

## Answers for Lesson 8-3 Exercises

1. The earthquake in Missouri released about 1.97 times more energy.
2. The earthquake in Chile released about 231 times more energy.
3. The earthquake in Missouri released about 8,759,310 times more energy.
4. The earthquake in Missouri released about 30 times more energy.
5. The earthquake in Alaska released about 83 times more energy.

6.  $\log_7 49 = 2$

7.  $3 = \log 1000$

8.  $\log_5 625 = 4$

9.  $\log \frac{1}{10} = -1$

10.  $2 = \log_8 64$

11.  $\log_{\frac{1}{2}} 4 = -2$

12.  $3 = \log_{\frac{1}{3}} \left( \frac{1}{27} \right)$

13.  $-2 = \log 0.01$

14. 4

15.  $\frac{1}{2}$

16. 1

17.  $\frac{3}{2}$

$\frac{1}{2}$  18. 3

19.

20. undefined

21. 2

22. 5

23. 1

24. 4

25. 3

26.  $6.3 \times 10^{-6}$

27.  $6.3 \times 10^{-3}$

28.  $1.0 \times 10^{-8}$

29.  $7.9 \times 10^{-4}$

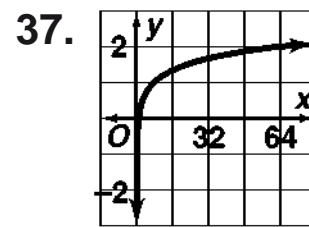
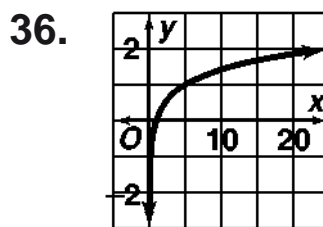
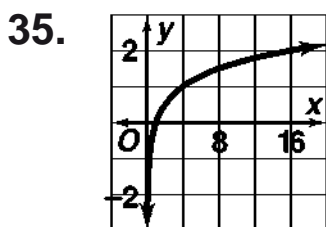
30.  $5.0 \times 10^{-7}$

31.  $1.3 \times 10^{-5}$

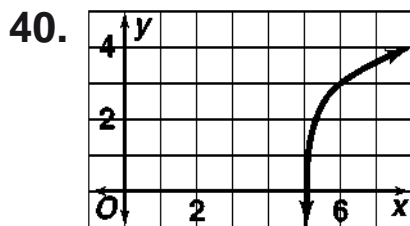
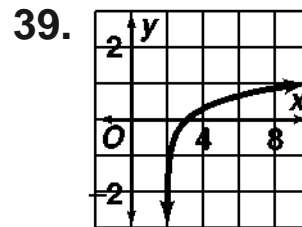
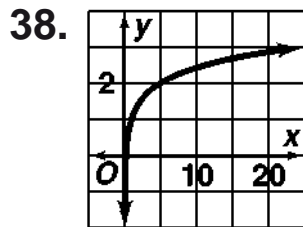
32.  $1.0 \times 10^{-4}$

33.  $4.0 \times 10^{-6}$

34.  $2.5 \times 10^{-4}$



## Answers for Lesson 8-3 Exercises (cont.)



41. 0.6990; 0

42. -4.2147; -5

43. -1.0969; -2

44. 2.3010; 2

45. -0.7782; -1

46. 1.2435; 1

47. 7.1139; 7

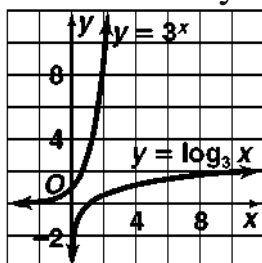
48. 0.5119; 0

49. apple juice: 3.5, acidic; buttermilk: 4.6, acidic; cream: 6.6, acidic; ketchup: 3.9, acidic; shrimp sauce: 7.1, basic; strained peas: 6, acidic

50. The error is in the second line. It should read  $3 = 27^x$ ; the correct answer is  $\frac{1}{3}$ .

51. First rewrite  $y = \log_1 x$  as  $1^y = x$ . For any real number  $y$ ,  $x = 1$ .

52. Answers may vary. Sample:  $y = \log_3 x$ ;  $y = 3^x$



## Answers for Lesson 8-3 Exercises (cont.)

53.  $128 = 2^7$

54.  $0.0001 = 10^{-4}$

55.  $16,807 = 7^5$

56.  $6 = 6^1$

57.  $1 = 4^0$

58.  $\frac{1}{9} = 3^{-2}$

59.  $\frac{1}{2} = 2^{-1}$

60.  $10 = 10^1$

61.  $8192 = 2^{13}$

62. a. buffalo bone: 9826 to 10,128 years old,  
bone fragment: 9776 to 10,180 years old,  
pottery shard: 0 to 183 years old,  
charcoal: 9718 to 10,242 years old,  
spear shaft: 9776 to 10,263 years old

- b. The pottery shard; answers may vary. Samples: the pottery may be from a later civilization, or the mass or the beta radiation emissions may have been measured incorrectly.

63. C

64.  $y = 4^x$

65.  $y = 0.5x$

66.  $y = 10x$

67.  $y = 2^{x-1}$

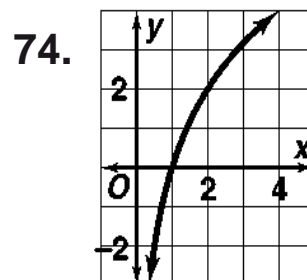
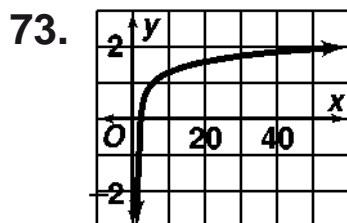
68.  $y = 10^x - 1$

69.  $y = 10^{x-1}$

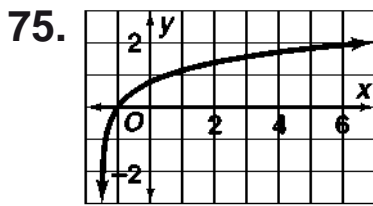
70.  $y = 10^x + 2$

71.  $y = 5^{\frac{x}{2}}$

72.  $y = a^x + b$



## Answers for Lesson 8-3 Exercises (cont.)



76. domain  $\{x|x > 0\}$ , range: all reals

77. domain  $\{x|x > 0\}$ , range: all reals

78. domain  $\{x|x > 3\}$ , range: all reals

79. domain  $\{x|x > 0\}$ , range: all reals

80. domain  $\{x|x > 2\}$ , range: all reals

81. domain  $\{x|x > -1\}$ , range: all reals

82. domain  $\{x|x > 0\}$ , range: all reals

83. domain  $\{x|x > 0\}$ , range: all reals

84. domain  $\{x|x > t\}$ , range: all reals

85. 100

86. 70

87. 60

88. 20

89. 10

90. a. II

b. III

c. I