

PUC MINAS
DERIVADAS
PRIMEIRO PERÍODO

Calcule a derivada primeira:

01. $f(x) = (x^2 + 4x + 6)^5$
02. $f(x) = \cos(\operatorname{tg} x)$
03. $f(x) = e^{\sqrt{x}}$
04. $f(x) = \operatorname{tg} 3x$
05. $f(x) = \sqrt[3]{1 + x^3}$
06. $f(x) = \operatorname{sen}(e^x)$
07. $f(x) = (x^3 + 4x)^7$
08. $f(x) = (x^2 - x + 1)^3$
09. $f(x) = \sqrt{x^2 - 7x}$
10. $f(x) = \frac{1}{(x^2 - 2x - 5)^4}$
11. $f(x) = \left(x - \frac{1}{x}\right)^{\frac{3}{2}}$
12. $f(x) = \operatorname{tg}(\sqrt[3]{1 + \operatorname{tg} x})$
13. $f(x) = \cos(a^3 + x^3)$
14. $f(x) = a^3 + \cos^3 x$
15. $f(x) = e^{-mx}$
16. $f(x) = 4 \sec 5x$
17. $f(x) = (3x - 2)^{10} (5x^2 - x + 1)^{12}$
18. $f(x) = (6x^2 + 5)^3 (x^3 - 7)^4$
19. $f(x) = (2x - 5)^4 (8x^2 - 5)^{-3}$
20. $f(x) = (x^2 + 1)(\sqrt[3]{x^2} + 2)$
21. $f(x) = x e^{-x^2}$
22. $f(x) = e^{-5x} \cos 3x$
23. $f(x) = \left(\frac{x - 6}{x + 7}\right)^3$
24. $f(x) = \sqrt[4]{\frac{x^3 + 1}{x^3 - 1}}$
25. $f(x) = \frac{1}{\sqrt[5]{2x - 1}}$
26. $f(x) = \frac{x}{\sqrt{7 - 3x}}$
27. $f(x) = \operatorname{tg}(\cos x)$
28. $f(x) = \frac{\operatorname{sen}^2 x}{\cos x}$
29. $f(x) = 5^{\frac{1}{x}}$
30. $f(x) = \sqrt{1 + 2 \operatorname{tg} x}$
31. $f(x) = \operatorname{sen}^3 x + \cos^3 x$
32. $f(x) = \operatorname{sen}^2(\cos kx)$
33. $f(x) = (1 + \cos^2 x)^6$
34. $f(x) = x \operatorname{sen} \frac{1}{x}$
35. $f(x) = \frac{e^{3x}}{1 + e^x}$
36. $f(x) = e^{5 \operatorname{sen} x}$
37. $f(x) = e^{x \cos x}$
38. $f(x) = \operatorname{sen}(\operatorname{sen}(\operatorname{sen} x))$
39. $f(x) = \sqrt{x + \sqrt{x}}$
40. $f(x) = \operatorname{sen}(\operatorname{tg} \sqrt{\operatorname{sen} x})$
41. $f(x) = \sqrt{x + \sqrt{x + \sqrt{x}}}$
42. $f(x) = 2^{3^{x^2}}$
43. $f(x) = \log_{10}(x^2 - x)$
44. $f(x) = \ln \operatorname{sen} x - \frac{1}{2} \operatorname{sen}^2 x$
44. $f(x) = \ln(\csc 5x)$
45. $f(x) = \ln \left| \frac{x^2 - 4}{2x + 5} \right|$
46. $f(x) = \ln(\sec x + \operatorname{tg} x)$
47. $f(x) = \ln(1 + x^2)$
48. $f(x) = \ln(x + \ln x)$
49. $f(x) = \ln \sqrt{\frac{3x + 2}{3x - 2}}$
50. $f(x) = \ln(x^3 \operatorname{sen} x)$

Encontre a equação da reta tangente no ponto dado

51. $f(x) = \frac{8}{\sqrt{4 + 3x}}$, (4, 2)
52. $f(x) = \operatorname{sen} x + \cos 2x$, $(30^\circ, 1)$
53. $f(x) = \operatorname{sen}(\operatorname{sen} x)$, $(\pi, 0)$
54. $f(x) = 10^x$, (1, 10)
55. $f(x) = \frac{2}{1 + e^{-x}}$, (0, 1)
56. $f(x) = \frac{x}{\sqrt{2 - x^2}}$, $(1, 1)^2 x$
57. $f(x) = \frac{\sqrt{1 - x^2}}{x}$, (1, 0)
58. $f(x) = 2 \operatorname{sen} x + \operatorname{sen}^2 x$, (0, 0)
59. $f(x) = \ln(e^x + e^{2x})$, (0, $\ln 2$)
60. $f(x) = (\ln \operatorname{tg} x)^2$, $(45^\circ, 0)$

01. $10(x^2 + 4x + 6)^4(x+2)$ 02. $-\text{sen}(\text{tg}x)\sec^2x$ 03. $\frac{e^{\sqrt{x}}}{2\sqrt{x}}$
04. $3\sec^2 3x$ 05. $\frac{x^2}{(1+x^3)^{\frac{2}{3}}}$ 06. $e^x \cos(e^x)$
07. $7x^6(x^2+4)^6(3x^2+4)$ 08. $3(x^2-x+1)^2(2x-1)$ 09. $\frac{2x-7}{2\sqrt{x^2-7x}}$
10. $\frac{8(1-x)}{(x^2-2x-5)^5}$ 11. $\frac{3}{2}(x-\frac{1}{x})^2(1+\frac{1}{x^2})$ 12. $\frac{\sec^2 x}{3\sqrt[3]{(1+\text{tg}x)^2}}$
13. $-3x^2 \text{sen}(a^3+x^3)$ 14. $-3\text{sen}x \cos^2 x$ 15. $-m \cdot e^{-mx}$
16. $20\cos(5x)\text{tg}(5x)$ 17. $6(3x-2)^9(5x^2-x+1)^{11}(85x^2-51x+9)$
18. $12x(6x^2+5)^2(x^3-7)^3(9x^3+5x-21)$ 19. $8(2x-5)^3(8x^2-5)^{-4}(-4x^2+30x-5)$
20. $2x(x^2+2)[1+\frac{x^2+1}{3(x^2+2)}]$ 21. $e^{-x^2}(1-2x^2)$ 22. $-e^{-5x}[3\text{sen}(3x)+5\cos(3x)]$
23. $\frac{-39(x-6)^2}{(x+7)^4}$ 24. $\frac{1}{2}(\frac{x^3+1}{x^3-1})^{-\frac{3}{4}}(\frac{-3x^2}{(x^3-1)^2})$ 25. $\frac{-2}{5}(2x-1)^{-\frac{6}{5}}$
26. $\frac{14-3x}{2(7-3x)^{\frac{3}{2}}}$ 27. $-\text{sen}x(\sec^2 x)(\cos x)$ 28. $\text{sen}x(1+\sec^2 x)$ 29. $5^{\frac{-1}{x}} \frac{\ln 5}{x^2}$
30. $\frac{\sec^2 x}{\sqrt{1+2\text{tg}x}}$ 31. $3\text{sen}x \cos x (\text{sen}x - \cos x)$ 32. $-k \text{sen}(kx) \text{sen}(2\cos kx)$
33. $-12\cos x \text{sen}x(1+\cos^2 x)^5$ 34. $\text{sen} \frac{1}{x} - \frac{1}{x} \cos \frac{1}{x}$ 35. $\frac{3e^{3x} + 2e^{4x}}{(1+e^x)^2}$ 36. $5\cos(5x)e^{\text{sen}(5x)}$
37. $(\cos x - x \text{sen}x)e^{x \cos x}$ 38. $\cos(\text{sen}(\text{sen}x))\cos(\text{sen}x)\cos x$ 39. $\frac{1+\frac{1}{2}x}{2\sqrt{x+\sqrt{x}}}$
40. $\cos(\text{tg}\sqrt{\text{sen}x})(\sec^2 \sqrt{\text{sen}x})\frac{1}{2\sqrt{\text{sen}x} \cos x}$ 41. $\frac{1}{2}(x+\sqrt{x+\sqrt{x}})^{-\frac{1}{2}}[1+\frac{1}{2}(x+\sqrt{x})^{-\frac{1}{2}}(1+\frac{1}{2}x^{-\frac{1}{2}})]$
42. $(\ln 2)3^{x^2}(\ln 3)2x$ 43. $\frac{2x-1}{(x^2-x)\ln 10}$ 44. $\csc x - \text{sen}x \cos x$ 44b. $-5\cot(5x)$
45. $\frac{1}{x-2}$ 46. $\sec x \text{tg}x$ 47. $\frac{2-2x^2}{x^2+1}$ 48. $\frac{x+1}{x(x+\ln x)}$ 49. $\frac{-6}{9x^2-4}$
50. $\frac{3\cot x}{x}$ 51. $y = \frac{-3x+44}{16}$ 52. $y = 1 - \frac{\sqrt{3}}{2}(x-\frac{\pi}{6})$ 53. $y = -x + \pi$
54. $y = 10[(x-1)\ln 10 + 1]$ 55. $y = \frac{1}{2}x + 1$ 56. $y = 2x - 1$ 57. $y = 0$
58. $y = 2x - 4$ 59. $y = \frac{3}{2}x + \ln 2$ 60. $y = 0$