NAME _____ DATE _____ PERIOD ____

Practice

Properties of Logarithms

Use $\log_{10} 5 \approx 0.6990$ and $\log_{10} 7 \approx 0.8451$ to approximate the value of each expression.

1. $\log_{10} 35$ _____
2. $\log_{10} 25$ _____
3. $\log_{10} \frac{7}{5}$ _____
4. $\log_{10} \frac{5}{7}$ _____
5. $\log_{10} 245$ _____
6. $\log_{10} 175$ _____
7. $\log_{10} 0.2$ _____
8. $\log_{10} \frac{25}{7}$ _____

Solve each equation. Check your solutions.

9. $\log_7 n = \frac{2}{3} \log_7 8$ _____
10. $\log_{10} u = \frac{3}{2} \log_{10} 4$ _____
11. $\log_6 x + \log_6 9 = \log_6 54$ _____
12. $\log_8 48 - \log_8 w = \log_8 4$ _____
13. $\log_9 (3u + 14) - \log_9 5 = \log_9 2u$ _____
14. $4 \log_2 x + \log_2 5 = \log_2 405$ _____
15. $\log_3 y = -\log_3 16 + \frac{1}{3} \log_3 64$ _____
16. $\log_2 d = 5 \log_2 2 - \log_2 8$ _____
17. $\log_{10} (3m - 5) + \log_{10} m = \log_{10} 2$ _____
18. $\log_{10} (b + 3) + \log_{10} b = \log_{10} 4$ _____
19. $\log_8 (t + 10) - \log_8 (t - 1) = \log_8 12$ _____
20. $\log_3 (a + 3) + \log_3 (a + 2) = \log_3 6$ _____
21. $\log_{10} (r + 4) - \log_{10} r = \log_{10} (r + 1)$ _____
22. $\log_4 (x^2 - 4) - \log_4 (x + 2) = \log_4 1$ _____
23. $\log_{10} 4 + \log_{10} w = 2$ _____
24. $\log_8 (n - 3) + \log_8 (n + 4) = 1$ _____
25. $3 \log_5 (x^2 + 9) - 6 = 0$ _____
26. $\log_{16} (9x + 5) - \log_{16} (x^2 - 1) = \frac{1}{2}$ _____
27. $\log_6 (2x - 5) + 1 = \log_6 (7x + 10)$ _____
28. $\log_2 (5y + 2) - 1 = \log_2 (1 - 2y)$ _____
29. $\log_{10} (c^2 - 1) - 2 = \log_{10} (c + 1)$ _____
30. $\log_7 x + 2 \log_7 x - \log_7 3 = \log_7 72$ _____

31. **SOUND** Recall that the loudness L of a sound in decibels is given by $L = 10 \log_{10} R$, where R is the sound's relative intensity. If the intensity of a certain sound is tripled, by how many decibels does the sound increase?

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32. **EARTHQUAKES** An earthquake rated at 3.5 on the Richter scale is felt by many people, and an earthquake rated at 4.5 may cause local damage. The Richter scale magnitude reading m is given by $m = \log_{10} x$, where x represents the amplitude of the seismic wave causing ground motion. How many times greater is the amplitude of an earthquake that measures 4.5 on the Richter scale than one that measures 3.5?

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