

EJERCICIOS DE DERIVADAS

Deriva las siguientes funciones. Simplifica los cálculos cuando sea posible.

1. a) $y = 5x^2 - 3x + 6$ b) $y = -3x^4 + 2x^3 - 5x^2 - 3$

c) $y = x^4 - 4x^2 + 2x$ d) $y = \frac{2}{3}x^3 - \frac{1}{4}x^2 + 3x$

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

c) $y = \frac{3x^4 - 3x}{4}$ d) $y = \frac{3}{4}(x^4 - 3x)$

e) $y = \frac{1}{3}x^2 - \frac{5}{7}x + 3$ f) $y = \frac{3x^4}{4} - 7x^3 + \frac{x^2}{2} + \frac{1}{5}$

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

c) $y = 2(x^2 + 3)(x^2 - 5x)$ d) $y = -(x^2 - 3x + 5)(2x + 4)$

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

c) $y = (x^2 + 2)^3$ d) $y = 2(4x - 7)^3$

e) $y = -2(5x^2 + 1)^3$ f) $y = 5(6x^2 + 2x - 1)^3$

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

c) $y = \frac{2}{4x^2 - 3x}$ d) $y = \frac{3x}{x^2 - 1}$

e) $y = \frac{x^2}{x^2 - 1}$ f) $y = \frac{1 - x}{3x^3 + x}$

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

c) $y = \frac{2}{5x^3}$ d) $y = \frac{-1}{x^2 - 2x}$

e) $y = \frac{2}{x^3 - 5x}$ f) $y = \frac{1}{(x^2 - 2)^3}$

Deriva y simplifica:

7. a) $y = \sqrt{3x^2}$ b) $y = \sqrt{2x^3}$

c) $y = \sqrt{5x + 2}$ d) $y = \sqrt{3x^2 + 5x}$

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

c) $y = \sqrt{(1 + 5x)^3}$ d) $y = \sqrt{1 - 2x + 3x^2}$

9. a) $y = 2\sqrt{4x-5}$

b) $y = x\sqrt{3x}$

c) $y = \frac{3}{7}\sqrt{x^2-x}$

d) $y = x\sqrt{x^2-3}$

10. a) $y = (3x^2-x)^{1/3}$

b) $y = (3x-x^2)^{1/3}$

c) $y = \sqrt[3]{3x-x^2}$

d) $y = \sqrt[4]{2x-3x^2}$

11. a) $y = \frac{1}{\sqrt{x}}$

b) $y = \frac{\sqrt{3x^2-2x}}{5x}$

c) $y = \sqrt{\frac{3x^2-2x}{2}}$

d) $y = \sqrt{\frac{2x-3}{x^2}}$

Deriva:

12. a) $y = 2^{x^2-1}$

b) $y = 3^{2x-x^2}$

c) $y = e^{-x+3}$

d) $y = 2e^{3-5x}$

e) $y = xe^x$

f) $y = x^2e^{1-5x}$

g) $y = 3xe^{-x^2}$

h) $y = (2x+1)e^{2x+1}$

13. a) $y = e^{\sqrt{x}}$

b) $y = \sqrt{e^x}$

c) $y = \frac{e^x}{x}$

d) $y = \frac{x}{e^x}$

e) $y = \frac{3e^x}{2x+1}$

f) $y = \frac{xe^x}{1-x}$

Deriva y simplifica (emplea las propiedades de los logaritmos):

14. a) $y = \log(3x)$

b) $y = \log(3x^2)$

c) $y = \log(3x)^2$

d) $y = (\log(3x))^2$

e) $y = \log(x^2+3x)$

f) $y = \log(3x+4)^7$

g) $y = \log\left(\frac{2x-1}{x^2}\right)$

h) $y = \frac{\log(2x-1)}{\log x^2}$

15. a) $y = \ln(3x^2-2)$

b) $y = 3\ln(x^2-2)$

c) $y = \ln(x^2-2)^3$

d) $y = (\ln(2x^2+3))^2$

e) $y = x + \ln x$

f) $y = x \ln x$

g) $y = \frac{\ln x}{x}$

h) $y = \frac{1}{x} - \ln x$

16. a) $y = \ln\left(\frac{x^2}{6}\right)$

b) $y = \frac{\ln x^2}{6}$

c) $y = \frac{\ln x^2}{\ln 6}$

d) $y = \frac{6}{\ln x^2}$

17. a) $y = \ln \sqrt{5x}$

b) $y = \sqrt{\ln 5x}$

c) $y = \ln(5\sqrt{x})$

d) $y = \ln(5 - \sqrt{x})$

Deriva:

18. a) $y = 7 \sin x$

b) $y = \sin 7x$

c) $y = \sin x^7$

d) $y = \sin^7 x$

19. a) $y = -3 \cos x$

b) $y = \cos(-3x)$

c) $y = \cos x^{-3}$

d) $y = \cos^{-3} x$

20. a) $y = 3 \sin 2x - 5 \cos x$

b) $y = x \sin 4x$

c) $y = \cos x \cdot \sin(-3x)$

d) $y = \cos(-3x) \cdot \sin x$

21. a) $y = x^2 \cos 4x$

b) $y = 2x^3 - \sin(3x)$

c) $y = \sin^2(3x - 1)$

d) $y = \frac{\cos(5x)}{5x}$

22. a) $y = \frac{1}{\sin x}$

b) $y = \frac{1}{\cos x}$

c) $y = \frac{\cos x}{\sin x}$

d) $y = \frac{1}{\sin x^2}$

23. El ejercicio anterior formulado de otra forma

a) $y = \operatorname{cosec} x$

b) $y = \sec x$

c) $y = \operatorname{cotag} x$

d) $y = \operatorname{cosec} x^2$

24. a) $y' = 3e^{4x} \sin 5x$

b) $y = \cos(3e^x)$

c) $y = e^{\cos 4x}$

d) $y = \cos(e^{\cos x})$

25. a) $y = \sin(\ln x)$

b) $y = \cos(\ln x)$

c) $y = \cos \frac{1}{x}$

d) $y = \sqrt{\sin 2x}$

26. a) $y = \ln(\sin x)$

b) $y = \ln(\cos x)$

c) $y = \ln(\tan x)$

d) $y = \ln(\sin x)^2$

27. a) $y = \operatorname{tag}(x^2 - 1)$

b) $y = \operatorname{tag}(x - 1)^2$

c) $y = 2 \operatorname{tag}(x - 1)$

d) $y = \operatorname{tag}^2(x - 1)$

e) $y = (\operatorname{tag}(x - 1))^2$

f) $y = \operatorname{tag} \sqrt{x}$

28. a) $y = \operatorname{arcsen} 2x$

b) $y = \operatorname{arcsen} (2 + x)$

c) $y = \operatorname{arccos} x^2$

d) $y = \operatorname{arccos} e^x$

e) $y = \operatorname{arctag}(3x + 2)$

f) $y = \operatorname{arctag}(x^2)$