

Compute $\frac{dy}{dx}$ in each of the following:

1. $y = \sqrt{x^2 + 1}$
2. $y = (x^3 - 1)\sqrt{3x^2 + 4}$
3. $y = (x^2 + 1)^{37}(x^3 - 1)^{21}$
4. $\frac{x^2 + 1}{1 - 3x}$
5. $y^3 + x^2y^4 + x^3 = 1$
6. $y = \cos^{-1}\left(\frac{\tan(2x)}{2x}\right)$
7. $y = \frac{x^3}{\sqrt[3]{3x^2 - 1}}$
8. $y = \frac{10^x}{\ln(10x)}$
9. $y = \frac{(x^2 + 1)\sqrt{x^2 - 1}}{3x + 2}$
10. $y = \left(\frac{2x + 1}{3x - 1}\right)^4$
11. $y = \sqrt{1 - \frac{1}{x^2 + 1}}$
12. $y = \sqrt{x + \sqrt{x + \sqrt{x}}}$
13. $y = 2x^2 \sin^3(5x^8)$
14. $y = (\tan(x) - \cos(3x^2))^4$
15. $y = \sin(\cos(x)) + \sin(x) \cos(x)$
16. $y = x^2 \csc^5(\sqrt{x - 1})$
17. $y = \frac{1 - \cos(2x)}{\tan(x)}$
18. $y = \sin^{-1}(x^2)$
19. $y = 3 + \frac{5}{\sqrt{x}} + 2\sqrt{x} - \frac{1}{x\sqrt{x}}$
20. $(x + y)^2 - (x - y)^2 = x^4 + y^4$
21. $y = \frac{1}{4x^3 + 5x^2 - 7x + 8}$
22. $y = \sqrt{\sin^{-1}(2x)}$
23. $y = \cos^{-1}(\sqrt{1 - 2x})$
24. $y = \sqrt[3]{4 - x}$
25. $y = \tan^{-1}\left(\frac{x - 3}{1 + 3x}\right)$
26. $y = \ln(\tan(x))$
27. $y = \ln(x^2 + \ln(x + \ln(x)))$
28. $y = x^{e^x}$
29. $y = (4x^2 - 7)^{2 + \sqrt{x^2 - 5}}$
30. $\ln(x + y) = \tan^{-1}\left(\frac{x}{y}\right)$
31. $x^2 + xy + y^2 - 3 = 0$
32. $x \cos(y) + y \cos(x) = 1$
33. $y = 2x^{\csc(x)}$
34. $y = t^2 + 2$ and $t = \tan(x^2 - x)$
35. $y = 3^{3x^2}$
36. $y = \ln\left(\frac{x - 1}{x + 1}\right)$
37. $y = (x^2 + 4)^4(x^3 - 3)^{3/4}$
38. $y = 2\sqrt{4 \sin(x) - 6 \cos(2x)}$
39. $x^2 + \cos(2y) = 3$
40. $y = (e^{\sin(x)} - \sqrt{2x})(x^2 - 9)(\tan(x) - \cot(x))^4$