

1. $y = 5x^6 - 3x^5 + 3x^3 - 2$
2. $y = x^{-4} + 2x^{-3} + x - 4$
3. $y = 3x^{10} + 2\sqrt{x} + \frac{3}{x}$
4. $y = \sqrt{3} \cdot x^3 - p \cdot x + \sqrt{3}$
5. $y = 4 \operatorname{sen} x - 3 \operatorname{cos} x$
6. $y = 2\sqrt{x} + \frac{2}{x} + x^5$
7. $y = 4x^3 + 2x^3 - x^3 + 4$
8. $y = \frac{p}{2} \cdot \cos x - 3\sqrt{x}$
9. $y = \cos(3x)$
10. $y = \cos^2(x^3)$
11. $y = \operatorname{sen}(3x^2 - 2x)$
12. $y = \cos(x^2)$
13. $y = \operatorname{sen}^3(2x^2)$
14. $y = \cos^4(3x^4)$
15. $y = 3 \operatorname{sen}^2(2x - 3)$
16. $y = \cos^5(3x^2)$
17. $y = \cos(\operatorname{sen} x)$
18. $y = \cos^2(\operatorname{sen}(3x))$
19. $y = \sqrt[3]{\cos^2 x}$
20. $y = \sqrt[3]{\cos^2(x^2)}$
21. $y = \sqrt{x^2 - 3x}$
22. $y = \sqrt[3]{(x^2 - 3x)^2}$
23. $y = (2\sqrt{x} - 3x)^3$
24. $y = \sqrt[3]{\operatorname{sen}^2 x}$
25. $y = \sqrt[3]{\operatorname{sen}(3x)}$
26. $y = \sqrt{3x - \operatorname{sen} x}$
27. $y = (3x^2 - \sqrt{1 - x^2})^3$
28. $y = \operatorname{sen}(\sqrt{3x^2 - 5x})$
29. $y = \sqrt{\operatorname{sen}^3 x + (x - 1)^3}$
30. $y = \cos^3(x^2 - 3\sqrt{x})$
31. $y = \frac{x}{5}$
32. $y = \frac{5}{x}$
33. $y = \frac{x^4 - 3x}{4}$
34. $y = \frac{x^3 - 3}{x}$
35. $y = \frac{(x^4 - 3x)^2}{3}$
36. $y = \frac{(x - 1)^3}{3x}$
37. $y = \frac{x^2}{x^2 - 1}$
38. $y = \frac{\sqrt{3x}}{x}$
39. $y = \sqrt{\frac{3}{x}}$
40. $y = \frac{x}{\sqrt{3x}}$
41. $y = \sqrt[3]{3x^2 - \operatorname{sen} x}$
42. $y = \ln(3x - 1)$
43. $y = \ln(x^2 - 3x)$
44. $y = \ln\sqrt{x - 2}$
45. $y = \log_2(3x^2)$
46. $y = e^{x^2}$
47. $y = 2^x$
48. $y = e^{x^2 - 2x}$
49. $y = 3^{\operatorname{sen} x}$
50. $y = \operatorname{tg}(x^3)$
51. $y = 3e^{x^2 - 3x}$
52. $y = \sqrt{e^{\operatorname{cos} x}}$
53. $y = 3 \operatorname{tg}^2 x$
54. $y = (x^2 - 1) \cdot (x - 1)$
55. $y = x^2 \cdot \ln x$
56. $y = e^{x^2} \cdot \cos x$
57. $y = x^4 \cdot e^{3x}$
58. $y = e^{x^4 - 3x^2} \cdot \operatorname{sen} x$

$$59. y = \ln x^2 \cdot e^{\sin x}$$

$$61. y = \left(\frac{x^2 - 3}{x^2 + 1} \right)^3$$

$$63. y = (\cos^2 3x - \sin^3 x) \cdot e^{x^3}$$

$$65. y = \frac{\ln x}{3^x}$$

$$67. y = \ln \left(\frac{\sin x}{e^x} \right)$$

$$69. y = \frac{3x^4 - 2x^2 + 3x - 2}{2x - 1}$$

$$71. y = \arctg(x^2)$$

$$73. y = \ln(\sec x)$$

$$75. y = \arcsen x \cdot e^{\cos x}$$

$$77. y = \ln \left(\frac{\operatorname{tg} x}{e^{3x^2}} \right)$$

$$79. y = \ln(\arctg(5x))$$

$$81. y = 5 \arctg^2(\sin x)$$

$$83. y = \frac{\arcsen(3x - 2)}{x^2}$$

$$85. y = x^{\sin x}$$

$$87. y = (\cos x)^{x^2 - x}$$

$$89. y = \ln \left(\frac{x + 2}{x^2} \right)^3$$

$$91. y = 10 \left(\frac{\sin x - e^x}{3x - \cos x} \right)$$

$$93. y = \frac{x^{\cos x}}{(\ln x)^3}$$

$$95. y = \sqrt[3]{\frac{\sin^2(e^x)}{\arctg(\cos x)}}$$

$$97. y = \frac{\sqrt{\cos(e^x) \cdot x}}{\sqrt{e^{\operatorname{tg} x}}}$$

$$99. y = \sqrt{\frac{\arctg e^x \cdot \cos x}{\ln(x^2 - x)}}$$

$$60. y = \frac{1}{\ln \sqrt{x}}$$

$$62. y = \ln x \cdot e^{x^2 - \sin x}$$

$$64. y = \left(\frac{\ln x^2}{x^3 - 2} \right)^2$$

$$66. y = \frac{e^x + \ln x}{x^2 - \sin x}$$

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

$$70. y = (\sin(e^{3x}))^2 \cdot \cos x$$

$$72. y = \arcsen x^3$$

$$74. y = \arctg(\ln x)$$

$$76. y = \arctg(e^{3x})$$

$$78. y = \arcsen \left(\frac{x + 1}{e^x} \right)$$

$$80. y = \arctg \sqrt{x^3}$$

$$82. y = 3^{\arctg(x^2)}$$

$$84. y = \frac{\sin x - \operatorname{tg} x}{\sqrt{4x - 3}}$$

$$86. y = (\sin x)^{x^2}$$

$$88. y = 4^{\arctg(\ln x)}$$

$$90. y = \left(\frac{e^{3x}}{\sin x} \right)^{x^2}$$

$$92. y = \cos \left(\frac{\operatorname{tg} \sqrt{x}}{\sin(\ln x)} \right)$$

$$94. y = \cos^2(4e^x) \cdot \ln \left(\frac{\operatorname{tg} x}{3^{x^2}} \right)$$

$$96. y = \sqrt{\frac{e^{\ln(\cos x)}}{5^{\cos x}}}$$

$$98. y = (\operatorname{tg}(e^x) + x^2)^x$$

$$100. y = \frac{\ln \sqrt{\cos x}}{\sin(e^{\cos x})}$$

SOLUCIONES

Todas las soluciones se dan sin simplificar

$$1. y' = 30x^5 - 15x^4 + 9x^2$$

$$3. y' = 30x^9 + \frac{1}{\sqrt{x}} - \frac{3}{x^2}$$

$$5. y' = 4 \cos x + 3 \operatorname{sen} x$$

$$7. y' = 15x^2$$

$$9. y' = -3 \operatorname{sen}(3x)$$

$$11. y' = \cos(3x^2 - 2x) \cdot (6x - 2)$$

$$13. y' = 3 \operatorname{sen}^2(2x^2) \cdot \cos(2x^2) \cdot 4x$$

$$15. y' = 6 \operatorname{sen}(2x - 3) \cdot \cos(2x - 3) \cdot 2$$

$$17. y' = -\operatorname{sen}(\operatorname{sen} x) \cdot \operatorname{cos} x$$

$$19. y' = \frac{-2 \operatorname{cos} x \cdot \operatorname{sen} x}{3 \sqrt[3]{\operatorname{cos}^4 x}}$$

$$21. y' = \frac{2x - 3}{2 \sqrt{x^2 - 3x}}$$

$$23. y' = 3 \left(2\sqrt{x} - 3x \right)^2 \cdot \left(\frac{1}{\sqrt{x}} - 3 \right)$$

$$25. y' = \frac{3 \operatorname{cos} 3x}{5 \sqrt[5]{\operatorname{sen}^4(3x)}}$$

$$27. y' = 3 \left(3x^2 - \sqrt{1-x^2} \right)^2 \cdot \left(6x - \frac{-2x}{2\sqrt{1-x^2}} \right)$$

$$29. y' = \frac{3 \operatorname{sen}^2 x \operatorname{cos} x + 3(x-1)^2}{2 \sqrt{\operatorname{sen}^3 x + (x-1)^3}}$$

$$30. y' = -3 \operatorname{cos}^2(x^2 - 3\sqrt{x}) \cdot \operatorname{sen}(x^2 - 3\sqrt{x}) \cdot \left(2x - \frac{3}{2\sqrt{x}} \right)$$

$$31. y' = \frac{1}{5}$$

$$33. y' = \frac{4x^3 - 3}{4}$$

$$35. y' = \frac{2(x^4 - 3x)^2 \cdot (4x^3 - 3)}{3}$$

$$37. y' = \frac{2x(x^2 - 1) - x^2 \cdot 2x}{(x^2 - 1)^2}$$

$$2. y' = -4x^{-5} - 6x^{-4} + 1$$

$$4. y' = 3\sqrt{3} \cdot x^2 - p$$

$$6. y' = \frac{1}{\sqrt{x}} - \frac{2}{x^2} + 5x^4$$

$$8. y' = -\frac{p}{2} \operatorname{sen} x - \frac{3}{2\sqrt{x}}$$

$$10. y' = -2 \operatorname{cos}(x^3) \cdot \operatorname{sen}(x^3) \cdot 3x^2$$

$$12. y' = -\operatorname{sen}(x^2) \cdot 2x$$

$$14. y' = 4 \operatorname{cos}^3(3x^4) \cdot (-\operatorname{sen}(3x^4)) \cdot 12x^3$$

$$16. y' = 5 \operatorname{cos}^4(3x^2) \cdot (-\operatorname{sen}(3x^2)) \cdot 6x$$

$$18. y' = 2 \operatorname{cos}(\operatorname{sen} 3x) \cdot (-\operatorname{sen}(\operatorname{sen} 3x)) \cdot \operatorname{cos} 3x \cdot 3$$

$$20. y' = \frac{-2 \operatorname{cos}(x^2) \cdot \operatorname{sen}(x^2) \cdot 2x}{3 \sqrt[3]{\operatorname{cos}^4(x^2)}}$$

$$22. y' = \frac{2(x^2 - 3x)(2x - 3)}{3 \sqrt[3]{(x^2 - 3x)^4}}$$

$$24. y' = \frac{2 \operatorname{sen} x \operatorname{cos} x}{3 \sqrt[3]{\operatorname{sen}^4 x}}$$

$$26. y' = \frac{3 - \operatorname{cos} x}{2 \sqrt{3x - \operatorname{sen} x}}$$

$$28. y' = \operatorname{cos} \left(\sqrt{3x^2 - 5x} \right) \cdot \frac{6x - 5}{2 \sqrt{3x^2 - 5x}}$$

$$32. y = -\frac{5}{x^2}$$

$$34. y' = 2x + \frac{3}{x^2}$$

$$36. y' = \frac{3(x-1)^2 \cdot 3x - 3(x-1)^3}{(3x)^2}$$

$$38. y' = \frac{\frac{3}{2\sqrt{3x}} \cdot x - \sqrt{3x}}{x^2}$$

39. $y' = \frac{1}{2\sqrt{\frac{3}{x}}} \cdot \frac{-3}{x^2}$
40. $y' = \frac{\sqrt{3x} - x \frac{3}{2\sqrt{3x}}}{3x}$
41. $y' = \frac{6x - \cos x}{3\sqrt[3]{(3x^2 - \sin x)^2}}$
42. $y' = \frac{3}{3x-1}$
43. $y' = \frac{2x-3}{x^2-3x}$
44. $y' = \frac{1}{2\sqrt{x-2}} \cdot \frac{1}{\sqrt{x-2}}$
45. $y' = \frac{6x}{3x^2 \cdot \ln 2}$
46. $y' = e^{x^2} \cdot 2x$
47. $y' = 2^x \cdot \ln 2$
48. $y' = e^{x^2-2x} \cdot (2x-2)$
49. $y' = 3^{\sin x} \cdot \cos x \cdot \ln 3$
50. $y' = \frac{3x^2}{\cos^2(x^3)}$
51. $y' = 3e^{x^2-3x} \cdot (2x-3)$
52. $y' = \frac{-e^{\cos x} \sin x}{2\sqrt{e^{\cos x}}}$
53. $y' = \frac{6 \operatorname{tg} x}{\cos^2 x}$
54. $y = 2x(x-1) + (x^2-1)$
55. $y' = 2x \cdot \ln x + \frac{x^2}{x}$
56. $y' = e^{x^2} 2x \cos x - e^{x^2} \sin x$
57. $y' = 4x^3 \cdot e^{3x} + x^4 e^{3x} \cdot 3$
58. $y' = e^{x^4-3x^2} \cdot (4x^3-6x) \sin x + e^{x^4-3x^2} \cos x$
59. $y' = \frac{2x}{x^2} \cdot e^{\sin x} + \ln x^2 e^{\sin x} \cos x$
60. $y' = \frac{1}{\frac{2\sqrt{x}}{\sqrt{x}} \cdot (\ln \sqrt{x})^2}$
61. $y' = 3 \left(\frac{x^2-3}{x^2+1} \right)^2 \cdot \frac{2x(x^2+1) - (x^2-3)2x}{(x^2+1)^2}$
62. $y' = \frac{1}{x} \cdot e^{x^2-\sin x} + \ln x \cdot e^{x^2-\sin x} (2x - \cos x)$
63. $y' = (2 \cos 3x (-\sin 3x) 3 - 3 \sin^2 x \cos x) \cdot e^{x^3} + (\cos^2 3x - \sin^3 x) e^{x^3} 3x^2$
64. $y' = 2 \left(\frac{\ln x^2}{x^3-2} \right) \cdot \frac{\frac{2x}{x^2} (x^3-2) - \ln x^2 3x^2}{(x^3-2)^2}$
65. $y' = \frac{\frac{1}{x} 3^x - \ln x 3^x \ln 3}{(3^x)^2}$
66. $y' = \frac{\left(e^x + \frac{1}{x} \right) (x^2 - \sin x) - (e^x + \ln x) (2x - \cos x)}{(x^2 - \sin x)^2}$
67. $y' = \frac{e^x \cos x e^x - e^x \sin x}{\sin x (e^x)^2}$
68. $y' = \frac{1}{2\sqrt{\frac{\sin x}{x-1}}} \cdot \frac{\cos x (x-1) - \sin x}{(x-1)^2}$

$$69. y' = \frac{(12x^3 - 4x + 3)(2x - 1) - (3x^4 - 2x^2 + 3x - 2) \cdot 2}{(2x - 1)^2}$$

$$70. y' = 2 \left(\operatorname{sen}(e^{3x}) \right) \cdot \cos(e^{3x}) \cdot e^{3x} \cdot 3 \cos x - \left(\operatorname{sen}(e^{3x}) \right)^2 \cdot \operatorname{sen} x$$

$$71. y' = \frac{2x}{1 + x^4}$$

$$72. y' = \frac{3x^2}{\sqrt{1 - x^6}}$$

$$73. y' = \frac{\operatorname{sen} x}{\cos^2 x} \cdot \sec x$$

$$74. y' = \frac{\frac{1}{x}}{1 + (\ln x)^2}$$

$$75. y' = \frac{e^{\cos x}}{\sqrt{1 - x^2}} - \operatorname{arcsen} x \cdot e^{\cos x} \operatorname{sen} x$$

$$76. y' = \frac{e^{3x} \cdot 3}{1 + (e^{3x})^2}$$

$$77. y' = \frac{e^{3x^2}}{\operatorname{tg} x} \cdot \frac{\frac{e^{3x^2}}{\cos^2 x} - \operatorname{tg} x \cdot e^{3x^2} \cdot 6x}{(e^{3x^2})^2}$$

$$78. y' = \frac{\frac{e^x - (x+1)e^x}{(e^x)^2}}{\sqrt{1 - \left(\frac{x+1}{e^x}\right)^2}}$$

$$79. y' = \frac{1}{\operatorname{arctg}(5x)} \cdot \frac{5}{1 + (5x)^2}$$

$$80. y' = \frac{\frac{3x^2}{2\sqrt{x^3}}}{1 + x^3}$$

$$81. y' = 10 \operatorname{arctg}(\operatorname{sen} x) \cdot \frac{\cos x}{1 + \operatorname{sen}^2 x}$$

$$82. y' = 3^{\operatorname{arctg}(x^2)} \cdot \frac{2x}{1 + x^4} \ln 3$$

$$83. y' = \frac{\frac{3x^2}{\sqrt{1 - (3x - 2)^2}} - \operatorname{arcsen}(3x - 2) \cdot 2x}{x^4}$$

$$84. y' = \frac{\left(\cos x - \frac{1}{\cos^2 x} \right) \sqrt{4x - 3} - (\operatorname{sen} x - \operatorname{tg} x) \cdot \frac{4}{2\sqrt{4x - 3}}}{4x - 3}$$

$$85. y' = \left(\cos x \cdot \ln x + \frac{\operatorname{sen} x}{x} \right) \cdot x^{\operatorname{sen} x}$$

$$86. y' = \left(2x \ln(\operatorname{sen} x) + \frac{x^2 \cos x}{\operatorname{sen} x} \right) (\operatorname{sen} x)^{x^2}$$

$$87. y' = \left((3x^2 - 1) \ln \cos x - \frac{(x^3 - x) \operatorname{sen} x}{\cos x} \right) \cdot (\cos x)^{x^3 - x}$$

$$88. y' = 4^{\operatorname{arctg}(\ln x)} \cdot \frac{\frac{1}{x}}{1 + (\ln x)^2} \cdot \ln 4$$

$$89. y' = \frac{1}{\left(\frac{x+2}{x^2}\right)^3} \cdot 3 \left(\frac{x+2}{x^2}\right)^2 \cdot \frac{x^2 - 2x(x+2)}{x^4}$$

$$90. y' = \left(2x \ln x \left(\frac{e^{3x}}{\operatorname{sen} x} \right) + x^2 \frac{\operatorname{sen} x}{e^{3x}} \frac{3e^{3x} \operatorname{sen} x - e^{3x} \operatorname{cos} x}{\operatorname{sen}^2 x} \right) \cdot \left(\frac{e^{3x}}{\operatorname{sen} x} \right)^2$$

$$91. y' = 10 \left(\frac{\operatorname{sen} x - e^x}{3x - \operatorname{cos} x} \right) \cdot \ln 10 \frac{(\operatorname{cos} x - e^x)(3x - \operatorname{cos} x) - (\operatorname{sen} x - e^x)(3 + \operatorname{sen} x)}{(3x - \operatorname{cos} x)^2}$$

$$92. y' = -\operatorname{sen} \left(\frac{\operatorname{tg} \sqrt{x}}{\operatorname{sen}(\ln x)} \right) \cdot \frac{\frac{1}{\operatorname{cos}^2 \sqrt{x}} \cdot \frac{1}{2\sqrt{x}} \cdot \operatorname{sen}(\ln x) - \operatorname{tg} \sqrt{x} \cdot \operatorname{cos}(\ln x)}{\operatorname{sen}^2(\ln x)} \cdot \frac{1}{x}$$

$$93. y' = \frac{\left(-\operatorname{sen} x \ln nx + \frac{\operatorname{cos} x}{x} \right) x^{\operatorname{cos} x} (\ln x)^3 - x^{\operatorname{cos} x} 3 (\ln x)^2 \frac{1}{x}}{(\ln x)^6}$$

94.

$$y' = 2 \operatorname{cos}(4e^x) \cdot (-\operatorname{sen}(4e^x) \cdot 4e^x \cdot \ln \left(\frac{\operatorname{tg} x}{3^{x^2}} \right) + \operatorname{cos}^2(4e^x) \cdot \frac{3^{x^2} \frac{3^{x^2}}{\operatorname{cos}^2 x} - \operatorname{tg} x \cdot 3^{x^2} \cdot 2x \cdot \ln 3}{(3^{x^2})^2})$$

$$95. y = \frac{1}{2 \sqrt{\frac{e^{\ln(\operatorname{cos} x)}}{5^{\operatorname{cos} x}}}} \cdot \frac{e^{\ln(\operatorname{cos} x)} \frac{-\operatorname{sen} x}{\operatorname{cos} x} \cdot 5^{\operatorname{cos} x} - e^{\ln(\operatorname{cos} x)} \cdot 5^{\operatorname{cos} x} (-\operatorname{sen} x) \ln 5}{(5^{\operatorname{cos} x})^2}}$$

96.

$$y' = \frac{1}{3 \sqrt[3]{\frac{\operatorname{sen}^2(e^x)}{\operatorname{arctg}(\operatorname{cos} x)}}} \cdot \frac{2 \operatorname{sen}(e^x) \cdot \operatorname{cos}(e^x) \cdot e^x \cdot \operatorname{arctg}(\operatorname{cos} x) - \operatorname{sen}^2(e^x) \cdot \frac{1}{1 + \operatorname{cos}^2 x} \cdot (-\operatorname{sen} x)}{\operatorname{arctg}^2(\operatorname{cos} x)}$$

$$97. y' = \frac{\frac{-\operatorname{sen}(e^x) e^x x + \operatorname{cos}(e^x)}{\sqrt{\operatorname{cos}(e^x) \cdot x}} \cdot \sqrt{e^{\operatorname{tg} x}} - \sqrt{\operatorname{cos}(e^x) \cdot x} \cdot \frac{1}{2 \sqrt{e^{\operatorname{tg} x}}} \cdot e^{\operatorname{tg} x} \cdot \frac{1}{\operatorname{cos}^2 x}}{e^{\operatorname{tg} x}}$$

$$98. y' = \left(\ln(\operatorname{tge}^x + x^2) + x \frac{\frac{e^x}{\operatorname{cos}^2(e^x)} + 2x}{\operatorname{tge}^x + x^2} \right) \cdot (\operatorname{tg}(e^x) + x^2)^x$$

99.

$$y' = \frac{1}{2 \sqrt{\frac{\operatorname{arctg} e^x \cdot \operatorname{cos} x}{\ln(x^2 - x)}}} \cdot \frac{\left(\frac{e^x}{1 + (e^x)^2} \operatorname{cos} x - \operatorname{arctg} e^x \operatorname{sen} x \right) \ln(x^2 - x) - (\operatorname{arctg} e^x \operatorname{cos} x) \frac{2x - 1}{x^2 - x}}{\ln^2(x^2 - x)}$$

$$100. y' = \frac{\frac{1}{\sqrt{\operatorname{cos} x}} \frac{-\operatorname{sen} x}{2 \sqrt{\operatorname{cos} x}} \operatorname{sen}(e^{\operatorname{cos} x}) - \ln \sqrt{\operatorname{cos} x} \operatorname{cos}(e^{\operatorname{cos} x}) e^{\operatorname{cos} x} (-\operatorname{sen} x)}{\operatorname{sen}^2(e^{\operatorname{cos} x})}}$$