Tabla de derivadas

Función	Derivada	Ejemplos	
Constante			
$y=k$	**$y'=0$**	**$y=8$**	**$y'=0$**
Identidad			
$y=x$	**$y'=1$**	**$y=x$**	**$y'=1$**
Funciones potenciales			
$y = u^m$	$y' = mu^{m-1}u'$	$y = \left(2x^2 + 1\right)^3$	$y' = 3\left(2x^2 + 1\right)^2 \cdot 4x$
$y = \dfrac{1}{u^m}$	$y' = -\dfrac{mu'}{u^{m+1}}$	$y = \dfrac{1}{(2x+1)^3}$	$y' = -\dfrac{6}{(2x+1)^4}$
$y = \sqrt{u}$	$y' = \dfrac{u'}{2\sqrt{u}}$	$y = \sqrt{5x}$	$y' = \dfrac{5}{2\sqrt{5x}}$
$y = \sqrt[m]{u}$	$y' = \dfrac{u'}{m\sqrt[m]{u^{m-1}}}$	$y = \sqrt[5]{3x^2}$	$y' = \dfrac{6x}{5\sqrt[5]{\left(3x^2\right)^4}}$
Funciones exponenciales			
$y = e^u$	$y' = u'e^u$	$y = e^{3x^2+1}$	$y' = 6xe^{3x^2+1}$
$y = a^u$	$y' = u'a^u La$	$y = 5^{3x-4}$	$y' = 3 \cdot 5^{3x-4} L5$
Funciones logarítmicas			
$y = Lu$	$y' = \dfrac{u'}{u}$	$y = L\left(x^2 + 7x\right)$	$y' = \dfrac{2x+7}{x^2+7x}$
$y = \log_a u$	$y' = \dfrac{u'}{u}\log_a e$	$y = \log_2(5x+7)$	$y' = \dfrac{5}{5x+7}\log_2 e$
Funciones trigonométricas			
$y = \operatorname{sen} u$	$y' = u'\cos u$	$y = \operatorname{sen} 5x$	$y' = 5\cos 5x$
$y = \cos u$	$y' = -u'\operatorname{sen} u$	$y = \cos 3x^2$	$y' = -6x\operatorname{sen} 3x^2$

$y = \text{tg } u$	$y' = u'\sec^2 u$	$y = \text{tg } 7x$	$y' = 7\sec^2 7x$
$y = \cot g u$	$y' = -u'\cos ec^2 u$	$y = \cot g(4x+5)$	$y' = -4\cos ec^2(4x+5)$
$y = \sec u$	$y' = u'\sec u \cdot \text{tg } u$	$y = \sec x^3$	$y' = 3x^2 \sec x^3 \text{ tg } x^3$
$y = \cos ec u$	$y' = -u'\cos ec u \cot g u$	$y = \cos ec x^2$	$y' = -2x\cos ec x^2 \cot g x^2$
$y = \text{arcsen} u$	$y' = \dfrac{u'}{\sqrt{1-u^2}}$	$y = \text{arcsen } x^2$	$y' = \dfrac{2x}{\sqrt{1-x^4}}$
$y = \text{arccos} u$	$y' = \dfrac{-u'}{\sqrt{1-u^2}}$	$y = \text{arccos} 3x$	$y' = \dfrac{-3}{\sqrt{1-9x^2}}$
$y = \text{arctg } u$	$y' = \dfrac{u'}{1+u^2}$	$y = \text{arctg } 3x$	$y' = \dfrac{3}{1+9x^2}$

Derivadas de sumas, restas, productos y cocientes de funciones

$y = ku$	$y' = ku'$	$y = 3x^5$	$y' = 3 \cdot 5x^4 = 15x^4$
$y = u + v - w$	$y' = u' + v' - w'$	$y = 3x^2 - 2x + 5$	$y' = 6x - 2$
$y = uv$	$y' = u'v + uv'$	$y = x^2 \cos x$	$y' = 2x\cos x + x^2(-\operatorname{sen} x)$
$y = \dfrac{u}{v}$	$y' = \dfrac{u'v - uv'}{v^2}$	$y = \dfrac{2x^2}{x^3 - 1}$	$y' = \dfrac{4x(x^3-1) - 2x^2(3x^2)}{\left(x^3-1\right)^2}$

■ Hallar las derivadas de las siguientes funciones, <u>simplificando al máximo el resultado</u> 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. $y = \dfrac{x}{2} - 5$ ($y'=1/2$)

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

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

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

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

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

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

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

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

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

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

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

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

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

1. $y=3$ $(y'=0)$

2. $y=x$ $(y'=1)$

3. $y=5x$ $(y'=5)$

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

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

6. $y= 4x^4-x^3+3x^2-7$ $(y'=16x^3-3x^2+6x)$

7. $y=-\dfrac{1}{5}x^5+4x^4-\dfrac{1}{6}x^3+\dfrac{1}{2}x^2-3$ $\left(y'=-x^4+16x^3-\dfrac{1}{2}x^2+x\right)$

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

9. $y=4(3x^3-2x^2+5)+x^2+1$ $(y'=36x^2-14x)$

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

11. $y=(x^2+1)\,(2x^3-4)$ $(y'=10x^4+6x^2-8x)$

12. $y=1/x$ $(y'=-1/x^2)$

13. $y=1/x^3$ $(y'=-3/x^4)$

14. $y=1/x^5$ $(y'=-5/x^6)$

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

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

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

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

19. $y=2\sqrt[3]{x^2}-3x^2+\dfrac{1}{5}$ $\left(y'=\dfrac{4}{3\sqrt[3]{x}}-6x\right)$

20. $y=(x+1)^5$ $(y'=5(x+1)^4)$

21. $y=(2x^2-3x+1)^3$ $(y'=3\,(2x^2-3x+1)^2\,(4x-3))$

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

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

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

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

26. $y=\left(\dfrac{2x-3}{x+4}\right)^4$ $\left(y'=\dfrac{44(2x-3)^3}{(x+4)^5}\right)$

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

28. $y=2\sqrt{x^3-x^2+1}\ (2x^2+3)$ $\left(y'=\dfrac{14x^4-12x^3+9x^2+2x}{\sqrt{x^3-x^2+1}}\right)$

29. $y=\log x$ $\left(y'=\dfrac{1}{x}\log_{10}e=\dfrac{1}{x\ln10}\right)$

30. $y=\ln x$ $(y'=1/x)$

31. $y=3\log_2 x-4\ln x$ $\left(y'=\dfrac{-4+3\log_2 e}{x}\right)$

32. $y=\ln(3x^2+4x+5)$ $\left(y'=\dfrac{6x+4}{3x^2+4x+5}\right)$

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

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

35. $y=2^x$

36. $y=2^{x^2+x+1}$

37. $y=e^{2x^2-3x+5}$

38. $y=e^{-x}$ $(y'=-1/e^x)$

39. $y=e^{1/x}$

40. $y=10^{\sqrt{x}}$ $\left(y'=\dfrac{10^{\sqrt{x}}\cdot\ln10}{2\sqrt{x}}\right)$

41. $y=\mathrm{sen}\ 2x$

42. $y=\mathrm{sen}\ x^2$

43. $y=\mathrm{sen}^2 x$ $(y'=\mathrm{sen}\ 2x)$

44. $y=2\ \mathrm{sen}\ x$

45. $y=\mathrm{sen}(x^2-2x+1)$

46. $y=\cos\sqrt{x}$ $\left(y'=-\dfrac{\mathrm{sen}\sqrt{x}}{2\sqrt{x}}\right)$

47. $y = 400x - \dfrac{400\,000}{x^2}$ $\left(y' = 400 + \dfrac{800\,000}{x^3}\right)$

48. $y = \operatorname{sen}^3(x^2+1)$ $(y' = 6x\,\operatorname{sen}^2(x^2+1)\,\cos(x^2+1))$

49. $y = \operatorname{tg}\dfrac{1}{x}$ $\left(y' = -\dfrac{1+\operatorname{tg}^2(1/x)}{x^2}\right)$

50. $y = \operatorname{ctg}(x^2+1)$ $\left(y' = -\dfrac{2x}{\operatorname{sen}^2(x^2+1)}\right)$

51. $y = \dfrac{1}{3}x^3 - \dfrac{3}{4}x^4 + \dfrac{1}{2}x^2 - \dfrac{1}{x}$ $(y' = -3x^3 + x^2 + x + 1/x^2)$

52. $y = 2/x$ $(y' = -2/x^2)$

53. $y = 2\operatorname{sen}(x^2+1)$ $(y' = 4x\cos(x^2+1))$

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

55. $y = \dfrac{1}{2}\cos(\sqrt{x}+1)$ $\left(y' = -\dfrac{\operatorname{sen}(\sqrt{x}+1)}{4\sqrt{x}}\right)$

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

57. $y = x/2$ $(y' = 1/2)$

58. $y = \dfrac{1}{x} + \dfrac{2}{x^2} + \dfrac{3}{x^3} + \ln x$ $\left(y' = -\dfrac{1}{x^2} - \dfrac{4}{x^3} - \dfrac{9}{x^4} + \dfrac{1}{x}\right)$

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

60. $y = (2x^2-1)(x^2-2)(x^3+1)$ $(y' = 14x^6 - 25x^4 + 8x^3 + 6x^2 - 10x)$

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

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

63. $y = \ln x^2$ $(y' = 2/x)$

64. $y = (x^2+1)(x+2)^3$ $(y' = 5x^4 + 24x^3 + 39x^2 + 28x + 12)$

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

66. $y = \dfrac{1}{3x^5 - x^3 + 2}$ $\left(y' = \dfrac{-15x^4 + 3x^2}{(3x^5 - x^3 + 2)^2}\right)$

67. $y = \operatorname{Ln}\operatorname{sen} x$

68. $y = \operatorname{sen}\operatorname{Ln} x$ $\left(y' = \dfrac{\cos\operatorname{Ln} x}{x}\right)$

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

70. $y = e^{\operatorname{sen} x}$

71. $y = 2\operatorname{tg}^3 x$

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

73. $y = 2^{\operatorname{tg} x}$

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

75. $y = \cos(e^x + 1)$

76. $y = \sqrt[5]{x^2} + 1$ $\left(y' = \dfrac{2}{5\sqrt[5]{x^3}}\right)$

77. $y = \operatorname{tg}(1 + \operatorname{Ln}^2 x)$ $\left(y' = \dfrac{2\operatorname{Ln} x}{x\cos^2(1+\operatorname{Ln}^2 x)}\right)$

78. $y = \log(2^x + 5)$ $\left(y' = \dfrac{2^x \operatorname{Ln} 2}{(2^x+5)\operatorname{Ln} 10}\right)$

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

80. $y = \dfrac{5}{x^4 - 2x^2 + 1}$ $\left(y' = \dfrac{20x - 20x^3}{(x^4 - 2x^2 + 1)^2}\right)$

81. $y = 3(x+1)^3\sqrt[3]{x+1}$ $\left(y' = 10\sqrt[3]{(x+1)^7}\right)$

82. $y = \ln(x-3)$ $\left(y' = \dfrac{1}{x-3}\right)$

83. $y = 4\ln\sqrt{x}$ $(y' = 2/x)$

84. $y = \sqrt{4\ln x}$ $\left(y' = \dfrac{1}{x\sqrt{\ln x}}\right)$

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

86. $y = \sqrt{x}\cdot\ln x$ $\left(y' = \dfrac{2+\ln x}{2\sqrt{x}}\right)$

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

88. $y = \ln(x+1)\cdot\log(x-1)$ $\left(y' = \dfrac{\log(x-1)}{x+1} + \dfrac{\ln(x+1)\log e}{x-1}\right)$

89. $y = \ln(\ln x)$ $\left(y' = \dfrac{1}{x\ln x}\right)$

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

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

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

93. $y = 7\dfrac{3x^2 - 5}{\ln(3x^2 - 5)}$ $\left(y' = \dfrac{42x\left[-1+\ln(3x^2-5)\right]}{\ln^2(3x^2-5)}\right)$

94. $y = e^{x^2}$ $\left(y' = e^{x^2}\cdot 2x\right)$

95. $y = x\cdot e^x$ $(y' = (x+1)\cdot e^x$

96. $y = \dfrac{t^2 + 2t}{e^t}$ $\left(y' = \dfrac{t^2 + 4t + 2}{e^t}\right)$

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

98. $y = \dfrac{\sqrt{x}}{\ln x}$ $\qquad \left(y' = \dfrac{\ln x - 2}{2\sqrt{x}\,\ln^2 x} \right)$

99. $y = \dfrac{2x+4}{\sqrt{x+3}}$ $\qquad \left(y' = \dfrac{x+4}{(x+3)\sqrt{x+3}} \right)$

100. $y = \text{arc sen}\,(x^2-4)$ $\qquad \left(y' = \dfrac{2x}{\sqrt{-x^4+8x^2-15}} \right)$

101. $y = \text{arc cos}\,\dfrac{1}{x}$ $\qquad \left(y' = \dfrac{1}{x\sqrt{x^2-1}} \right)$

102. $y = \dfrac{-6x^2+72x+4}{(6-x)^2}$ $\qquad \left(y' = \dfrac{440}{(6-x)^3} \right)$

103. $y = 2(\sqrt{x} - \text{arc tg}\,\sqrt{x})$ $\qquad \left(y' = \dfrac{\sqrt{x}}{x+1} \right)$

104. $y = \text{arc tg}\,\dfrac{2x^3-1}{x^2-2}$ $\qquad \left(y' = \dfrac{2x^4-12x^2+2x}{4x^6+x^4-4x^3-4x^2+5} \right)$

105. $y = (x^3-4x^2+7x-6)e^x$ $\qquad \left(y' = (x^3-x^2-x+1)e^x \right)$

106. $y = \text{arc sen}\,\sqrt{1-x^2}$ $\qquad \left(y' = \dfrac{-1}{\sqrt{1-x^2}} \right)$

107. $y = \dfrac{1}{2}\text{arc tg}\,e^{x^2}$ $\qquad \left(y' = \dfrac{x\,e^{x^2}}{1+e^{2x^2}} \right)$

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

109. $y = \text{Ln cos}\,(\text{arc tg}\,x)$ $\qquad \left(y' = -\dfrac{x}{1+x^2} \right)$

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

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

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

113. $y = \text{arc sen}\,\dfrac{2}{\sqrt{x}}$ $\qquad \left(y' = -\dfrac{1}{x\sqrt{x-4}} \right)$

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

115. $y = \dfrac{1}{3}\,\text{arc tg}\,e^x$ $\qquad \left(y' = \dfrac{e^x}{3(1+e^{2x})} \right)$

116. $y = \dfrac{x^2+5}{x^2-4}$ $\qquad \left(y' = \dfrac{-18x}{(x^2-4)^2} \right)$

117. $y = \text{arc sen}\,(x^2+1)$ $\qquad \left(y' = \dfrac{2}{\sqrt{-x^2-2}} \right)$

118. $y = \text{arc cos}\,\sqrt{x}$

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

120. $y = \text{arc tg}\,\dfrac{x^2+1}{x^2-1}$ $\qquad \left(y' = \dfrac{-2x}{x^4+1} \right)$

121. $y = \sqrt[3]{(x^3+1)^4}$ $\qquad \left(y' = 4x^2\,\sqrt[3]{x^3+1} \right)$

122. $y = (x+2)\,\ln(x+2)$ $\qquad (y' = 1+\ln(x+2))$

123. $y = \sqrt{x^2+1}\,(x^2+1)^2$ $\qquad \left(y' = 5x\,\sqrt{(x^2+1)^3} \right)$

124. $y = (2x+1)^3\,\sqrt[3]{3x-1}$

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

126. Dada $y = \dfrac{x^2-1}{x^3}$, hallar y', y'' e y''' $\qquad \left(y' = \dfrac{3-x^2}{x^4};\ y'' = \dfrac{2x^2-12}{x^5};\ y''' = \dfrac{60-6x^2}{x^6} \right)$

■ Derivación implícita:

Hallar, por derivación implícita, la derivada de las siguientes funciones:

127. $y^2+2xy+5=0$ $\qquad \left(y' = \dfrac{-y}{x+y} \right)$

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

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

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

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

98. $y = \dfrac{\sqrt{x}}{\ln x}$ $\left(y' = \dfrac{\ln x - 2}{2\sqrt{x}\,\ln^2 x}\right)$

99. $y = \dfrac{2x+4}{\sqrt{x+3}}$ $\left(y' = \dfrac{x+4}{(x+3)\sqrt{x+3}}\right)$

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101. $y = \text{arc cos}\,\dfrac{1}{x}$ $\left(y' = \dfrac{1}{x\sqrt{x^2-1}}\right)$

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103. $y = 2(\sqrt{x} - \text{arc tg}\,\sqrt{x})$ $\left(y' = \dfrac{\sqrt{x}}{x+1}\right)$

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

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