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Chapter 9 Logarithmic & Exponential Functions

Worksheet/Study Guide (100 points)

Tell whether the function shows growth or decay. Then graph.

1. $f(x) = 12(2.4)^x$ 2. $f(x) = 20\left(\frac{4}{5}\right)^x$ 3. $f(x) = 0.25(5)^x$

Explain whether each function is exponential.

4. $f(x) = 4x^9$ 5. $f(x) = 0$ 6. $f(x) = 10(0)^x$

Graph the relation and connect the points. Then graph the inverse. Identify the domain and the range of each relation.

7.

x	1	2	3	4
y	-1	0	2	4

8.

x	-3	-1	2	4
y	-3	-1	-1	-3

Use inverse operations to write the inverse of each function.

9. $f(x) = 15x$ 10. $f(x) = x + 9$ 11. $f(x) = \frac{x}{7}$
12. $f(x) = 3x + 2$ 13. $f(x) = 5 - \frac{3}{4}x$ 14. $f(x) = \frac{2x + 1}{5}$

Graph each function. Then write and graph its inverse.

15. $f(x) = 2x + 4$ 16. $f(x) = 0.8x + 1$ 17. $f(x) = \frac{4x - 5}{3}$

Write each exponential equation in logarithmic form.

18. $3^5 = 243$ 19. $51^0 = 1$
20. $16^{1.5} = 64$ 21. $7^x = 343$

Write each logarithmic equation in exponential form.

22. $\log_{64} 512 = 1.5$ 23. $\log_2 0.125 = -3$
24. $\log_4 x = 70$ 25. $\log_x 12 = 3$

Evaluate using mental math.

26. $\log_{10} 1000$ 27. $\log_5 0.2$
28. $\log_{0.5} 0.125$ 29. $\log_{1.1} 1.21$

Use the given values to graph each function. Then graph its inverse. Describe the domain and the range of the inverse function.

30. $f(x) = 4^x$; $x = -2, -1, 0, 1, 2$

31. $f(x) = 0.2^x$; $x = -2, -1, 0, 1, 2$

Express as a single logarithm. Simplify, if possible.

32. $\log_2 10 + \log_2 12.8$

33. $\log_4 8 + \log_4 2$

34. $\log_5 1.25 + \log_5 4$

35. $\log_6 144 + \log_6 4$

36. $\log 10,000 - \log 100$

37. $\log_8 8 - \log_8 1$

Simplify, if possible.

38. $\log_8 64^4$

39. $\log_8 64^4$

40. $\log_9 1^4$

41. $\log_3 3^{5x+8}$

42. $4^{\log_4 12}$

43. $\log_{1.4} 1.4^5$

Evaluate.

44. $\log_4 256$

45. $\log_4 \left(\frac{1}{64} \right)$

46. $\log_3 7$

47. $\log_4 13$

Solve and check.

48. $3^{x+1} = 9^4$

49. $32^{x-2} = 8^x$

50. $9^x = 12$

51. $3 \cdot 5^{2x-1} = 15$

Solve.

52. $\log_6 (4x - 9) = \log_6 (x)$

53. $\log_7 (10x + 13) = 3$

54. $\log (20x) - \log 4 = 2$

55. $\log_9 x^3 = 8$

Graph.

56. $f(x) = e^x - 1$

57. $f(x) = -2e^x + 3$

Simplify.

58. $\ln e^{20}$

59. $\ln e^{2x+10}$

60. $e^{\ln 5x^2}$