

Use the rules for integrating polynomials, exponentials and logarithms to find an antiderivative and then the indefinite integral of each of the following functions. Remember your exponent and logarithmic laws, these will help you.

For any $n \neq -1$,

Constant Rule	$\int 0 dx = C$	Power Rule	$\int x^n dx = \frac{1}{n+1}x^{n+1} + C$
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Exponential Rule	$\int e^x dx = e^x + C$	Logarithm Rule	$\int \frac{1}{x} dx = \ln x + C$
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| 1. $y = 3$ | 22. $h(t) = -\frac{1}{3}t^{-4/3}$ | 43. $P = -0.2e^{0.2t}$ |
| 2. $y = 0$ | 23. $z = 2t$ | 44. $y = -4e^{-4t}$ |
| 3. $y = -12x^{-13}$ | 24. $R = 4s^3 + 4s$ | 45. $P = 24e^{0.12t}$ |
| 4. $y = 12x^{11}$ | 25. $y = 2z + -\frac{1}{2}z^{-2}$ | 46. $P(t) = 12.41 \ln(0.94)(0.94)^t *$ |
| 5. $y = 24t^2$ | 26. $y = 6t - \frac{5}{2}t^{-1/2} - 7t^{-2}$ | 47. $P(t) = 3000 \ln(1.02)(1.02)^t *$ |
| 6. $y = \frac{4}{3}x^{1/3}$ | 27. $h(t) = -3t^{-2} - 8t^{-3}$ | 48. $y = \ln(10)10^x - 10x^{-2} *$ |
| 7. $y = 5$ | 28. $h(t) = \frac{1}{2}t^{-1/2} + t^{-2}$ | 49. $f(x) = \frac{1}{x}$ |
| 8. $y = 12t^3 - 4t$ | 29. $y = \frac{3}{2}x^{1/2} + \frac{1}{2}x^{-1/2}$ | 50. $h(t) = \ln(2)2^t *$ |
| 9. $f(q) = 3q + 10$ | 30. $z = \frac{3}{4}x^{-1/4} + 7$ | 51. $D = -\frac{1}{p}$ |
| 10. $f(x) = -4x^{-5}$ | 31. $P = 9t^2 + 2e^t$ | 52. $g(t) = 4\frac{1}{t}$ |
| 11. $y = 18x^2 + 8x - 2$ | 32. $f(x) = 2e^x + 2x$ | 53. $R = 3\frac{1}{q}$ |
| 12. $y = 2x + 5x + 9$ | 33. $f(x) = 3x^2 + \ln(3)3^x *$ | 54. $R(q) = 2q - 2\frac{1}{q}$ |
| 13. $y = 24t^2 - 8t + 12$ | 34. $y = 10t + 4e^t$ | 55. $y = 2t + 5\frac{1}{t}$ |
| 14. $y = 6x + 7$ | 35. $P(t) = 5 \ln(5) \cdot 5^t + 6 \ln(6) \cdot 6^t *$ | 56. $y = 2x + 4 - 3\frac{1}{x}$ |
| 15. $y = -12x^3 - 12x^2 - 6$ | 36. $y = \ln(2)2^x - 6x^{-4} *$ | 57. $S(x) = \ln(8)8^x - \frac{1}{x} *$ |
| 16. $y = 8.4q^2 - 0.5$ | 37. $y = 4 \ln(10) \cdot 10^x - 3x^2 *$ | 58. $F = \frac{1}{x} + \ln(16)16^x *$ |
| 17. $f(z) = -6.1z^{-7.1}$ | 38. $f(x) = \ln(2)2^x + 2 \ln(3) \cdot 3^x *$ | 59. $y = 4e^x - \ln(4)4^x *$ |
| 18. $g(t) = -5t^{-6}$ | 39. $y = 5 \ln(2) \cdot 2^x - 5 *$ | 60. $g(x) = \frac{1}{x}$ |
| 19. $y = \frac{1}{2}x^{-1/2}$ | 40. $y = 3 - 2 \ln(4) \cdot 4^x *$ | 61. $y = \frac{1}{x}$ |
| 20. $y = \frac{7}{2}r^{-9/2}$ | 41. $S = 0.7e^{0.7t}$ | 62. $f = \frac{1}{x}$ |
| 21. $f(x) = -\frac{3}{2}x^{-5/2}$ | 42. $f(t) = 3e^{3t}$ | 63. $R = \frac{1}{x} + 2x - e^x$ |

Answers

1. $\int y \, dx = 3x + C$
 2. $\int y \, dx = C$
 3. $\int y \, dx = x^{-12} + C$
 4. $\int y \, dx = x^{12} + C$
 5. $\int y \, dt = 8t^3 + C$
 6. $\int y \, dx = x^{4/3} + C$
 7. $\int y \, dx = 5x + 13 + C$
 8. $\int y \, dt = 3t^4 - 2t^2 + C$
 9. $\int f(q) \, dq = q^3 + C$
 10. $\int f(x) \, dx = \frac{1}{x^4} + C$
 11. $\int y \, dx = 6x^3 + 4x^2 - 2x + C$
 12. $\int y \, dx = x^2 + 5x + C$
 13. $\int y \, dt = 8t^3 - 4t^2 + 12t + C$
 14. $\int y \, dx = 3x^2 + 7x + C$
 15. $\int y \, dx = -3x^4 - 4x^3 - 6x + C$
 16. $\int y \, dq = 4.2q^2 - 0.5q + C$
 17. $\int f(z) \, dz = \frac{1}{z^{6.1}} + C$
 18. $\int g(t) \, dt = \frac{1}{t^5} + C$
 19. $\int y \, dx = \sqrt{x} + C$
 20. $\int y \, dr = \frac{1}{r^{7/2}} + C$
 21. $\int f(x) \, dx = \sqrt{\frac{1}{x^3}} + C$
 22. $\int h(t) \, dt = \frac{1}{\sqrt[3]{t}} + C$
 23. $\int z \, dt = (t-1)(t+1) + C$
 24. $\int R \, ds = (s^2 + 1)^2 + C$
 25. $\int y \, dz = z^2 + \frac{1}{2z} + C$
 26. $\int y \, dt = 3t^2 - 5\sqrt{t} + \frac{7}{t} + C$
 27. $\int h(t) \, dt = \frac{3}{t} + \frac{4}{t^2} + C$
 28. $\int h(t) \, dt = t(t^{-1/2} - t^{-2}) + C$
 29. $\int y \, dx = \sqrt{x}(x+1) + C$
 30. $\int z \, dx = \sqrt[4]{x^3} + 7\frac{1}{x^{-1}} + C$
 31. $\int P \, dt = 3t^3 + 2e^t + C$
 32. $\int f(x) \, dx = 2e^x + x^2 + C$
 33. $\int f(x) \, dx = x^3 + 3^x + C$
 34. $\int y \, dt = 5t^2 + 4e^t + C$
 35. $\int P(t) \, dt = 5 \cdot 5^t + 6 \cdot 6^t + C$
 36. $\int y \, dx = 2^x + \frac{2}{x^3} + C$
 37. $\int y \, dx = 4 \cdot 10^x - x^3 + C$
 38. $\int f(x) \, dx = 2^x + 2 \cdot 3^x + C$
 39. $\int y \, dx = 5 \cdot 2^x - 5x + C$
 40. $\int y \, dx = 3x - 2 \cdot 4^x + C$
 41. $\int S \, dt = e^{0.7t} + C$
 42. $\int f(t) \, dt = e^{3t} + C$
 43. $\int P \, dt = e^{-0.2t} + C$
 44. $\int y \, dt = e^{-4t} + C$
 45. $\int P \, dt = 200e^{0.12t} + C$
 46. $\int P(t) \, dt = 12.41(0.94)^t + C$
 47. $\int P(t) \, dt = 3000(1.02)^t + C$
 48. $\int y \, dt = 10^x + \frac{10}{x} + C$
 49. $\int f(x) \, dx = \ln|x| + C$
 50. $\int h(t) \, dt = 2^t + C$
 51. $\int D \, dp = 10 - \ln|p| + C$
 52. $\int g(t) \, dt = 4 \ln|t| + C$
 53. $\int R \, dq = 3 \ln|q| + C$
 54. $\int R(q) \, dq = q^2 - 2 \ln|q| + C$
 55. $\int y \, dt = t^2 + 5 \ln|t| + C$
 56. $\int y \, dx = x^2 + 4x - 3 \ln|x| + C$
 57. $\int S(x) \, dx = 8^x - \ln|x| + C$
 58. $\int F \, dx = \ln|x| + 16^x + C$
 59. $\int y \, dx = 4e^x - 4^x + C$
 60. $\int g(x) \, dx = \ln|x| + C$
 61. $\int y \, dx = \ln|x| + C$
 62. $\int f \, dx = \ln|x| + C$
 63. $\int R \, dx = \ln|x| + x^2 - e^x + C$
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