

**LESSON**  
**7.6**
**Practice B**
*For use with pages 515–522*

**Solve the exponential equation. Check for extraneous solutions. Round the result to three decimal places if necessary.**

- |                                  |                                    |   |
|----------------------------------|------------------------------------|---|
| 1. $e^x = 1$                     | 2. $e^x = 4$                       | 3. $e^x + 1 = 7$                                |
| 4. $5^x = 12$                    | 5. $4^x - 6 = 4$                   | 6. $3^{4x} = 27$                                |
| 7. $e^{2x} = 4$                  | 8. $3e^{3x} = 12$                  | 9. $10^{2x-3} + 3 = 19$                         |
| 10. $3e^x + 7 = 9$               | 11. $10^{x+2} - 12 = 22$           | 12. $10^{-x+4} + 7 = 5$                         |
| 13. $3^{-3x+1} = 3^{x-9}$        | 14. $8^{2x} = 8^{x+7}$             | 15. $7^{2x-3} - 4 = 14$                         |
| 16. $4e^{3x} = 1$                | 17. $e^{5x+2} = e^{3x+12}$         | 18. $3e^{3-x} = 15$                             |
| 19. $9^{2x} = 3^{2x+4}$          | 20. $25^{x-4} = 5^{3x+1}$          | 21. $8^{x-1} = \left(\frac{1}{2}\right)^{2x-1}$ |
| 22. $3(2^{x+6}) = 17$            | 23. $5^{0.5x} + 12 = 21$           | 24. $-5e^x - 3 = 24$                            |
| 25. $\frac{3}{4}e^{3x} - 8 = -6$ | 26. $\frac{2}{3}(4^{3x}) - 5 = -2$ | 27. $10^{2x+1} + 2 = 2$                         |

**Solve the logarithmic equation. Check for extraneous solutions. Round the result to three decimal places if necessary.**

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|-----------------------------------|----------------------------|--------------------------------|
| 28. $\log x = 3$                  | 29. $\ln x = 4$            | 30. $\log_3 x = 5$             |
| 31. $\log_7(2-x) = \log_7 5x$     | 32. $\ln(3x-3) = \ln(x-6)$ | 33. $\ln(5-2x) = \ln(5x+3)$    |
| 34. $\log_4 3x = 6$               | 35. $\log_2(3x-1) = 8$     | 36. $7 - \log_3 8x = 2$        |
| 37. $2 \log_7(1-2x) = 12$         | 38. $3 \ln x - 7 = 4$      | 39. $\ln(1-3x) + 3 = 9$        |
| 40. $\log 7x + 4 = 5$             | 41. $4 + \log_9(3x-7) = 6$ | 42. $\log_2 2x + \log_2 x = 5$ |
| 43. $\log_6(2x-6) + \log_6 x = 2$ | 44. $\ln 3x - \ln 2 = 4$   | 45. $\ln(-5x+3) = \ln 2x+2$    |
46. **Multiple Choice** You deposit \$500 in an account that pays 3.25% annual interest compounded monthly. About how long does it take for the balance to quadruple?
- A. 36.3 years      B. 42.7 years      C. 45.1 years

**In Exercises 47–49, use the following information.**

**Compounding Interest** You deposit \$700 in an account that pays 2.75% annual interest. How long does it take the balance to reach the following amounts?

47. \$1000 when interest is compounded quarterly
48. \$1500 when interest is compounded yearly
49. \$2000 when interest is compounded continuously
50. **Rocket Velocity** Disregarding the force of gravity, the maximum velocity  $v$  of a rocket is given by  $v = t \ln M$  where  $t$  is the velocity of the exhaust and  $M$  is the ratio of the mass of the rocket with fuel to its mass without fuel. A solid propellant rocket has an exhaust velocity of 2.3 kilometers per second. Its maximum velocity is 7.2 kilometers per second. Find its mass ratio  $M$ .