82 DERIVADAS (con SOLUCIONES)

■ Hallar las derivadas **<u>simplificadas</u>** de las siguientes funciones:

1. $y = 5$ $(y'=0)$

2. $y = 3/2$ $(y'=0)$

3. $y = 3x$ $(y'=3)$

4. $y = 2x-3$ $(y'=2)$

5. $y = -x$ $(y'=-1)$

6. $y = \dfrac{x}{2} - 5$ $(y'=1/2)$

7. $y = x^4$ $(y'=4x^3)$

8. $y = 2x^5$ $(y'=10x^4)$

9. $y = \dfrac{x^3}{2}$ $\left(y' = \dfrac{3x^2}{2}\right)$

10. $y = x^3+x^2+x+1$ $(y'=3x^2+2x+1)$

11. $y = 2x^4-3x^2+5x-8$ $(y'=8x^3-6x+5)$

12. $y = \dfrac{x^5}{5} - \dfrac{x^3}{3} + \dfrac{x^2}{4} - \dfrac{x}{7} + 5$ $\left(y' = x^4 - x^2 - \dfrac{x}{2} - \dfrac{1}{7}\right)$

13. $y = -x^4 + \dfrac{1}{7}$ $(y'=-4x^3)$

14. $y = \dfrac{1}{x}$ $\left(y' = -\dfrac{1}{x^2}\right)$

15. $y = \dfrac{3}{x}$ $\left(y' = -\dfrac{3}{x^2}\right)$

16. $y = \dfrac{1}{3x}$ $\left(y' = -\dfrac{1}{3x^2}\right)$

17. $y = \dfrac{1}{x^2}$ $\left(y' = -\dfrac{2}{x^3}\right)$

18. $y = \dfrac{3}{x^3}$ $\left(y' = -\dfrac{9}{x^4}\right)$

19. $y = \dfrac{1}{2x^4}$ $\left(y' = -\dfrac{2}{x^5}\right)$

20. $y = \dfrac{1}{x^3} + \dfrac{1}{x^2} + \dfrac{1}{x} + 1$ $\left(y' = -\dfrac{3}{x^4} - \dfrac{2}{x^3} - \dfrac{1}{x^2}\right)$

21. $y = \dfrac{1}{x^2 + 2x - 3}$ $\left(y' = -\dfrac{2x + 2}{(x^2 + 2x - 3)^2}\right)$

22. $y = \dfrac{3}{x^3 - 2x^2 + 5}$ $\left(y' = -3\dfrac{3x^2 - 4x}{(x^3 - 2x^2 + 5)^2}\right)$

23. $y = \dfrac{x^3 - 2x^2 + 5}{3}$ $\left(y' = \dfrac{3x^2 - 4x}{3}\right)$

24. $y = \sqrt{x}$ $\left(y' = \dfrac{1}{2\sqrt{x}}\right)$

25. $y = \sqrt{6x}$ $\left(y' = \dfrac{3}{\sqrt{6x}}\right)$

26. $y = \sqrt{x^2 + x + 1}$ $\left(y' = \dfrac{2x + 1}{2\sqrt{x^2 + x + 1}}\right)$

27. $y = \sqrt[3]{x}$ $\left(y' = \dfrac{1}{3\sqrt[3]{x^2}}\right)$

28. $y = \sqrt[3]{x^2}$ $\left(y' = \dfrac{2}{3\sqrt[3]{x}}\right)$

29. $y = 2\sqrt[3]{x^4} - 3\sqrt{x} + 1$ $\left(y' = \dfrac{8}{3}\sqrt[3]{x} - \dfrac{3}{2\sqrt{x} + 1}\right)$

30. $y = (x^2+1)^2$ $(y'=4x^3+4x)$

31. $y = (x^2+1)^{100}$ $(y'=200x(x^2+1)^{99})$

32. $y = (2x^3-3x+5)^3$ $(y'=3(2x^3-3x+5)^2(6x^2-3))$

33. $y = 5(\sqrt{x} + 1)^2$ $\left(y' = \dfrac{5(\sqrt{x} + 1)}{\sqrt{x}}\right)$

34. $y = \left(x^2 + \dfrac{1}{x}\right)^5$ $\left(y' = 5\left(x^2 + \dfrac{1}{x}\right)^4\left(2x - \dfrac{1}{x^2}\right)\right)$

35. $y = (2x^2-3)(x^2-3x+1)$ $(y'=8x^3-18x^2-2x+9)$

36. $y = (x^2+x+1)(x^2-x+1)$ $\qquad$ $\left(y'=4x^3+2x\right)$

37. $y = (x^2-3)(2x^2-5)^3$

38. $y = (x^2+1)(x-3)(x^2+x)$ $\qquad$ $\left(y'=5x^4-8x^3-6x^2-4x-3\right)$

39. $y = x^2\sqrt{x}$ $\qquad$ $\left(y' = \dfrac{5}{2}x\sqrt{x}\right)$

40. $y = \sqrt[4]{x^3}\,(2x-3)$ $\qquad$ $\left(y' = \dfrac{14x-9}{4\sqrt[4]{x}}\right)$

41. $y = \dfrac{2x-3}{2x+3}$ $\qquad$ $\left(y' = \dfrac{12}{(2x+3)^2}\right)$

42. $y = \dfrac{x^2-3}{2x+1}$ $\qquad$ $\left(y' = \dfrac{2x^2+2x+6}{(2x+1)^2}\right)$

43. $y = \dfrac{2x^2-1}{x^2+2}$ $\qquad$ $\left(y' = \dfrac{10x}{(x^2+2)^2}\right)$

44. $y = \dfrac{3}{x^2-1}$ $\qquad$ $\left(y' = \dfrac{-6x}{(x^2-1)^2}\right)$

45. $y = \dfrac{x}{\sqrt{x}}$ $\qquad$ $\left(y' = \dfrac{1}{2\sqrt{x}}\right)$

46. $y = \sqrt{\dfrac{1}{x}+1}$ $\qquad$ $\left(y' = \dfrac{-1}{2x\sqrt{x^2+x}}\right)$

47. $y = 3\,\dfrac{x^2-4}{x^2+1}$ $\qquad$ $\left(y' = \dfrac{30x}{(x^2+1)^2}\right)$

48. $y = \dfrac{(3x^2-1)^3}{x^2+1}$ $\qquad$ $\left(y' = \dfrac{108x^7+108x^5-108x^3+20x}{(x^2+1)^2}\right)$

49. $y = \sqrt[4]{x^3}$ $\qquad$ $\left(y' = \dfrac{3}{4\sqrt[4]{x}}\right)$

50. $y = \dfrac{1}{\sqrt{x}}$ $\qquad$ $\left(y' = -\dfrac{\sqrt{x}}{2x^2}\right)$

51. $y = \dfrac{1}{\sqrt[3]{x}}$ $\qquad$ $\left(y' = \dfrac{-1}{3\sqrt[3]{x^4}}\right)$

52. $y = \dfrac{x}{\sqrt[3]{x}}$ $\qquad$ $\left(y' = \dfrac{-2}{3\sqrt[3]{x}}\right)$

53. $y = \dfrac{1}{x\sqrt{x}}$ $\qquad$ $\left(y' = -\dfrac{3\sqrt{x}}{2x^3}\right)$

54. $y = x^3\sqrt{x}$ $\qquad$ $\left(y' = \dfrac{7\sqrt{x^5}}{2}\right)$

55. $y = \dfrac{1}{(x^2+x+1)^2}$ $\qquad$ $\left(y' = -\dfrac{4x}{(x^2+x+1)^3}\right)$

56. $y = \dfrac{x}{x^2+1}$ $\qquad$ $\left(y' = -\dfrac{x^2+1}{(x^2+1)^2}\right)$

57. $y = \dfrac{x^2-1}{x^2+1}$ $\qquad$ $\left(y' = \dfrac{4x}{(x^2+1)^2}\right)$

58. $y = \sqrt{\dfrac{x^2+1}{x+1}}$ $\qquad$ $\left(y' = \dfrac{(x^2+2x-1)\sqrt{x+1}}{2(x+1)^2\sqrt{x^2+1}}\right)$

59. $y = \sqrt{\dfrac{x+1}{x-1}}$ $\qquad$ $\left(y' = -\dfrac{\sqrt{x-1}}{(x-1)^2\sqrt{x+1}}\right)$

60. $y = \sqrt{x^5}$ $\qquad$ $\left(y' = \dfrac{5\sqrt{x^3}}{2}\right)$

61. $y = \dfrac{\sqrt{x+2}}{x^2}$ $\qquad$ $\left(y' = -\dfrac{3x+8}{2x^3\sqrt{x+2}}\right)$

62. $y = \dfrac{2x+3}{x^2+4x-1}$ $\qquad$ $\left(y' = -\dfrac{2x^2+6x+14}{(x^2+4x-1)^2}\right)$

63. $y = \dfrac{3x}{x^2-4}$ $\qquad$ $\left(y' = -\dfrac{3x^2+12}{(x^2-4)^2}\right)$

64. $y = \dfrac{x}{x-1}$ $\qquad$ $\left(y' = -\dfrac{1}{(x-1)^2}\right)$

65. $y = \sqrt{x^2-5}$ $\qquad$ $\left(y' = \dfrac{x}{\sqrt{x^2-5}}\right)$

66. $y = x^6-10x^4+8x-3$ $\qquad$ $\left(y' = 6x^5-40x^3+8\right)$

67. $y = \dfrac{x^3-x+1}{x-3}$ $\qquad$ $\left(y' = \dfrac{2x^3-9x^2+2}{(x-3)^2}\right)$

68. $y = \dfrac{x^2}{x^2-25}$ $\qquad$ $\left(y' = -\dfrac{50x}{(x^2-25)^2}\right)$

69. $y = 5x^4+x^3-x+6$ $\qquad$ $\left(y' = 20x^3+3x^2-1\right)$

70. $y = \sqrt[3]{2x^7}$ $\left(y' = \dfrac{7\,\sqrt[3]{2x^7}}{3x}\right)$

76. $y = 4x + \sqrt[5]{x}$ $\left(y' = 4 + \dfrac{1}{5\,\sqrt[5]{x^4}}\right)$

71. $y = \dfrac{5}{x} + \sqrt{x^3}$ $\left(y' = \dfrac{-5}{x^2} + \dfrac{3}{2}\,\sqrt{x}\right)$

77. $y = 5x + \dfrac{2}{x}$ $\left(\left(y' = 5 - \dfrac{2}{x^2}\right)\right)$

78. $y = 5x^9\,(3x+2)^3$ $\left(y' = 45x^8\,(3x+2)^2\,(4x+2)\right)$

72. $y = \dfrac{x^2 + x - 2}{x + 1}$ $\left(y' = \dfrac{x^2 + 2x + 3}{(x + 1)^2}\right)$

79. $y = \dfrac{x\sqrt{x}}{x + 2}$ $\left(y' = \dfrac{\sqrt{x}\,(x + 6)}{2\,(x + 2)^2}\right)$

73. $y = x^4 - 10x^2 + 8$ $(y' = 4x^3 - 20x)$

80. $y = \dfrac{2x}{5x + 8}$ $\left(y' = \dfrac{16}{(5x+8)^2}\right)$

74. $y = \sqrt[6]{x}$ $\left(y' = \dfrac{1}{6\,\sqrt[6]{x^5}}\right)$

81. $y = (x^3 + 8x)^{10}$ $\left(y' = 10\,(x^3 + 8x)^9\,(3x^2 + 8)\right)$

75. $y = \dfrac{5}{x^2} + \sqrt{x}$ $\left(y' = \dfrac{-10}{x^3} + \dfrac{1}{2\sqrt{x}}\right)$

82. $y = \dfrac{3x - 1}{x^5 - 4x}$ $\left(y' = \dfrac{-12x^5 + 5x^4 - 4}{\left(x^5 - 4x\right)^2}\right)$

83. Deducir la fórmula de la derivada de $y = \sqrt[n]{x}$ e $y = \sqrt[n]{u}$

84. Deducir las derivadas de $y = \dfrac{u}{v \cdot w}$ e $y = \dfrac{u \cdot v}{w}$