'(y) = (2y^2 - y)(2y^2 + 1)$$

$$f'(y) = (4y-1)(2y^2+1) + (2y^2-y)(4y+1)$$

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

$$f'(x) = 16x^3 - \left[ \frac{0 \cdot x^2 - 1 \cdot 2x}{(x^2)^2} \right]$$

$$f'(x) = 16x^3 + \frac{2}{x^3}$$

9.  $g(x) = \frac{1}{x+1} - \frac{1}{x-1}$

$$g'(x) = \frac{0(x+1) - (1)(1+0)}{(x+1)^2} - \frac{0(x-1) - 1(1-0)}{(x-1)^2}$$

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

10.  $F(t) = \frac{1}{4-t^2}$

$$F'(t) = \frac{0(4-t^2-1)(0-2t)}{(4-t^2)^2}$$

$$F'(t) = \frac{2t}{(4-t^2)^2} \quad 16 - 8t^2 + t^4$$

11.  $h(x) = \frac{3}{x^2+x+1}$

$$h'(x) = \frac{0(x^2+x+1) - 3(2x+1+0)}{(x^2+x+1)^2}$$

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

12.  $F(x) = \frac{1}{1-\frac{2}{x}}$

$$F'(x) = \frac{0 \left[ 1 - \frac{2}{x} \right] - (1) \left( 0 - \frac{0(x) - 2(1)}{(x)^2} \right)}{\left( 1 - \frac{2}{x} \right)^2}$$

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

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13.  $g(t) = (t^2+1)(t^3+t^2+1)$

$g'(t) = (2t)(t^3+t^2+1) + (t^2+1)(3t^2+2t+0)$   
 $g'(t) = (2t)(t^3+t^2+1) + (t^2+1)(3t^2+2t)$

15.  $g(z) = \frac{1}{2z} - \frac{1}{3z^2}$

$g'(z) = \left[ \frac{-2z}{9z^3} \right]$   
 $g'(z) = \frac{-2}{3z^3} - 2z^{-2}$

17.  $g(y) = 2y(3y^2-1)(y^2+2y+3)$

$g'(y) = 2y(3y^2 - y^2 + 6y^3 - 2y + 9y^2 - 3)$   
 $g'(y) = 2y(3y + 6y^3 + 8y^2 - 2y - 3)$   
 $g'(y) = 6y + 12 + 16y^5 - 4y^2 - 6y$

19.  $g(t) = \frac{t-1}{t^2+2t+1}$

$g'(t) = \frac{(1-0)(t^2+2t+1) - (t-1)(2t+2+0)}{(t^2+2t+1)^2}$   
 $g'(t) = \frac{(t^2+2t+1) - (t-1)(2t+2)}{(t^2+2t+1)^2}$

21.  $h(x) = \frac{2x^3+2x^2-3x+17}{2x-5}$

$h'(x) = \frac{(6x^2+4x-3)(2x-5) - (2x^3+2x^2-3x+17)(2)}{(2x-5)^2}$   
 $h'(x) = \frac{12x^3 - 10x^2 - 6x + 15 - 4x^3 - 4x^2 + 6x - 34}{(2x-5)^2}$   
 $h'(x) = \frac{8x^3 - 14x^2 - 28x - 19}{(2x-5)^2}$

23.  $g(x) = \frac{3x}{x^3+7x-5}$

$g'(x) = \frac{(3)(x^3+7x-5) - (3x)(3x^2+7)}{(x^3+7x-5)^2}$   
 $g'(x) = \frac{3x^3+21x-15-9x^3-21}{(x^3+7x-5)^2}$   
 $g'(x) = \frac{-6x^3-15}{(x^3+7x-5)^2}$

14.  $f(x) = (2x^3-3)(17x^4-6x+2)$

$f'(x) = (6x^2)(17x^4-6x+2) + (2x^3-3)(68x^3-6(1)+0)$   
 $f'(x) = (6x^2)(17x^4-6x+2) + (2x^3-3)(68x^3-6)$

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

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

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

$f'(x) = \frac{(x^2+2)(2x) - (x^2-4)(2x)}{(x^2+4)^2}$   
 $f'(x) = \frac{2x^3+4x-2x^3+8x}{(x^2+4)^2}$   
 $f'(x) = \frac{12x}{(x^2+4)^2}$

20.  $U(x) = \frac{1}{(x+2)^2}$

$U'(x) = \frac{0(x+2)^2 - 2(x+2)(1)}{[(x+2)^2]^2}$   
 $U'(x) = \frac{-2(x+2)}{(x+2)^4}$   
 $U'(x) = \frac{-2}{(x+2)^3}$

22.  $h(x) = \frac{2x^3+2x^2-3x+17}{2x-5}$

$h'(x) = \frac{8x^3-4x^2-10x-19}{(2x-5)^2}$   
 $h'(x) = \frac{(2x-3)(6x^2+7+3)(2x^3+17)}{(2x-5)^2}$

24.  $f(t) = \frac{1}{(t+\frac{1}{t})^2}$

$f'(t) = \frac{-2}{(t+\frac{1}{t})^3} \cdot (1 - \frac{1}{t^2})$

25.  $g(x) = \frac{3y^2}{x} - \frac{2}{x^2}$

$g'(x) = -\frac{1}{x^2} - \frac{4x}{x^4} \left[ \frac{2}{x^2} - \frac{3}{x^4} \right] - \left[ \frac{1}{x} - \frac{2}{x^2} \right] \dots$   
 $\left[ -\frac{6x^2}{x^4} - \frac{12x^3}{x^6} \right]$   
 $\left[ \frac{2}{x^3} - \frac{3}{x^4} \right]^2$

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$$f(x) = \frac{1}{x} \quad f'(x) = \frac{0(x) - 1(1)}{x^2} = -\frac{1}{x^2}$$

$$g(x) = \frac{2}{x^2} \quad g'(x) = \frac{0(x^2) - 2(2x)}{(x^2)^2} = -\frac{4x}{x^4}$$

$$h(x) = \frac{2}{x^3} \quad h'(x) = \frac{0(x^3) - 2(3x^2)}{(x^3)^2} = -\frac{6x^2}{x^6}$$

$$l(x) = \frac{-3}{x^4} \quad l'(x) = \frac{0(x^4) - 3(4x^3)}{(x^4)^2} = -\frac{12x^3}{x^8}$$

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