

82 DERIVADAS (con SOLUCIONES)

■ Hallar las derivadas simplificadas de las siguientes funciones:

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. $y = 5$ $(y'=0)$</p> | <p>20. $y = \frac{1}{x^3} + \frac{1}{x^2} + \frac{1}{x} + 1$ $\left(y' = -\frac{3}{x^4} - \frac{2}{x^3} - \frac{1}{x^2}\right)$</p> |
| <p>2. $y = 3/2$ $(y'=0)$</p> | <p>21. $y = \frac{1}{x^2 + 2x - 3}$ $\left(y' = -\frac{2x+2}{(x^2+2x-3)^2}\right)$</p> |
| <p>3. $y = 3x$ $(y'=3)$</p> | <p>22. $y = \frac{3}{x^3 - 2x^2 + 5}$ $\left(y' = -3 \frac{3x^2 - 4x}{(x^3 - 2x^2 + 5)^2}\right)$</p> |
| <p>4. $y = 2x - 3$ $(y'=2)$</p> | <p>23. $y = \frac{x^3 - 2x^2 + 5}{3}$ $\left(y' = \frac{3x^2 - 4x}{3}\right)$</p> |
| <p>5. $y = -x$ $(y'=-1)$</p> | <p>24. $y = \sqrt{x}$ $\left(y' = \frac{1}{2\sqrt{x}}\right)$</p> |
| <p>6. $y = \frac{x}{2} - 5$ $(y'=1/2)$</p> | <p>25. $y = \sqrt{6x}$ $\left(y' = \frac{3}{\sqrt{6x}}\right)$</p> |
| <p>7. $y = x^4$ $(y'=4x^3)$</p> | <p>26. $y = \sqrt{x^2 + x + 1}$ $\left(y' = \frac{2x+1}{2\sqrt{x^2+x+1}}\right)$</p> |
| <p>8. $y = 2x^5$ $(y'=10x^4)$</p> | <p>27. $y = \sqrt[3]{x}$ $\left(y' = \frac{1}{3\sqrt[3]{x^2}}\right)$</p> |
| <p>9. $y = \frac{x^3}{2}$ $\left(y' = \frac{3x^2}{2}\right)$</p> | <p>28. $y = \sqrt[3]{x^2}$ $\left(y' = \frac{2}{3\sqrt[3]{x}}\right)$</p> |
| <p>10. $y = x^3 + x^2 + x + 1$ $(y'=3x^2+2x+1)$</p> | <p>29. $y = 2\sqrt[3]{x^4} - 3\sqrt{x+1}$ $\left(y' = \frac{8}{3}\sqrt[3]{x} - \frac{3}{2\sqrt{x+1}}\right)$</p> |
| <p>11. $y = 2x^4 - 3x^2 + 5x - 8$ $(y'=8x^3-6x+5)$</p> | <p>30. $y = (x^2+1)^2$ $(y'=4x^3+4x)$</p> |
| <p>12. $y = \frac{x^5}{5} - \frac{x^3}{3} + \frac{x^2}{4} - \frac{x}{7} + 5$ $\left(y' = x^4 - x^2 - \frac{x}{2} - \frac{1}{7}\right)$</p> | <p>31. $y = (x^2+1)^{100}$ $(y'=200x(x^2+1)^{99})$</p> |
| <p>13. $y = -x^4 + \frac{1}{7}$ $(y'=-4x^3)$</p> | <p>32. $y = (2x^3 - 3x + 5)^3$ $(y'=3(2x^3-3x+5)^2(6x^2-3))$</p> |
| <p>14. $y = \frac{1}{x}$ $\left(y' = -\frac{1}{x^2}\right)$</p> | <p>33. $y = 5(\sqrt{x} + 1)^2$ $\left(y' = \frac{5(\sqrt{x} + 1)}{\sqrt{x}}\right)$</p> |
| <p>15. $y = \frac{3}{x}$ $\left(y' = -\frac{3}{x^2}\right)$</p> | <p>34. $y = \left(x^2 + \frac{1}{x}\right)^5$ $\left(y' = 5\left(x^2 + \frac{1}{x}\right)^4 \left(2x - \frac{1}{x^2}\right)\right)$</p> |
| <p>16. $y = \frac{1}{3x}$ $\left(y' = -\frac{1}{3x^2}\right)$</p> | <p>35. $y = (2x^2-3)(x^2-3x+1)$ $(y'=8x^3-18x^2-2x+9)$</p> |
| <p>17. $y = \frac{1}{x^2}$ $\left(y' = -\frac{2}{x^3}\right)$</p> | |
| <p>18. $y = \frac{3}{x^3}$ $\left(y' = -\frac{9}{x^4}\right)$</p> | |
| <p>19. $y = \frac{1}{2x^4}$ $\left(y' = -\frac{2}{x^5}\right)$</p> | |

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. $y = \sqrt{\frac{1}{x}+1}$ $\left(y' = \frac{-1}{2x\sqrt{x^2+x}}\right)$
47. $y = 3 \frac{x^2-4}{x^2+1}$ $\left(y' = \frac{30x}{(x^2+1)^2}\right)$
48. $y = \frac{(3x^2-1)^3}{x^2+1}$ $\left(y' = \frac{108x^7+108x^5-108x^3+20x}{(x^2+1)^2}\right)$
49. $y = \sqrt[4]{x^3}$ $\left(y' = \frac{3}{4 \sqrt[4]{x}}\right)$
50. $y = \frac{1}{\sqrt{x}}$ $\left(y' = -\frac{\sqrt{x}}{2x^2}\right)$
51. $y = \frac{1}{\sqrt[3]{x}}$ $\left(y' = \frac{-1}{3 \sqrt[3]{x^4}}\right)$
52. $y = \frac{x}{\sqrt[3]{x}}$ $\left(y' = \frac{-2}{3 \sqrt[3]{x}}\right)$
53. $y = \frac{1}{x\sqrt{x}}$ $\left(y' = -\frac{3\sqrt{x}}{2x^3}\right)$
54. $y = x^3 \sqrt{x}$ $\left(y' = \frac{7\sqrt{x^5}}{2}\right)$
55. $y = \frac{1}{(x^2+x+1)^2}$ $\left(y' = -\frac{4x}{(x^2+x+1)^3}\right)$
56. $y = \frac{x}{x^2+1}$ $\left(y' = -\frac{x^2+1}{(x^2+1)^2}\right)$
57. $y = \frac{x^2-1}{x^2+1}$ $\left(y' = \frac{4x}{(x^2+1)^2}\right)$
58. $y = \sqrt{\frac{x^2+1}{x+1}}$ $\left(y' = \frac{(x^2+2x-1)\sqrt{x+1}}{2(x+1)^2 \sqrt{x^2+1}}\right)$
59. $y = \sqrt{\frac{x+1}{x-1}}$ $\left(y' = -\frac{\sqrt{x-1}}{(x-1)^2 \sqrt{x+1}}\right)$
60. $y = \sqrt{x^5}$ $\left(y' = \frac{5\sqrt{x^3}}{2}\right)$
61. $y = \frac{\sqrt{x+2}}{x^2}$ $\left(y' = -\frac{3x+8}{2x^3 \sqrt{x+2}}\right)$
62. $y = \frac{2x+3}{x^2+4x-1}$ $\left(y' = -\frac{2x^2+6x+14}{(x^2+4x-1)^2}\right)$
63. $y = \frac{3x}{x^2-4}$ $\left(y' = -\frac{3x^2+12}{(x^2-4)^2}\right)$
64. $y = \frac{x}{x-1}$ $\left(y' = -\frac{1}{(x-1)^2}\right)$
65. $y = \sqrt{x^2-5}$ $\left(y' = \frac{x}{\sqrt{x^2-5}}\right)$
66. $y = x^6-10x^4+8x-3$ $(y' = 6x^5-40x^3+8)$
67. $y = \frac{x^3-x+1}{x-3}$ $\left(y' = \frac{2x^3-9x^2+2}{(x-3)^2}\right)$
68. $y = \frac{x^2}{x^2-25}$ $\left(y' = -\frac{50x}{(x^2-25)^2}\right)$
69. $y = 5x^4+x^3-x+6$ $(y' = 20x^3+3x^2-1)$

70. $y = \sqrt[3]{2x^7}$	$\left(y' = \frac{7 \sqrt[3]{2x^7}}{3x} \right)$	76. $y = 4x + \sqrt[5]{x}$	$\left(y' = 4 + \frac{1}{5 \sqrt[5]{x^4}} \right)$
71. $y = \frac{5}{x} + \sqrt{x^3}$	$\left(y' = -\frac{5}{x^2} + \frac{3}{2} \sqrt{x} \right)$	77. $y = 5x + \frac{2}{x}$	$\left(y' = 5 - \frac{2}{x^2} \right)$
72. $y = \frac{x^2 + x - 2}{x + 1}$	$\left(y' = \frac{x^2 + 2x + 3}{(x + 1)^2} \right)$	78. $y = 5x^9 (3x + 2)^3$	$(y' = 45x^8 (3x + 2)^2 (4x + 2))$
73. $y = x^4 - 10x^2 + 8$	$(y' = 4x^3 - 20x)$	79. $y = \frac{x\sqrt{x}}{x + 2}$	$\left(y' = \frac{\sqrt{x}(x + 6)}{2(x + 2)^2} \right)$
74. $y = \sqrt[6]{x}$	$\left(y' = \frac{1}{6 \sqrt[6]{x^5}} \right)$	80. $y = \frac{2x}{5x + 8}$	$\left(y' = \frac{16}{(5x + 8)^2} \right)$
75. $y = \frac{5}{x^2} + \sqrt{x}$	$\left(y' = -\frac{10}{x^3} + \frac{1}{2\sqrt{x}} \right)$	81. $y = (x^3 + 8x)^{10}$	$(y' = 10 (x^3 + 8x)^9 (3x^2 + 8))$
		82. $y = \frac{3x - 1}{x^5 - 4x}$	$\left(y' = \frac{-12x^5 + 5x^4 - 4}{(x^5 - 4x)^2} \right)$

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

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