

Find the derivative of each of the following functions by using the product rule.

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|--|--|--------------------------------|
| 1. $\frac{1}{x} \cot(x)$               | 21. $\tan(x) \sqrt{x}$                 | 41. $\sqrt[18]{x}(-\cos(x))$   |
| 2. $x^{100} 10e^x$                     | 22. $\cot(x) \sqrt[9]{x}$              | 42. $\cos(x) \sqrt{x}$         |
| 3. $-\sin(x) \left(\frac{1}{x}\right)$ | 23. $\frac{1}{x} \cos(x)$              | 43. $\frac{1}{x} \csc(x)$      |
| 4. $\cos(x)(-\sin(x))$                 | 24. $\sqrt[3]{x} \csc(x)$              | 44. $\tan(x) \sec(x)$          |
| 5. $\cos(x) \tan(x)$                   | 25. $\sqrt[3]{x}(-\cos(x))$            | 45. $\sin(x)(-5x^2 + 14x + 3)$ |
| 6. $\sin(x) \sec(x)$                   | 26. $e^x \sec(x)$                      | 46. $-\cos(x) \sqrt{x}$        |
| 7. $x^{2008} \sin(x)$                  | 27. $-\sin(x)(-\cos(x))$               | 47. $\tan(x)(3x^3 + 4)$        |
| 8. $\sqrt[3]{x} \sin(x)$               | 28. $\sin(x) \left(\frac{1}{x}\right)$ | 48. $\sqrt{x} e^x$             |
| 9. $x^{100} \sec(x)$                   | 29. $\cot(x) \left(\frac{1}{x}\right)$ | 49. $\cos(x)(3x^3 + 4)$        |
| 10. $x^{2008} \cot(x)$                 | 30. $\frac{1}{x} \tan(x)$              | 50. $x^{22}(-\cos(x))$         |
| 11. $\cot(x) \csc(x)$                  | 31. $\sqrt[3]{x}(-\sin(x))$            | 51. $\sqrt[18]{x} \tan(x)$     |
| 12. $x^{81} \cot(x)$                   | 32. $-\cos(x)(16x + 1)$                | 52. $\sqrt{x} \cos(x)$         |
| 13. $e^x \sqrt[9]{x}$                  | 33. $\sqrt{x} \tan(x)$                 | 53. $x^{81} \cos(x)$           |
| 14. $-\cos(x) 6e^x$                    | 34. $\frac{1}{x} 10e^x$                | 54. $\sqrt[10]{x} \csc(x)$     |
| 15. $-\sin(x)(16x + 1)$                | 35. $\sqrt{x} \cot(x)$                 | 55. $-\cos(x) \csc(x)$         |
| 16. $\tan(x) \sqrt[18]{x}$             | 36. $\sqrt[3]{x} \csc(x)$              | 56. $\sqrt{x}(-\cos(x))$       |
| 17. $x^{2008} \cos(x)$                 | 37. $\sqrt[10]{x} \sqrt{x}$            | 57. $x^{100} \csc(x)$          |
| 18. $x^{22} 6e^x$                      | 38. $\sqrt[3]{x}(-\cos(x))$            | 58. $\sqrt{x} \sec(x)$         |
| 19. $x^{2008}(-\cos(x))$               | 39. $\cot(x) \sqrt{x}$                 | 59. $-\sin(x) \tan(x)$         |
| 20. $\frac{1}{x}(-\sin(x))$            | 40. $e^x \sqrt{x}$                     | 60. $\frac{1}{x} \sin(x)$      |