

71 DERIVADAS (con SOLUCIONES)

■ Hallar las derivadas **simplificadas** de las siguientes funciones:

- | | |
|---|---|
| <p>1. $y=3$ $(y'=0)$</p> | <p>20. $y=(x+1)^5$ $(y'=5(x+1)^4)$</p> |
| <p>2. $y=x$ $(y'=1)$</p> | <p>21. $y=(2x^2-3x+1)^3$ $(y'=3(2x^2-3x+1)^2(4x-3))$</p> |
| <p>3. $y=5x$ $(y'=5)$</p> | <p>22. $y=(x^2+1)^{100}$ $(y'=200x(x^2+1)^{99})$</p> |
| <p>4. $y=x^3$ $(y'=3x^2)$</p> | <p>23. $y=\frac{x+1}{x-1}$ $(y'=\frac{-2}{(x-1)^2})$</p> |
| <p>5. $y=x^4+x^3+x^2+x+1$ $(y'=4x^3+3x^2+2x+1)$</p> | <p>24. $y=\frac{1}{x^2+1}$ $(y'=\frac{-2x}{(x^2+1)^2})$</p> |
| <p>6. $y=4x^4-x^3+3x^2-7$ $(y'=16x^3-3x^2+6x)$</p> | <p>25. $y=3\frac{2x^2-1}{x^3+1}$ $(y'=3\frac{-2x^4+3x^2+4x}{(x^3+1)^2})$</p> |
| <p>7. $y=-\frac{x^5}{5}+4x^4-\frac{x^3}{6}+\frac{x^2}{2}-3$
$(y'=-x^4+16x^3-\frac{1}{2}x^2+x)$</p> | <p>26. $y=\left(\frac{2x-3}{x+4}\right)^4$ $(y'=\frac{44(2x-3)^3}{(x+4)^5})$</p> |
| <p>8. $y=3(x^2+x+1)$ $(y'=3(2x+1))$</p> | <p>27. $y=\sqrt{x^2+1}$ $(y'=\frac{x}{\sqrt{x^2+1}})$</p> |
| <p>9. $y=4(3x^3-2x^2+5)+x^2+1$ $(y'=36x^2-14x)$</p> | <p>28. $y=2\sqrt{x^3-x^2+1}(2x^2+3)$ $(y'=\frac{14x^4-12x^3+9x^2+2x}{\sqrt{x^3-x^2+1}})$</p> |
| <p>10. $y=\frac{2x^3-3x^2+4x-5}{2}$ $(y'=3x^2-3x+2)$</p> | <p>29. $y=\frac{x^3}{3}-\frac{3x^4}{4}+\frac{x^2}{2}-\frac{1}{x}$ $(y'=-3x^3+x^2+x+1/x^2)$</p> |
| <p>11. $y=(x^2+1)(2x^3-4)$ $(y'=10x^4+6x^2-8x)$</p> | <p>30. $y=2/x$ $(y'=-2/x^2)$</p> |
| <p>12. $y=1/x$ $(y'=-1/x^2)$</p> | <p>31. $y=3(x^2-x+1)(x^2+x-1)$ $(y'=3(4x^3-2x+2))$</p> |
| <p>13. $y=1/x^3$ $(y'=-3/x^4)$</p> | <p>32. $y=\frac{x^2-1}{x^2+1}$ $(y'=\frac{4x}{(x^2+1)^2})$</p> |
| <p>14. $y=2/x^5$ $(y'=-10/x^6)$</p> | <p>33. $y=x/2$ $(y'=1/2)$</p> |
| <p>15. $y=\frac{2}{x^3}+\frac{1}{x^2}-\frac{3}{x}$ $(y'=\frac{3x^2-2x-6}{x^4})$</p> | <p>34. $y=\frac{1}{x}+\frac{2}{x^2}+\frac{3}{x^3}$ $(y'=-\frac{1}{x^2}-\frac{4}{x^3}-\frac{9}{x^4})$</p> |
| <p>16. $y=\sqrt{x}$ $(y'=\frac{1}{2\sqrt{x}})$</p> | <p>35. $y=(2x^2-1)(x^2-2)(x^3+1)$ $(y'=14x^6-25x^4+8x^3+6x^2-10x)$</p> |
| <p>17. $y=\sqrt[3]{x^2}$ $(y'=\frac{2}{3\sqrt[3]{x}})$</p> | <p>36. $y=\sqrt{\frac{1-x^3}{x^2+1}}$ $(y'=\frac{(-x^4-3x^2-2x)\sqrt{x^2+1}}{2(x^2+1)^2\sqrt{1-x^3}})$</p> |
| <p>18. $y=\sqrt[5]{x^3}$ $(y'=\frac{3}{5\sqrt[5]{x^2}})$</p> | <p>37. $y=(x^2+1)(3x+2)^3$ $(y'=(3x+2)^2(15x^2+4x+9))$</p> |
| <p>19. $y=2\sqrt[3]{x^2}-3x^2+\frac{1}{5}$ $(y'=\frac{4}{3\sqrt[3]{x}}-6x)$</p> | <p>38. $y=(3x^2+2)(2x+1)^3$ $(y'=(2x+1)^2(30x^2+6x+12))$</p> |

$$39. y = \frac{1}{3x^5 - x^3 + 2} \quad \left(y' = \frac{-15x^4 + 3x^2}{(3x^5 - x^3 + 2)^2} \right)$$

$$40. y = \sqrt{x^4 - 2x^2 + 3} \quad \left(y' = \frac{2x^3 - 2x}{\sqrt{x^4 - 2x^2 + 3}} \right)$$

$$41. y = \sqrt{\frac{x^2 + 1}{x^2 - 1}} \quad \left(y' = \frac{-2x\sqrt{x^2 - 1}}{(x^2 - 1)^2 \sqrt{x^2 + 1}} \right)$$

$$42. y = \sqrt[5]{x^2 + 1} \quad \left(y' = \frac{2}{5\sqrt[5]{x^3}} \right)$$

$$43. y = \frac{x^4 - 2x^2 + 1}{5} \quad \left(y' = \frac{4x^3 - 4x}{5} \right)$$

$$44. y = \frac{5}{x^4 - 2x^2 + 1} \quad \left(y' = \frac{20x - 20x^3}{(x^4 - 2x^2 + 1)^2} \right)$$

$$45. y = 3(x+1)^3 \sqrt[3]{x+1} \quad \left(y' = 10\sqrt[3]{(x+1)^7} \right)$$

$$46. y = x^3 \sqrt{x} \quad \left(y' = \frac{7x^2 \sqrt{x}}{2} \right)$$

$$47. y = \sqrt[3]{\frac{1}{2x+1}} \quad \left(y' = -\frac{2}{3\sqrt[3]{(2x+1)^4}} \right)$$

$$48. y = 2x(x^2+1)(2x-1)(x+2)$$

$$49. y = 3 \frac{(x-1)^2(x+2)}{x+1} \quad \left(y' = 3 \frac{2x^3 + 3x^2 - 5}{(x+1)^2} \right)$$

$$50. y = \frac{2x+4}{\sqrt{x+3}} \quad \left(y' = \frac{x+4}{\sqrt{(x+3)^3}} \right)$$

$$51. y = \frac{3x^4}{4} - \frac{2x^3}{3} + \frac{x^2}{2} - \frac{x}{5} + \frac{1}{x} \quad \left(y' = 3x^3 - 2x^2 + x - 1/5 - 1/x^2 \right)$$

$$52. y = \sqrt[4]{(x^4 - 1)^3} \quad \left(y' = \frac{3x^3}{\sqrt[4]{x^4 - 1}} \right)$$

$$53. y = \frac{1}{(x^2 + 1)^3} \quad \left(y' = \frac{-6x}{(x+1)^4} \right)$$

$$54. y = \frac{2x^2 - 3}{3x^2 - 2} \quad \left(y' = \frac{10x}{(3x^2 - 2)^2} \right)$$

$$55. y = \frac{2x^2 + 1}{x^2 - 4} \quad \left(y' = \frac{-18x}{(x^2 - 4)^2} \right)$$

$$56. y = 2(3x^2 - 2)^3 \quad \left(y' = 324x^5 - 432x^3 + 144x \right)$$

$$57. y = \frac{x+2}{\sqrt{x+1}} \quad \left(y' = \frac{x}{2(x+1)\sqrt{x+1}} \right)$$

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

$$59. y = \frac{x^5}{5} - \frac{x^3}{3} + \frac{x^2}{2} - \frac{x}{5} + \sqrt{x}$$

$$60. y = \sqrt[3]{(x^3 - 2)^3}$$

$$61. y = \sqrt{\frac{2}{x}}$$

$$62. y = 1 + \frac{x^3 - 3}{x^3 + 2}$$

$$63. y = \left(\frac{x+1}{x-1} \right)^3$$

$$64. y = \sqrt[4]{x^3} + \frac{1}{2x^2}$$

$$65. y = \frac{\sqrt{x+1}}{x+2}$$

$$66. y = \frac{x+2}{\sqrt{x+1}}$$

$$67. y = (x^2 - 3)^3 (2x - 1)$$

$$68. y = \frac{1}{2\sqrt{x}}$$

$$69. y = \frac{x^2 + x + 1}{x^2 - x + 1}$$

$$70. y = \sqrt[3]{x^2 + 1}$$

$$71. y = \sqrt[3]{\frac{2}{x}} \quad \left(y' = -\frac{\sqrt[3]{4x^2}}{3x^2} \right)$$