

Primero recuerda las reglas de derivación:

- $y = k$ $y' = 0$
- $y = x$ $y' = 1$
- $y = x^n$ $y' = nx^{n-1}$
- $y = f(x) \pm g(x)$ $y' = f'(x) \pm g'(x)$
- $y = k \cdot f(x)$ $y' = k \cdot f'(x)$
- $y = f(x) \cdot g(x)$ $y' = f'(x) \cdot g(x) + f(x) \cdot g'(x)$
- $y = \frac{f(x)}{g(x)}$ $y' = \frac{g(x) \cdot f'(x) - g'(x) \cdot f(x)}{g^2(x)}$
- $y = (f(x))^a$ $y' = a(f(x))^{a-1} \cdot f'(x)$
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- $y = \sqrt{f(x)}$ $y' = \frac{f'(x)}{2 \cdot \sqrt{f(x)}}$
- $y = \ln f(x)$ $y' = \frac{f'(x)}{f(x)}$
- $y = \log_a f(x)$ $y' = \frac{f'(x)}{f(x) \cdot \ln a}$
- $y = e^{f(x)}$ $y' = e^{f(x)} \cdot f'(x)$
- $y = a^{f(x)}$ $y' = a^{f(x)} \cdot f'(x) \cdot \ln a$

EJERCICIOS

Deriva:

1. a) $y = 5x^4 - 2x^3 - 3x + 2$ b) $y = x^2 \cdot (3x - 2)$ c) $y = (x^2 + 3) \cdot (x^2 - x - 1)$

2. a) $y = 3x \cdot (x^2 - x + 1) \cdot (5x - 3)$ b) $y = (x + 5)(x^3 - 1) \cdot (x^2 - x + 3)$

3. a) $y = \frac{x^2 - 3x + 4}{3x - 4}$ b) $y = \frac{3x^2 - 6}{x^2 + x + 1}$

4. a) $y = \frac{x^3 - 5x + 2}{x^2 - 3x}$ b) $y = \frac{x^2 - 3x + 11}{x^2 + x - 3}$

5. a) $y = (x^2 - 5x + 3)^4$ b) $y = (3x - 2)^5$

6. a) $y = (x^3 - x - 1)^4$ b) $y = (7x - 1)^4$

7. a) $y = \sqrt{x^2 + 5x - 4}$ b) $y = \sqrt[3]{x^2 - 5x}$

8. a) $y = \sqrt[4]{x^3 - x + 3}$ b) $y = \sqrt[3]{x^3 + x^2 - 7}$

9. a) $y = \ln(x^2 - 4x + 5)$ b) $y = \log_3(7x - 3)$ c) $y = \log(x^2 - 7x + 3)$

10. a) $y = \ln \frac{3x + 7}{5x - 2}$ b) $y = \ln(3x + 7)^4$ c) $y = \ln \sqrt[4]{(x^2 - 3x + 7)^3}$

11. a) $y = 5^{3x - 2}$ b) $y = e^{x^2 - 4x + 3}$

12. a) $y = a^{3x + 2} \cdot (x^2 - x + 1)$ b) $y = 5^{-x + 3}$

13. a) $y = \ln(x + \sqrt{x^2 + 9})$

14. a) $y = x \cdot e^x$ b) $y = x^x + x \frac{1}{x}$

15. a) $y = (x - \sqrt{1 - x^2})^2$ b) $y = x \cdot \ln(1 - x^2)$

16. a) $y = \ln \frac{1 + \sqrt{x}}{1 - \sqrt{x}}$ b) $y = \frac{x}{2} \cdot \sqrt{x^2 - a^2} - \frac{a^2}{2} \cdot \ln(x + \sqrt{x^2 - a^2})$

17. a) $y = e^{\sqrt{x^2 - 3x + 1}}$ b) $y = \frac{x^2 + 1}{x^2 - 1}$

18. a) $y = e^{-2x + 5} \cdot (x^2 - 4x + 5)$ b) $y = \frac{x}{\sqrt{x^2 - 2}}$

SOLUCIONES

$$1. \text{ a) } y' = 20x^3 - 6x^2 - 3 \quad \text{b) } y' = x(9x - 4) \quad \text{c) } y' = 4x^3 - 3x^2 + 4x - 3$$

$$2. \text{ a) } y' = 3(20x^3 - 24x^2 + 16x - 3) \quad \text{b) } y' = 6x^5 + 20x^4 - 8x^3 + 42x^2 - 8x + 2$$

$$3. \text{ a) } y' = \frac{x(3x-8)}{(3x-4)^2} \quad \text{b) } y' = \frac{3(x^2+6x+2)}{(x^2+x+1)^2}$$

$$4. \text{ a) } y' = \frac{x^4 - 6x^3 + 5x^2 - 4x + 6}{x^2 \cdot (x-3)^2} \quad \text{b) } y' = \frac{2(2x^2 - 14x - 1)}{(x^2 + x - 3)^2}$$

$$5. \text{ a) } y' = 4(2x-5)(x^2-5x+3)^3 \quad \text{b) } y' = 15(3x-2)^4$$

$$6. \text{ a) } y' = 4(3x^2-1)(x^3-x-1)^3 \quad \text{b) } y' = 28(7x-1)^3$$

$$7. \text{ a) } y' = \frac{2x+5}{2\sqrt{x^2+5x+4}} \quad \text{b) } y' = \frac{2x-5}{3\sqrt[3]{(x^2-5x)^2}}$$

$$8. \text{ a) } y' = \frac{3x^2-1}{4\sqrt[4]{(x^3-x+3)^3}} \quad \text{b) } y' = \frac{3x^2+2x}{3\sqrt[3]{(x^3+x^2-7)^2}}$$

$$9. \text{ a) } y' = \frac{2x-4}{x^2-4x+5} \quad \text{b) } y' = \frac{7}{(7x-3)\ln 3} \quad \text{c) } y' = \frac{2x-7}{(x^2-7x+3)\ln 10}$$

$$10. \text{ a) } y' = \frac{41}{(2-5x)(3x+7)} \quad \text{b) } y' = \frac{12}{(3x+7)} \quad \text{c) } y' = \frac{3(2x-3)}{4(x^2-3x+7)}$$

$$11. \text{ a) } y' = 3 \cdot 5^{3x-2} \cdot \ln 5 \quad \text{b) } y' = (2x-4) \cdot e^{x^2-4x+3}$$

$$12. \text{ a) } y' = a^{3x+2} [3(x^2-x+1)\ln a + 2x-1] \quad \text{b) } y' = 5^x + 3 \cdot \ln 5$$

$$13. \text{ a) } y' = \frac{1}{\sqrt{x^2+9}}$$

$$14. \text{ a) } y' = e^x \cdot (x+1) \quad \text{b) } y' = x^x (\ln x + 1) + x \frac{1}{x} \cdot \frac{1 - \ln x}{x^2}$$

$$15. \text{ a) } y' = \frac{4x^2-2}{\sqrt{1-x^2}} \quad \text{b) } y' = \ln(1-x^2) - \frac{2x^2}{1-x^2}$$

$$16. \text{ a) } y' = \frac{1}{(1-x)\sqrt{x}} \quad \text{b) } y' = \sqrt{x^2-a^2}$$

$$17. \text{ a) } y' = \frac{e^{\sqrt{x^2-3x+1}} \cdot (2x-3)}{2\sqrt{x^2-3x+1}} \quad \text{b) } y' = \frac{-4x}{(x^2-1)^2}$$

$$18. \text{ a) } y' = -2e^{-2x+5} \cdot (3x^2-7x+7) \quad \text{b) } y' = \frac{-2}{\sqrt{(x^2-2)^3}}$$