82 DERIVADAS CON SOLUCIÓN

■ Hallar las derivadas de las siguientes funciones, simplificando al máximo el resultado cuando proceda:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

48. $y = \dfrac{\left(3x^2-1\right)^3}{x^2+1}$ $\left(y' = \dfrac{108x^7 + 108x^5 - 108x^3 + 30x}{\left(x^2+1\right)^2} \right)$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 $y = \dfrac{u \cdot v}{w}$