

7-5**Practice**

Form G

Exponential and Logarithmic Equations**Solve each equation.**

1. $8^{2x} = 32$

2. $7^n = 343$

3. $9^{2x} = 27$

4. $25^{2n+1} = 625$

5. $36^{-2x+1} = 216$

6. $64^x = 4096$

Solve each equation. Round answers to the nearest hundredth.

7. $5^{2x} = 20$

8. $8^{n+1} = 3$

9. $4^{n-2} = 3$

10. $4^{3n} = 5$

11. $15^{2n-3} = 245$

12. $4^x - 5 = 12$

Solve by graphing. Round to the nearest hundredth.

13. $2^{n+5} = 120$

14. $5^{n+1} = 175$

15. $8^x = 58$

16. $10^n = 3$

17. $10^{3y} = 5$

18. $10^{k-2} = 20$

19. $5^x = 4$

20. $2^{4x} = 8$

21. $3^{x+5} = 15$

Use a table to solve each equation. Round to the nearest hundredth.

22. $8^{2n} = 3$

23. $12^{2n-1} = 64$

24. $12^{n-2} = 8$

25. $10^x = 182$

26. $8^n = 12$

27. $10^{2x} = 9$

28. $5^{n+1} = 3$

29. $10^{n-2} = 0.3$

30. $3^{3n} = 50$

31. The equation $y = 281(1.01)^x$ is a model for the population of the United States y , in millions of people, x years after the year 2000. Estimate when the United States population will reach 400 million people.

Solve each equation. Check your answers.

32. $\log x = 2$

33. $\log 4x = -1$

34. $\log 3x = 2$

35. $\log 4x = 2$

36. $4 \log x = 4$

37. $8 \log x = 16$

38. $2 \log x = 2$

39. $\log(2x + 5) = 3$

40. $\log(3x - 2) = 3$

41. $\log(x - 25) = 2$

42. $2 \log(2x + 5) = 4$

43. $3 \log(1 - 2x) = 6$

7-5

Practice (continued)

Form G

Exponential and Logarithmic Equations

Solve each equation.

44. $\log x - \log 4 = 3$

45. $\log x - \log 4 = -2$

46. $2 \log x - \log 4 = 2$

47. $\log 3x - \log 5 = 1$

48. $2 \log x - \log 3 = 1$

49. $\log 8 - \log 2x = -1$

50. $2 \log 3x - \log 9 = 1$

51. $2 \log x - \log 5 = -2$

52. $\log(x + 21) + \log x = 2$

53. The function $y = 1000(1.005)^x$ models the value of \$1000 deposited at an interest rate of 6% per year (0.005 per month) x months after the money is deposited.

- Use a graph (on your graphing calculator) to predict how many months it will be until the account is worth \$1100.
- Predict how many years it will be until the account is worth \$5000.

54. Suppose the population of a country is currently 8,100,000. Studies show this country's population is increasing 2% each year.

- What exponential function would be a good model for this country's population?
- Using the equation you found in part (a), how many years will it take for the country's population to reach 9 million? Round your answer to the nearest hundredth.

55. Suppose you deposit \$2500 in a savings account that pays you 5% interest per year.

- How many years will it take for you to double your money?
- How many years will it take for your account to reach \$8,000?

Mental Math Solve each equation.

56. $5^x = \frac{1}{25}$

57. $4^x = 64$

58. $10^x = 0.0001$

59. $\log_3 81 = x$

60. $\log_2 \frac{1}{32} = x$

61. $\log 1,000,000 = x$

Use the properties of exponential and logarithmic functions to solve each system. Check your answers.

62.
$$\begin{cases} -2^{10-x} + y = 0 \\ y = 8^{x+2} \end{cases}$$

63.
$$\begin{cases} 3^{2x-y} = 1 \\ 4^{x+y} - 8 = 0 \end{cases}$$

64.
$$\begin{cases} \log_2(x - 2y) = 3 \\ \log_2(x + y) = \log_2 8 \end{cases}$$