

CÁLCULO DE DERIVADAS

1) $y = x^5 + 5x^4 - 10x^2 + 6$

Sol: $y' = 5x(x^3 + 4x^2 - 4)$

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

Sol: $y' = \frac{3}{2\sqrt{x}} - \frac{3}{2}\sqrt{x} - \frac{1}{\sqrt{x^3}}$

3) $y = \frac{1}{2x^2} + \frac{4}{\sqrt{x}}$

Sol: $y' = \frac{3}{2\sqrt{x}} - \frac{3}{2}\sqrt{x} - \frac{1}{\sqrt{x^3}}$

4) $y = \sqrt{2x} + 2\sqrt{x}$

Sol: $y' = \frac{1+\sqrt{2}}{\sqrt{2x}}$

5) $f(t) = \frac{2}{\sqrt{t}} + \frac{6}{\sqrt[3]{t}}$

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

6) $y = (1-5x)^6$

Sol: $y' = -30(1-5x)^5$

7) $f(x) = (3x - x^3 + 1)^4$

Sol: $f'(x) = 12(1-x^2)(3x-x^3+1)^3$

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

Sol: $y' = \frac{2-x}{y}$

9) $t = \frac{3z+2}{2z+3}$

Sol: $t' = \frac{5}{(2z+3)^2}$

10) $y = \left(\frac{x}{1+x}\right)^5$

Sol: $y' = \frac{5x^4}{(1+x)^6}$

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

Sol: $y' = \frac{x(8-5x)}{\sqrt{2-x}}$

12) $f(t) = t\sqrt{3-2t^2}$

Sol: $f'(t) = \frac{3-4t^2}{\sqrt{3-2t^2}}$

13) $y = (x-1)\sqrt{x^2-2x+2}$

Sol: $y' = \frac{2x^2-4x+2}{\sqrt{x^2-2x+2}}$

14) $z = \frac{w}{\sqrt{1-4w^2}}$

Sol: $z' = \frac{1}{\sqrt{(1-4w^2)^2}}$

15) $y = \sqrt{1+\sqrt{x}}$

Sol: $y' = \frac{1}{4\sqrt{x+x\sqrt{x}}}$

16) $y = \sqrt{\frac{x-1}{x+1}}$

Sol: $y' = \frac{1}{(x+1)\sqrt{x^2-1}}$

17) $y = (x^2+3)^4 \cdot (2x^3-5)^3$

Sol: $y' = 2x(x^2+1)^3(2x^3-1)(7x^3+27x-20)$

18) $s = \frac{t^2+2}{3-t^2}$

Sol: $s' = \frac{10t}{(3-t^2)^2}$

19) $y = \left(\frac{x^3-1}{2x^3+1}\right)^4$

Sol: $y' = \frac{36x^2(x^3-1)^3}{(2x^3+1)^5}$

20) $y = \frac{a-x}{a+x}$

Sol: $y' = \frac{-2a}{(a+x)^2}$

21) $y = (a+x)\sqrt{a-x}$

Sol: $y' = \frac{a-3x}{2\sqrt{a-x}}$

22) $y = \sqrt[3]{x^2+x+1}$

Sol: $y' = \frac{2x+1}{3\sqrt[3]{(x^2+x+1)^2}}$

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23) $y = \frac{2x^4}{b^2 - x^2}$

Sol: $y' = \frac{4x^3(2b^2 - x^2)}{(b^2 - x^2)^2}$

24) $y = \frac{x}{m} + \frac{m}{x} + \frac{x^2}{n^2} + \frac{n^2}{x^2}$

Sol: $y' = \frac{1}{m} - \frac{m}{x^2} + \frac{2x}{n^2} - \frac{2n^2}{x^3}$

25) $y = \frac{x^5}{a+b} - \frac{x^x}{a-b} - x$

Sol: $y' = \frac{5x^4}{a+b} - \frac{2x}{a-b} - 1$

26) $y = \frac{x^p}{x^m - a^m}$

Sol: $y' = \frac{x^{p-1}[(p-m)x^m - pa^m]}{(x^m - a^m)^2}$

27) $y = \sqrt{x^2 + a^2}$

Sol: $y' = \frac{x}{\sqrt{x^2 + a^2}}$

28) $y = 2ax^3 - \frac{x^3}{b} + c$

Sol: $y' = 6ax^2 - \frac{2x^2}{b}$

$y = \text{sen}^2 x$

Sol: $y' = \text{sen} 2x$

29) $y = 2\text{sen} x + \cos 3x$

Sol: $y' = 2 \cos x - 3 \text{sen} 3x$

30) $y = \text{tg}(ax + b)$

Sol: $y' = \frac{a}{\cos^2(ax + b)}$

31) $y = \frac{\text{sen} x}{1 + \cos x}$

Sol: $y' = \frac{1}{1 + \cos x}$

32) $y = \cot g^2 5x$

Sol: $y' = -10 \cot g 5x \cos ec^2 5x$

33) $y = \text{sen}^3 t \cos t$

Sol: $y' = \text{sen}^2 t \cdot (3 \cos^2 t - \text{sen}^2 t)$

34) $y = a\sqrt{\cos 2x}$

Sol: $y' = -\frac{2 \text{sen} 2x}{\sqrt{\cos 2x}}$

35) $y = 5(1 - \cos^2 \frac{x}{2})$

Sol: $y' = 10 \cdot \text{sen}^3 \left(\frac{x}{2}\right) \cos \left(\frac{x}{2}\right)$

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

Sol: $y' = -\text{tg} x$

38) $y = \ln(\text{tg} x)$

Sol: $y' = \frac{2}{\text{sen} 2x}$

39) $y = \ln \text{sen}^2 x$

Sol: $y = 2 \cot g x$

40) $y = \ln \sqrt{\frac{1 + \text{sen} x}{1 - \text{sen} x}}$

Sol: $y' = \frac{1}{\cos x}$

41) $y = \ln \text{tg} \left(\frac{\pi}{4} + \frac{x}{2}\right)$

Sol: $y' = \frac{1}{\cos x}$

42) $y = \text{tg}(\ln x)$

Sol: $y' = \frac{\text{sec}^2(\ln x)}{x}$

43) $y = \text{sen}(\cos t)$

Sol: $y' = -\text{sen} t \cdot \cos(\cos t)$

44) $y = \frac{1}{3} \text{tg}^3 \varphi - \text{tg} \varphi + \varphi$

Sol: $r' = \text{tg}^4 \varphi$

45) $y = \log(x^2 + 1)$

Sol: $y' = \frac{2x}{(x^2 + 1) \ln 10}$

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46) $y = \ln\left(\frac{1+x}{1-x}\right)$

Sol: $y' = \frac{2}{1-x^2}$

47) $y = \log_3(x^2 - \text{sen}x)$

Sol: $y' = \frac{2x - \cos x}{(x^2 - \text{sen}x) \cdot \ln 3}$

48) $y = \ln(x^2 - 2x + 5)$

Sol: $y' = \frac{3x^2 - 2}{x^3 - 2x + 5}$

49) $y = \ln\left(\frac{\sqrt{x^2+1}-x}{\sqrt{x^2-1}+x}\right)$

Sol: $y' = \frac{-1}{\sqrt{1+x^2}} - \frac{1}{\sqrt{x^2-1}}$

50) $y = e^{ax}$

Sol: $y' = a \cdot e^{ax}$

51) $y = 7^{x^2+2x}$

Sol: $y' = 2(x+1)7^{x^2+2x} \cdot \ln 7$

52) $z = a^{\ln \theta}$

Sol: $z' = \frac{a^{\ln \theta} \cdot \ln a}{\theta}$

53) $y = \frac{e^x - 1}{e^x + 1}$

Sol: $y' = \frac{2e^x}{(e^x + 1)^2}$

54) $y = 10^{x \cdot \text{tg}x}$

Sol: $y' = 10^{x \cdot \text{tg}x} \cdot \ln 10 \cdot \left(\text{tg}x + \frac{x}{\cos^2 x}\right)$

55) $y = (\text{sen}x)^{\text{tg}x}$

Sol: $y' = (\text{sen}x)^{\text{tg}x} \cdot \left(1 + \frac{\ln \text{sen}x}{\cos^2 x}\right)$

56) $y = x^x$

Sol: $y' = x^x (\ln x + 1)$

57) $y = e^{x^x}$

Sol: $y' = e^{x^x} (1 + \ln x)x^x$

58) $y = \arctg(x^2 + 1)$

Sol: $y' = \frac{2x}{1 + (x^2 + 1)^2}$

59) $y = \arcsen\left(\frac{x+1}{\sqrt{2}}\right)$

Sol: $y' = \frac{1}{\sqrt{1-2x-x^2}}$

60) $y = \arccos(\ln x)$

Sol: $y' = \frac{-1}{x \cdot \sqrt{1 - \ln^2 x}}$

61) $y = \arctg\left(\frac{4\text{sen}x}{3+5\cos x}\right)$

Sol: $y' = \frac{4}{5+3\cos x}$