Primero recuerda las reglas de derivación:

- $y = k$ .... $y' = 0$

- $y = x$ .... $y' = 1$

- $y = x^n$ .... $y' = nx^{n-1}$

- $y = f(x) \pm g(x)$ .... $y' = f'(x) \pm g'(x)$

- $y = k \cdot f(x)$ .... $y' = k \cdot f'(x)$

- $y = f(x) \cdot g(x)$ .... $y' = f'(x).g(x) + f(x).g'(x)$

- $y = \dfrac{f(x)}{g(x)}$ .... $y' = \dfrac{g(x) \cdot f'(x) - g'(x) \cdot f(x)}{g^2(x)}$

- $y = \big(f(x)\big)^a$ .... $y' = a\big(f(x)\big)^{a-1} \cdot f'(x)$

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- $y = \sqrt{f(x)}$ .... $y' = \dfrac{f'(x)}{2 \cdot \sqrt{f(x)}}$

- $y = \ln f(x)$ .... $y' = \dfrac{f'(x)}{f(x)}$

- $y = \log_a f(x)$ .... $y' = \dfrac{f'(x)}{f(x).\ln a}$

- $y = e^{f(x)}$ .... $y' = e^{f(x)} \cdot f'(x)$

- $y = a^{f(x)}$ .... $y' = a^{f(x)} \cdot f'(x) \cdot \ln a$

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

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

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) $y = \ln \dfrac{3x + 7}{5x - 2}$ 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) $y = \ln \dfrac{1 + \sqrt{x}}{1 - \sqrt{x}}$ b) $y = \dfrac{x}{2} \cdot \sqrt{x^2 - a^2} - \dfrac{a^2}{2} \cdot \ln(x + \sqrt{x^2 - a^2})$

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

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

SOLUCIONES

1. a) $y' = 20x^3 - 6x^2 - 3$ b) $y` = x(9x - 4)$ c) $y' = 4x^3 - 3x^2 + 4x - 3$

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

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

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

5. a) $y' = 4(2x-5)(x^2 - 5x + 3)^3$ b) $y' = 15(3x-2)^4$

6. a) $y' = 4(3x^2 - 1)(x^3 - x - 1)^3$ b) $y' = 28(7x-1)^3$

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

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

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

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

11. a) $y' = 3.5^{3x-2} \cdot \ln 5$ b) $y' = (2x-4) \cdot e^{x^2 - 4x + 3}$

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

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

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

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

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

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

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