

Practice

Use the product and quotient laws to express each as a single logarithm and then evaluate.

1. $\log_{10} 8 + \log_{10} 1.25$
2. $\log_4 32 + \log_4 2$
3. $\log_3 108 - \log_3 4$
4. $\log_2 80 - \log_2 5$
5. $\log_6 4 + \log_6 9$
6. $\log_5 500 - \log_5 4$
7. $\log_3 8 - \log_3 24$
8. $\log_7 245 + \log_7 \frac{1}{5}$
9. $\log_8 6 - \log_8 3 + \log_8 2$
10. $\log_{10} 4 + \log_{10} 5 - \log_{10} 2$

Use the power and root laws to simplify and then evaluate each.

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|------------------------------|--------------------------|
| 11. $\log_3 9^{20}$ | 12. $\log_2 8^{25}$ |
| 13. $\log_{10} \sqrt{0.1}$ | 14. $\log_3 \sqrt[3]{9}$ |
| 15. $\log_5 5\sqrt{5}$ | 16. $\log_7 49^{2.5}$ |
| 17. $\log_8 2^{\frac{3}{2}}$ | 18. $\log_2 16^5$ |

If $\log 17 = k$, determine an expression for each of the following.

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| 19. $\log 170$ | 20. $\log 17\,000$ |
| 21. $\log 1.7$ | 22. $\log \sqrt{17}$ |
| 23. $\log 17^{10}$ | 24. $\log \frac{17}{1000}$ |

If $\log_3 4 = x$, express each of the following in terms of x .

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| 25. $\log_3 64$ | 26. $\log_3 2$ |
| 27. $\log_3 144$ | 28. $\log_3 \sqrt[5]{4^7}$ |

If $\log_3 x = 8$, evaluate the following.

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| 29. $\log_3 9x$ | 30. $\log_3 x^2$ |
| 31. $\log_3 \frac{x^4}{27}$ | 32. $\log_3 \frac{3}{x}$ |

Evaluate.

33. $2 \log_3 12 - 2 \log_3 4$
34. $\log_4 6 + \log_4 \frac{64}{3} - \log_4 8$
35. $\log_3 (9 \times 27 \times 81)$
36. $\frac{1}{2} \log_3 144 - \log_3 4 + 2 \log_3 3$
37. $7^{\log_7 3}$
38. $\log_5 \sqrt{175} - \log_5 \sqrt{7}$

Write each expression as a single logarithm.

39. $\log_2 a + \log_2 b - \log_2 c$
40. $\log x^2 - 5 \log y$
41. $\log A + \log \sqrt{B} - 3 \log C$
42. $\log_7 \sqrt[3]{x} - \log_7 y^3 + 2 \log_7 y$

- Practice 1. 1. 2. 3. 3. 3. 4. 4. 5. 2. 6. 3. 7. -1. 8. 2. 9. $\frac{3}{2}$ 10. 1. 11. 40 12. 75 13. $-\frac{1}{2}$ 14. $\frac{3}{2}$ 15. $\frac{3}{2}$ 16. 5 17. $\frac{7}{2}$ 18. 20 19. $k+1$ 20. $k+3$ 21. $k-1$ 22. $\frac{k}{2}$ 23. 10k 24. $k-3$ 25. $3x$ 26. $\frac{x}{2}$ 27. $2x+2$ 28. $\frac{5}{7x}$ 29. 10 30. 16 31. 29 32. -7 33. 2 34. 2 35. 9 36. 3 37. 3 38. 1 39. $\log_2 \frac{c}{ab}$ 40. $\log_3 \frac{x^2}{y}$ 41. $\log \frac{4\sqrt{B}}{C}$ 42. $\log \frac{\sqrt[3]{x}}{y}$