DERIVADAS. BACHILLERATO

Calcula la derivada de las siguientes funciones:

1. $y = 7x^3 - \frac{3}{2}x^2 + \frac{5}{3}x + 20$ **Sol:** $f'(x) = 21x^2 - 3x + \frac{5}{3}$

2. $y = (4x^2 - 2)(6x^3 - 4x)$ **Sol:** $f'(x) = 120x^4 - 84x^2 + 2$

3. $y = x^3 - 5x + 7$ **Sol:** $f'(x) = 3x^2 - 5$

4. $y = \sqrt{x} + 4x^5$ **Sol:** $f'(x) = \frac{1}{2\sqrt{x}} + 20x^4$

5. $y = 5x - \frac{6}{x}$ **Sol:** $f'(x) = 5 + \frac{6}{x^2}$

6. $y = 10\sqrt{2x^4}$ **Sol:** $f'(x) = 20\sqrt{2}x$

7. $y = 4x^{-2}$ **Sol:** $f'(x) = -\frac{8}{x^3}$

8. $y = x \cdot (3x - 8)$ **Sol:** $f'(x) = 6x - 8$

9. $y = \frac{x^2 - 4}{x^2 - 5x + 6}$ **Sol:** $f'(x) = -\frac{5}{(x-3)^2}$

10. $y = 2x^{14}$ **Sol:** $f'(x) = 28x^{13}$

11. $y = x^{10}\sqrt{x}$ **Sol:** $f'(x) = \frac{21x^{10}}{2\sqrt{x}}$

12. $y = 5x^{11} \cdot (4x - 3)$ **Sol:** $f'(x) = 240x^{11} - 165x^{10}$

13. $y = \frac{3x - 1}{x^5 - 4x}$ **Sol:** $f'(x) = -\frac{12x^5 - 5x^4 + 4}{x^2(x^2 - 4)^2}$

14. $y = \frac{x\sqrt{5x^2}}{6x - 6}$ **Sol:** $f'(x) = \frac{\sqrt{5}x(x-2)}{6(x-1)^2}$

15. $y = \frac{x + 1}{(x - 1)^2}$ **Sol:** $f'(x) = \frac{x+3}{(1-x)^3}$

16. $y = 2^{6x^2 - 2x}$ **Sol:** $f'(x) = (12x - 2) \cdot 2^{6x^2-2x} \cdot \ln 2$

17. $y = (8x^3 - 3x)^4$ **Sol:** $f'(x) = 4(8x^3 - 3x)^3 \cdot (24x^2 - 3)$

18. $y = \sqrt{x^3 - 8x}$ **Sol:** $f'(x) = \frac{3x^2 - 8}{2\sqrt{x^3 - 8x}}$

19. $y = \sqrt{\dfrac{x+1}{x-1}}$ **Sol:** $f'(x) = -\dfrac{1}{(x-1)\sqrt{x^2-1}}$

20. $y = \sqrt[3]{x+2}$ **Sol:** $f'(x) = \dfrac{1}{3\sqrt[3]{(x+2)^2}}$

21. $y = e^{4x^5-3}$ **Sol:** $f'(x) = e^{4x^5-3} \cdot 20x^4$

22. $y = \sqrt[4]{2x^2}$ **Sol:** $f'(x) = \dfrac{1}{\sqrt[4]{8x^2}}$

23. $y = (x^3+8x)^{11}$ **Sol:** $f'(x) = 11(x^3+8x)^{10}(3x^2+8)$

24. $y = 5e^x$ **Sol:** $f'(x) = 5e^x$

25. $y = \pi^x$ **Sol:** $f'(x) = \pi^x \cdot \ln \pi$

26. $y = 8^{3x}$ **Sol:** $f'(x) = 3 \cdot 8^{3x} \cdot \ln 8$

27. $y = 9^{5x^2-1}$ **Sol:** $f'(x) = 10x \cdot 9^{5x^2-1} \cdot \ln 9$

28. $y = \left(\dfrac{1}{3}\right)^{x^2}$ **Sol:** $f'(x) = 2x\left(\dfrac{1}{3}\right)^{x^2} \cdot \ln \dfrac{1}{3}$

29. $y = (5x^2-1)^9$ **Sol:** $f'(x) = 90x(5x^2-1)^8$

30. $y = e^{5x^3+8x}$ **Sol:** $f'(x) = e^{5x^3+8x} \cdot (15x^2+8)$

31. $y = (6x+3)^7$ **Sol:** $f'(x) = 42(6x+3)^6$

32. $y = e^{\ln x}$ **Sol:** $f'(x) = \dfrac{e^{\ln x}}{x}$

33. $y = \ln 9x$ **Sol:** $f'(x) = \dfrac{1}{x}$

34. $y = 4^{7x^4}$ **Sol:** $f'(x) = 28x^3 \cdot 4^{7x^4} \cdot \ln 4$

35. $y = \sqrt[6]{e^x \cdot (3x-2)}$ **Sol:** $f'(x) = \dfrac{3xe^x + e^x}{6\sqrt[6]{e^{5x} \cdot (3x-2)^5}}$

36. $y = 5^{\log_5 x}$ **Sol:** $f'(x) = \dfrac{5^{\log_5 x}}{x \ln 5}$

37. $y = 10 \log_3 x$ **Sol:** $f'(x) = \dfrac{10}{x \ln 3}$

38. $y = 3^{\sqrt{4x^5-3x}}$ **Sol:** $f'(x) = 3^{\sqrt{4x^5-3x}} \cdot \ln 3 \cdot \dfrac{20x^4-3}{2\sqrt{4x^5-3x}}$

39. $y = \log_5(5x-7)^6$ **Sol:** $f'(x) = \dfrac{30}{(5x-7)\ln 5}$

40. $y = 4^x \cdot \ln x$ **Sol:** $f'(x) = 4^x \cdot \ln 4 \cdot \ln x + \dfrac{4^x}{x}$

41. $y = 3^x \cdot \log_3 x$ **Sol:** $f'(x) = 3^x \cdot \ln x + \dfrac{3^x}{x \ln 3}$

42. $y = ln(\sqrt{x^2-2x})$ **Sol:** $f'(x) = \dfrac{x-1}{x(x-2)}$

43. $y = \ln(\sqrt{e^x})$ **Sol:** $f'(x) = \dfrac{1}{2}$

44. $y = \ln^4(5x-1)$ **Sol:** $f'(x) = \dfrac{20\ln^3(5x-1)}{5x-1}$

45. $y = \ln(5x-1)^4$ **Sol:** $f'(x) = \dfrac{20}{5x-1}$

46. $y = \dfrac{5}{\ln x}$ **Sol:** $f'(x) = -\dfrac{5}{x\ln^2 x}$

47. $y = \sqrt{\ln 6x}$ **Sol:** $f'(x) = \dfrac{1}{2x\sqrt{\ln 6x}}$

48. $y = (3x-2)\cdot \ln(6x^2)$ **Sol:** $f'(x) = 3\ln(6x^2) + \dfrac{6x-4}{x}$

49. $y = \left(x + \dfrac{1}{x}\right)^2$ **Sol:** $f'(x) = 2\left(x+\dfrac{1}{x}\right)\left(1-\dfrac{1}{x^2}\right)$

50. $y = \log_6 4^{3x-2}$ **Sol:** $f'(x) = \dfrac{3\ln 4}{\ln 6}$

51. $y = \ln(x^2-2)$ **Sol:** $f'(x) = \dfrac{2x}{x^2-2}$

52. $y = \ln^2(6x^3-5x)$ **Sol:** $f'(x) = 2\ln(6x^3-5x)\cdot\dfrac{18x^2-5}{6x^3-5x}$

53. $y = \ln(6x^3-5x)^2$ **Sol:** $f'(x) = \dfrac{36x^2-10}{6x^3-5x}$

54. $y = \ln\left(\sqrt{\dfrac{x-2}{x+2}}\right)$ **Sol:** $f'(x) = \dfrac{2}{x^2-4}$

55. $y = \sqrt{\dfrac{4x^2-1}{4x^2+1}}$ **Sol:** $f'(x) = \dfrac{8x}{(4x^2+1)\sqrt{16x^4-1}}$

56. $y = \dfrac{1}{\sqrt{x^2-1}}$ **Sol:** $f'(x) = -\dfrac{x}{\sqrt{(x^2-1)^3}}$

57. $y = \ln^5(8x^3)$ **Sol:** $f'(x) = \dfrac{15\ln^4(8x^3)}{x}$

58. $y = \left(\dfrac{e^{-x}+2}{e^{-x}+1}\right)^3$ **Sol:** $f'(x) = \dfrac{3e^{-x}(e^{-x}+2)^2}{(e^{-x}+1)^4}$

59. $y = e^{\ln^2(3x)}$ **Sol:** $f'(x) = e^{\ln^2(3x)}\dfrac{2\ln(3x)}{x}$

60. $y = \ln\sqrt{1+6x}$ **Sol:** $f'(x) = \dfrac{3}{1+6x}$

61. $y = \ln\left(\dfrac{x^2}{x^2+5}\right)$ **Sol:** $f'(x) = \dfrac{10}{x^3+5x}$

62. $y = \ln(x+\ln x)$ **Sol:** $f'(x) = \dfrac{x+1}{x^2+x\ln x}$

63. $y = \ln^3\left(\dfrac{x^2}{1-x^2}\right)$ **Sol:** $f'(x) = 6\ln^2\left(\frac{x^2}{1-x^2}\right)\dfrac{1}{x-x^3}$

64. $y = \dfrac{-2}{\sqrt{1-x}}$ **Sol:** $f'(x) = -\dfrac{1}{\sqrt{(1-x)^3}}$

65. $y = \ln\left(\dfrac{e^x-1}{e^x+1}\right)$ **Sol:** $f'(x) = \dfrac{2\cdot e^x}{e^{2x}-1}$

66. $y = \log_3(3x^2+5)$ **Sol:** $f'(x) = \dfrac{6x}{(3x^2+5)\ln 3}$

67. $y = \ln(2x-1)$ **Sol:** $f'(x) = \dfrac{2}{2x-1}$

68. $y = x^5\ln(x)$ **Sol:** $f'(x) = x^4(5\ln x+1)$

69. $y = \ln^5(3x)$ **Sol:** $f'(x) = \dfrac{5\ln^4(3x)}{x}$

70. $y = \ln\left(\sqrt[3]{\dfrac{3x}{x+2}}\right)$ **Sol:** $f'(x) = \dfrac{2}{3x^2+6x}$

71. $y = \dfrac{\ln x}{x}$ **Sol:** $f'(x) = \dfrac{1-\ln x}{x^2}$

72. $y = \ln\left(\dfrac{(x-2)^3}{\sqrt{2x-1}}\right)$ **Sol:** $f'(x) = \dfrac{5x-1}{(2x-1)(x-2)}$

73. $y = \log \sqrt{\dfrac{1+x}{1-x}}$ **Sol:** $f'(x) = \dfrac{1}{1-x^2}$

74. $y = x^2 \ln(2-x)$ **Sol:** $f'(x) = 2x \ln(2-x) - \dfrac{x^2}{2-x}$

75. $y = x \ln(x) - x$ **Sol:** $f'(x) = \ln x$

76. $y = x^3 \cdot e^{3x}$ **Sol:** $f'(x) = 3x^2(1+x)e^{3x}$

77. $y = 3^{2x^2} \cdot \sqrt{x}$ **Sol:** $f'(x) = 3^{2x^2}\left(4x\sqrt{x}\ln 3 + \dfrac{1}{2\sqrt{x}}\right)$

78. $y = 5^{\sqrt{x}}$ **Sol:** $f'(x) = \dfrac{5^{\sqrt{x}\ln 5}}{2\sqrt{x}}$