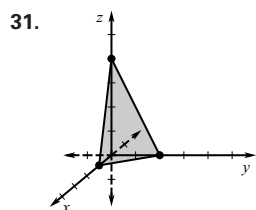


21.

23.  $y = -4x + 5$  25. (3, 5)

27. (1, 0, 3)

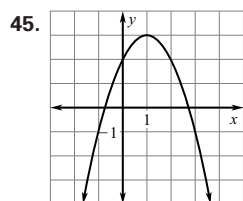


31.

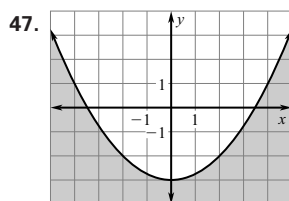
33.  $\begin{bmatrix} -11 & 8 \\ 1 & -2 \end{bmatrix}$  35.  $\begin{bmatrix} 17 & -7 & -27 \\ 3 & -9 & 69 \end{bmatrix}$

37. 3 39. -55 41.  $\begin{bmatrix} 7 & 2 \\ -4 & -1 \end{bmatrix}$

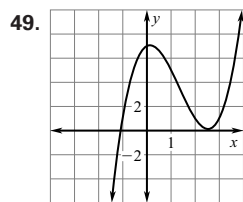
43. no inverse



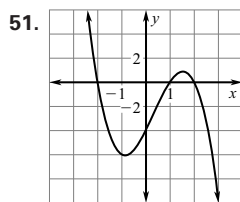
45.



47.



49.



51.

53.  $\pm\sqrt{13}$  55.  $\pm 8i$  57.  $-10 \leq x \leq 10$  59.  $\pm 2, \pm 1$

61.  $-2, \pm\frac{\sqrt{6}}{2}$  63.  $32 + 20i$  65.  $9 + 2i$  67.  $y = -(x+3)(x+2)$

69.  $36x^2y^6$  71.  $\frac{16}{25}$  73.  $x^4 - 5x^3 + 11x^2 - 27x + 36$

75.  $x^3 - 5x^2 + 18x - 36 + \frac{70}{x+2}$  77.  $\pm\sqrt{5}, \pm\sqrt{5}i$

79.  $f(x) = (x+4)(x+1)(x-1)$  81.  $r = \frac{I}{P}, 5.5\%$

83. 8 min 85. about 5.45 h

## CHAPTER 7

**SKILL REVIEW (p. 400)** 1.  $y = \frac{3x-12}{2}$  2.  $y = 10 - 2x$

3.  $y = \frac{x+1}{4}$  4.  $(x+7)(x+3)$  5.  $(x+9)(x-4)$

6.  $2(x-3)(x-5)$  7.  $a^4b^4c^8$  8.  $x^2$  9.  $\frac{x^4}{y^2}$  10.  $\frac{3x^3}{4y^6}$

11.  $5x^3 - 40x^2$  12.  $9y^2 - 12y + 4$  13.  $7x^2 - 5x + 4$

**7.1 PRACTICE (pp. 404–406)** 5. -7 7. 25 9. -1 11.  $\pm 10$

13.  $14^{1/4}$  15.  $5^{2/7}$  17.  $2^{11/8}$  19.  $\sqrt[4]{7}$  21.  $(\sqrt[5]{5})^2$  23.  $\pm 10$

25. -2 27. none 29. 4 31. -2 33. 1 35. 4 37. 0

39. 16 41. -7 43. 4 45. 0.56 47. 0.0019 49. 1.82

51. 0.087 53. 3 55. 0 57. -1.69 59. -9.24 61.  $\pm 1.40$

63.  $1247.73 \text{ ft}^3/\text{sec}$  65. 1.58 ft 67. about 37 species

**7.1 MIXED REVIEW (p. 406)** 73.  $x = 3, y = -4$  75.  $x = \frac{16}{5}$ ,

$y = \frac{3}{10}$  77.  $x = \frac{13}{11}, y = -\frac{13}{11}$  79.  $\frac{1}{x^{15}}$ ; power of a power and

negative exponent properties 81.  $\frac{5}{x^2}$ ; negative exponent and zero exponent properties

83.  $\frac{1}{x^4y^2}$ ; negative exponent and power of a quotient

properties 85.  $4x^2y$ ; product of powers and quotient of powers properties 87. -1, 2, 3, -5 89. 1,  $\pm 3i$

**7.2 PRACTICE (pp. 411–413)** 5. 3 7. 4 9.  $\frac{2}{3}$  11.  $3\sqrt[7]{8}$

13.  $x^2$  15.  $2a^3$  17.  $\frac{x^2}{y}$  19.  $-4a^{1/5}$  21.  $1333.78 \text{ cm}^2$

23.  $5^{1/3}$  25. 6 27.  $5^{1/3}$  29.  $\frac{8}{5}$  31.  $5^{3/4}$  33.  $\frac{1}{64,000}$

35. 2 37.  $6^7 = 279,936$  39.  $\frac{1}{2}$  41. 3 43.  $3\sqrt[5]{5}$  45.  $30\sqrt[4]{3}$

47.  $\frac{2\sqrt[3]{3}}{3}$  49.  $\sqrt[15]{2}$  51.  $-2\sqrt[7]{5}$  53.  $3\sqrt{10}$  55.  $9\sqrt[4]{11}$

57.  $y^{1/2}$  59.  $x^{5/4}$  61.  $\frac{x^3}{y}$  63.  $y^{5/3}$  65.  $\frac{x^{1/2}y}{z}$  67.  $\frac{1}{3y^2}$

69.  $xy^2z^2\sqrt[4]{10xz^2}$  71.  $y^2z^2\sqrt{2xz}$  73.  $\frac{x\sqrt[3]{y}}{y}$  75.  $x^{1/35}$

77.  $7x^{1/5}$  79.  $2x^3y^{1/3}$  81.  $(2x-1)y\sqrt[3]{3x^2}$  83.  $y^2$

85.  $\frac{1}{4\sqrt[7]{7}}$  87.  $\frac{x}{y^2}$  89.  $-2xy\sqrt{11}$  91.  $\frac{\sqrt{3}}{2}$  93. 0.45 mm

95. Higher notes have frequencies twice as high as lower notes of the same letter. 97.  $2^{2/3}$

**7.2 MIXED REVIEW (p. 414)** 101.  $\frac{441}{4}, \left(x - \frac{21}{2}\right)^2$

103. 24.5025,  $(x+4.95)^2$  105.  $\frac{1}{64}, \left(x - \frac{1}{8}\right)^2$

107.  $8x^3 + 9x^2 + 52x + 1$  109.  $4x^2 + 28x + 49$

111.  $(4x-1) - \frac{2}{x+1}$  113.  $x^3 + 3x^2 + 15x + 5 + \frac{45}{x-5}$

**QUIZ 1 (p. 414)** 1. 4 2.  $\frac{1}{8}$  3. -3 4. 16 5. 1.58 6.  $\pm 1.12$

7.  $\pm 1.90$  8. -4.47 9.  $4^{1/4}$  or  $2^{1/2}$  10.  $\frac{2\sqrt[4]{27}}{3}$  11. 4

12.  $3\sqrt{5}$  13. 7 14.  $3\sqrt[5]{8}$  15.  $x^{11/12}$  16.  $x^{1/2}$  17.  $x^{1/4}, y^{5/2}$

18.  $xy\sqrt[3]{5y^2}$  19.  $\frac{6\sqrt{xy}}{y^2}$  20.  $2xy^{1/2}$  21. about 30,000

horsepower 22. No; The surface area of the Labrador retriever is about 2.08 times the surface area of the Scottish terrier.

**7.3 PRACTICE (pp. 418–420)** 5.  $5x - 1$ ; all real numbers

7.  $4x^2 - 4x$ ; all real numbers 9.  $4x - 4$ ; all real numbers

11.  $g(f(x))$ ; The bonus is 0.02 times the amount over \$200,000 ( $x - 200,000$ ), so calculate amount first and then take 2%.

13.  $2x^2 - 5x + 4$ ; all real numbers 15.  $2x^2 - 8$ ; all real numbers

17.  $5x - 12$ ; all real numbers 19. 0; all real numbers 21.  $6x^{7/6}$ ; nonnegative real numbers

23.  $9x$ ; nonnegative real numbers 25.  $\frac{3}{2x^{1/6}}$ ; positive real

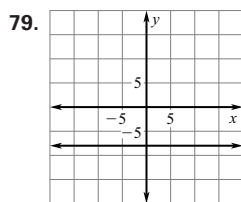
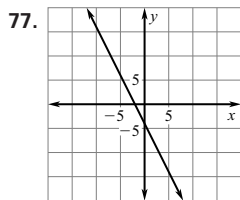
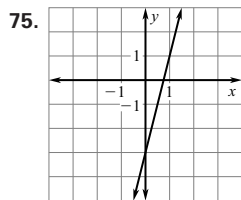
numbers 27. 1; positive real numbers 29.  $2^{3/2}x^{-15/4}$ ; positive real numbers

31.  $x^{9/16}$ ; nonnegative real numbers 33.  $9x - 4$ ; all real numbers 35.  $\frac{10x}{x+4}$ ; all real numbers

except -4 37.  $10x + 4$ ; all real numbers 39.  $x + 8$ ; all real numbers 41.  $x^{1/2}$ ; nonnegative real numbers 43.  $x^2 - x - 8$ ; all real numbers 45.  $4x^3 - 16x^2$ ; all real numbers 47.  $x - 5$ ; all real numbers except 0 49.  $x^4 - 6x^2 + 10$ ; all real numbers 51.  $81x - 20$ ; all real numbers 53.  $r(w) = 220w^{-0.266}$ ; about 134 breaths per minute; about 18 breaths per minute; about 11 breaths per minute

**7.3 MIXED REVIEW (p. 420)**

69.  $y = \frac{-2x - 8}{3}$  71.  $y = \frac{5}{x}$  73.  $y = \frac{c - ax}{b}$



81. 3 83. -6, -2

**7.4 PRACTICE (pp. 426–428)**

5. 

x	2	1	0	1	2
y	-4	-2	0	2	4

7.  $y = \frac{x + 1}{2}$

9. Both compositions equal x.

11.  $\frac{\sqrt[4]{27x}}{3}$  13. No; horizontal lines, such as  $y = 0$ , cross the graph more than once. 15. 

x	0	3	-2	2	-1
y	1	-2	4	2	-2

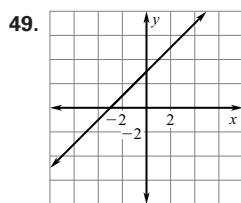
17.  $y = \frac{x + 3}{3}$

19.  $y = -\frac{5}{4}(x - 11)$  21.  $y = \frac{-x + 7}{12}$  23.  $y = \frac{x + 13}{8}$

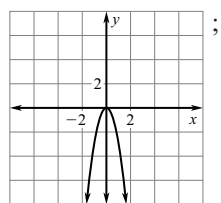
33. A 35. B 37.  $f^{-1}(x) = \sqrt[6]{-x}$  39.  $f^{-1}(x) = 2\sqrt[5]{x}$

41.  $f^{-1}(x) = -\frac{2}{3}\sqrt{-x}$  43.  $f^{-1}(x) = \sqrt[5]{-\frac{1}{2}x + \frac{1}{6}}$

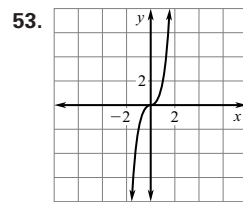
45.  $f^{-1}(x) = \sqrt[3]{\frac{5}{3}x + 15}$  47.  $f^{-1}(x) = \sqrt[5]{6x - 4}$



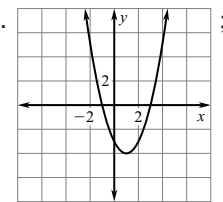
Yes, inverse is a function.



No, inverse is not a function.



Yes, inverse is a function.

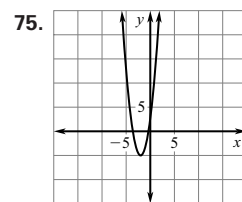
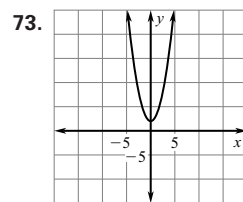
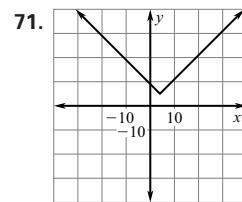
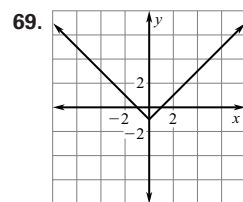


No, inverse is not a function.

57.  $D_{US} = 0.65677D_C$  59.  $a = 200 - 1.11h$ ; 170

61.  $l = \sqrt[3]{106723.59w}$ ; 41.69 cm

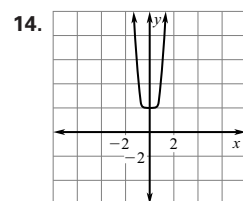
**7.4 MIXED REVIEW (p. 429)**



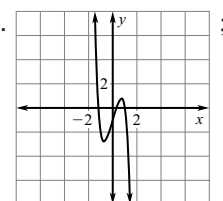
77. 2 79.  $\frac{1}{5y}$  81.  $5\sqrt[7]{5}$  83. \$.65

**QUIZ 2 (p. 429)**

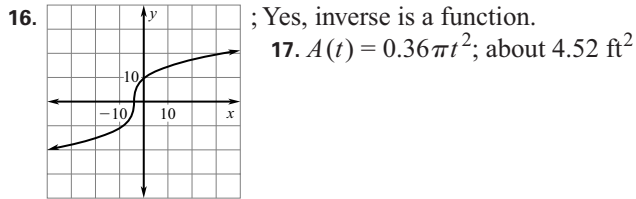
- $f(x) + g(x) = 6x^2 + x^{1/2}$ ; nonnegative real numbers
- $f(x) - g(x) = 6x^2 - 3x^{1/2}$ ; nonnegative real numbers
- $f(x) \cdot g(x) = 2x(6x^{3/2} - 1)$ ; nonnegative real numbers
- $\frac{f(x)}{g(x)} = 3x^{3/2} - \frac{1}{2}$ ; positive real numbers
- $f(g(x)) = \frac{3}{x - 8}$ ; real numbers except 8
- $g(f(x)) = \frac{3}{x} - 8$ ; real numbers except 0 7.  $f(f(x)) = x$ ; real numbers except 0 8.  $g(g(x)) = x - 16$ ; all real numbers
- Both compositions equal x. 10. Both compositions equal x.
- $f^{-1}(x) = x - 8$  12.  $f^{-1}(x) = \frac{-\sqrt[4]{8x}}{2}$  13.  $f^{-1}(x) = \sqrt[5]{6 - x}$



No, inverse is not a function.

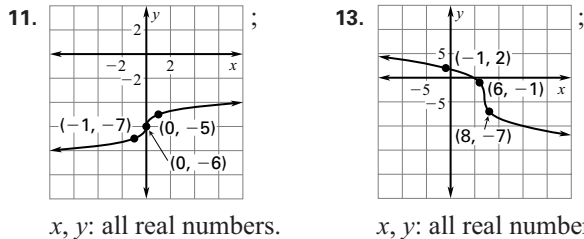
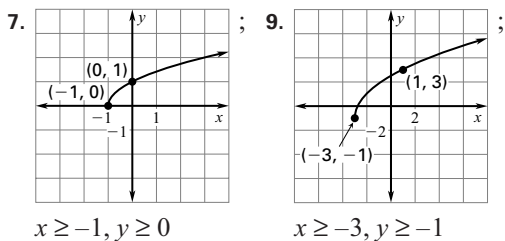


No, inverse is not a function.

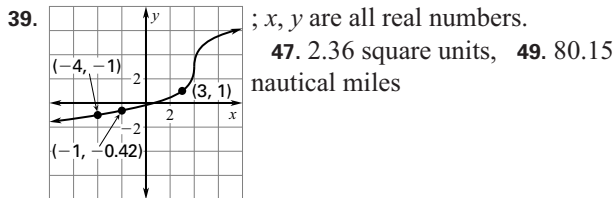
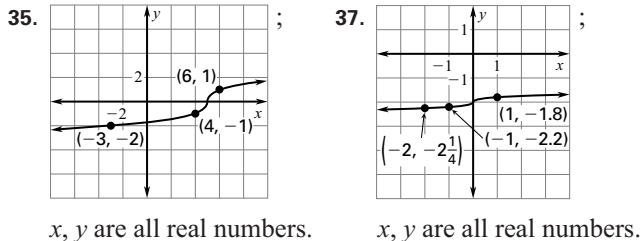
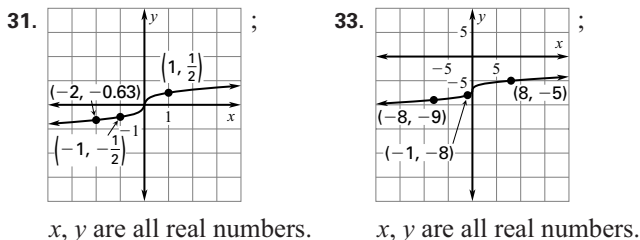
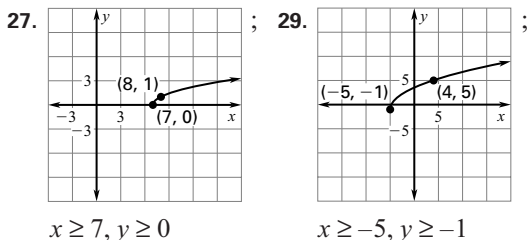
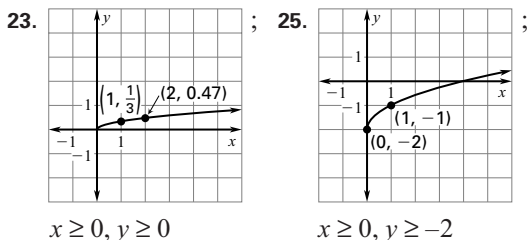


**TECHNOLOGY ACTIVITY 7.4** (p. 430) 1. Yes; the inverse passes the vertical line test. 3. Yes; the inverse passes the vertical line test. 5. No; the inverse does not pass the vertical line test. 7. Yes; the inverse passes the vertical line test. 9. Yes; the inverse passes the vertical line test. 11. No; the inverse does not pass the vertical line test.

**7.5 PRACTICE** (pp. 434–436) 5. Shift the graph 10 units down.



15. Shift graph 14 units left. 17. Shift graph 10 units down.  
 19. B 21. C



**7.5 MIXED REVIEW** (p. 436) 55.  $\pm\sqrt{10} - 7$  57.  $\pm 6$

59.  $\frac{\pm\sqrt{33}}{2} + \frac{1}{4}$  61.  $x^2 - 18xy + 81y^2$  63.  $9x^2 - 24xy^4 + 16y^8$  65.  $1 + 4x^2 + 4x^4$  67.  $f(g(x)) = 2x - 5$ ;  $g(f(x)) = 2x - 2$  69.  $f(g(x)) = 9x^2 - 18x + 16$ ;  $g(f(x)) = 3x^2 + 18$

**7.6 PRACTICE** (pp. 441–443) 5. 1 7. 8 9. -5 11.  $\frac{64}{3}$

13. 2, 3 15. no solution 17. yes 19. yes 21. no 23. 4

25. 27 27. 81 29.  $\frac{11}{2}$  31.  $\frac{406}{81}$  33. 216 35. 200

37. no solution 39.  $\frac{12}{7}$  41. 36 43.  $-\frac{2}{3}$  45. 1, 3 47. 5

49.  $-\frac{1}{6}$  51. no solution 53. 5 55. -18.96296 57. 0.10345

59. 11.099 61. no solution 63. 0.146 in. 65. 1991

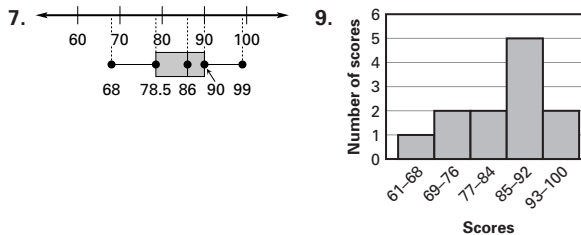
67. 34.078 mi/h 69. 4.90

**7.6 MIXED REVIEW** (p. 444) 81. 20 83. -78 85. 19

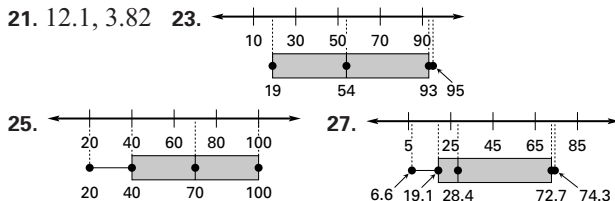
87. -0.95; no local maximums or minimums

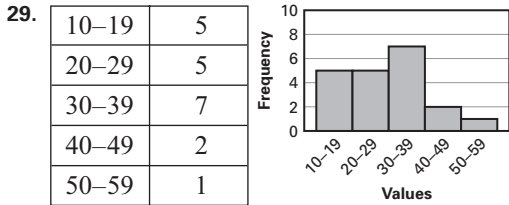
89. 0,  $\pm 1.41$ ; (-0.914, 4.08); (0.914, -4.08)

**7.7 PRACTICE** (pp. 449–451) 5. 31

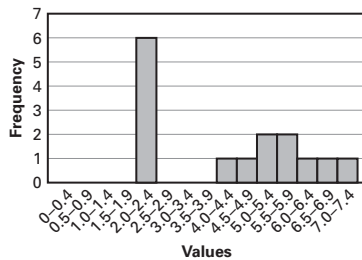


11. 49.57, 47, 47 13. about 249, 230, 230 15. 0.356; 0.3; 0, 0.5 (two modes) 17. 8, 2.73 19. 417, 143



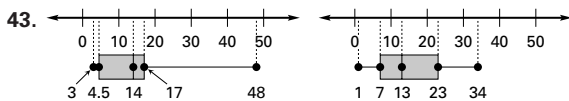
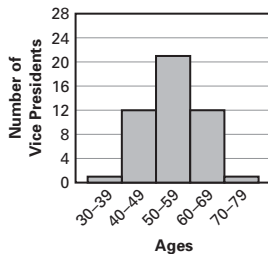
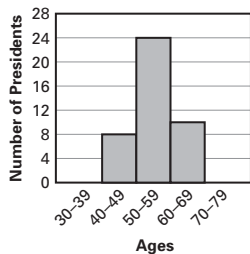


0-0.4	0	4.0-4.4	1
0.5-0.9	0	4.5-4.9	1
1.0-1.4	0	5.0-5.4	2
1.5-1.9	0	5.5-5.9	2
2.0-2.4	6	6.0-6.4	1
2.5-2.9	0	6.5-6.9	1
3.0-3.4	0	7.0-7.4	1
3.5-3.9	0		



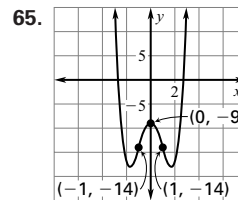
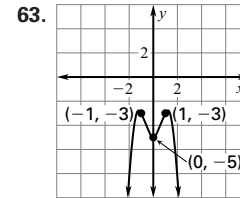
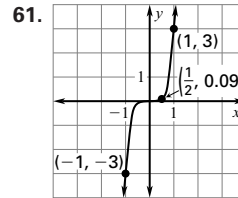
33. machine 1: 2.59, 2.59, none; machine 2: 2.59, 2.59, none  
 37. \$645,000; \$213,243.66 39. The mode is the most appropriate measure because it would indicate that most people have a positive opinion on the issue. Because the categories are not part of an ordered scale, means and medians are not meaningful.

Age	Pres	VP
30-39	0	1
40-49	8	12
50-59	24	21
60-69	10	12
70-79	0	1

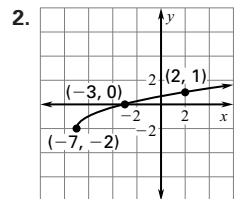
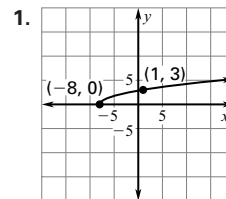


45. *Sample answer:* You cannot conclude that one conference consistently has larger (or smaller) margins of victory than the other.

**7.7 MIXED REVIEW (p. 452)** 51. 24 53. -326  
 55. 2187; product of powers 57.  $\frac{1}{4}$ ; product of powers, negative exponent 59.  $\frac{1}{100}$ ; zero exponent; negative exponent

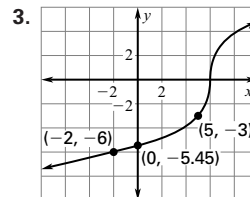


**QUIZ 3 (p. 452)**



$x \geq -8, y \geq 0$

$x \geq -7, y \geq -2$



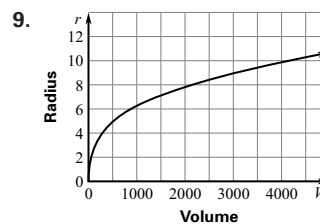
;  $x$  and  $y$  are all real numbers.

4. 312.5

5. 6 (-1 is an extraneous solution.)

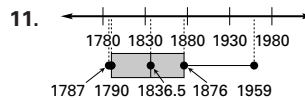
6. 0 7. 4.4, 5.5, 6, 9, 2.8

8. 23.9, 21, none, 31, 9.99

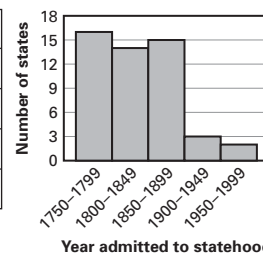


; 4196 cubic units

10. 228.24 million km



1750-1799	16
1800-1849	14
1850-1899	15
1900-1949	3
1950-1999	2



**TECHNOLOGY ACTIVITY 7.7 (p. 454)**

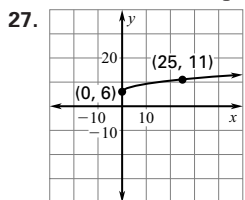
1. 17.3, 17.5, 22, 5.71 5. The second restaurant's

sandwiches have fewer calories than the sandwiches at the first restaurant. The histograms show that half of the sandwiches in the 1st restaurant contain over 500 calories while only 1 out of 10 sandwiches in the second restaurant contain over 500 calories.

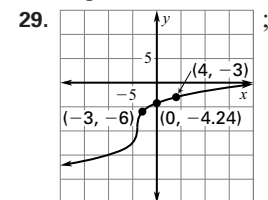
**CHAPTER 7 REVIEW** (pp. 456–458) 1. 2 3.  $\frac{1}{243}$  5. -2

7. -1 9.  $\frac{1}{25}$  11.  $\frac{\sqrt[3]{2}}{5}$  13.  $3x^{1/4}$  15.  $xyz\sqrt[6]{6yz^4}$  17.  $3x - 6$

17.  $3x - 6$  19.  $2x^2 - 8x + 8$  21.  $2x - 8$  23.  $f^{-1}(x) = (-x)^{1/4}$ ,  $x \leq 0$  25. Both compositions equal  $x$ .



$x \geq 0$ ;  $y \geq 6$



$x$  and  $y$  are all real numbers.

31. -3 33. 40.9, 42, 51, 42, 11.3

**CHAPTER 8**

**SKILL REVIEW** (p. 464) 1.  $\frac{1}{64}$  2.  $\frac{1}{9}$  3. 1 4. -25 5.  $\frac{2}{5}$

6.  $f(x) \rightarrow -\infty$  as  $x \rightarrow -\infty$ ;  $f(x) \rightarrow +\infty$  as  $x \rightarrow +\infty$

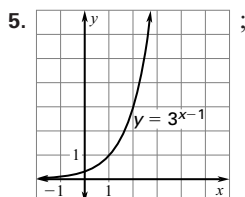
7.  $f(x) \rightarrow -\infty$  as  $x \rightarrow -\infty$ ;  $f(x) \rightarrow -\infty$  as  $x \rightarrow +\infty$

8.  $f(x) \rightarrow +\infty$  as  $x \rightarrow -\infty$ ;  $f(x) \rightarrow +\infty$  as  $x \rightarrow +\infty$

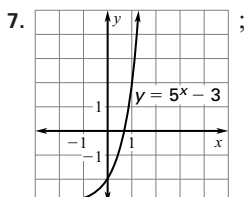
9.  $f(x) \rightarrow +\infty$  as  $x \rightarrow -\infty$ ;  $f(x) \rightarrow -\infty$  as  $x \rightarrow +\infty$

10. Sample answer:  $y = 0.403x + 2.013$

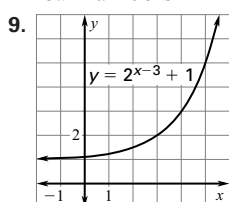
**8.1 PRACTICE** (pp. 469–471)



domain: all real numbers;  
range: all positive real numbers



domain: all real numbers;  
range:  $y > -3$

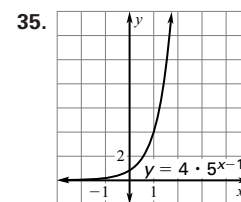
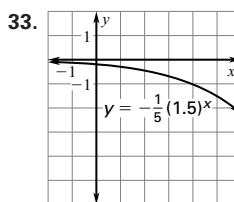
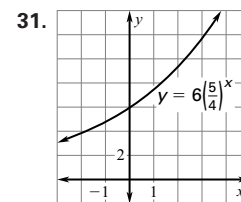
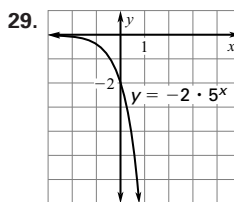
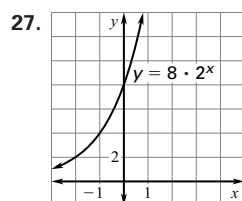
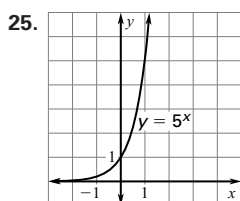


domain: all real numbers;  
range:  $y > 1$

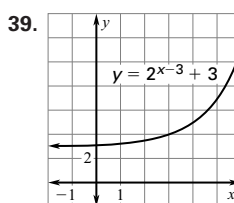
11. 6191; 4% 13. 1; the  $x$ -axis

15. 4; the  $x$ -axis 17.  $\frac{3}{2}$ ; the  $x$ -axis

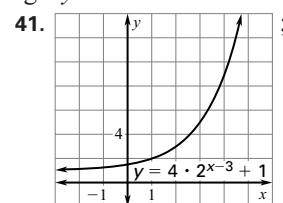
19. C 21. B 23. F



domain: all real numbers;  
range:  $y > 0$



domain: all real numbers;  
range:  $y > 3$

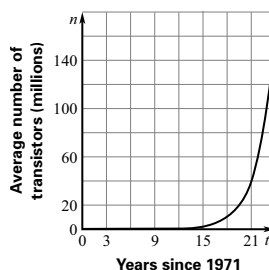


domain: all real numbers;  
range:  $y > 1$

43. 2.91 trillion  $\text{ft}^3$ ; 1.07; 7%

45. 8.03 trillion  $\text{ft}^3$

47.



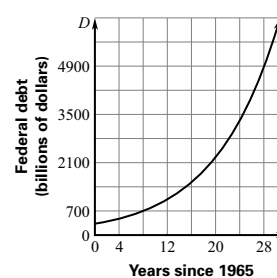
49.  $E = 5(1.59)^t$ ;

about 32 gigawatt-hours

51.  $t \approx 5.98$ ;

near the end of 1985

53. **Federal Debt**



55. a. \$2600 b. \$3041.63

c. ANS + ANS  $\times 0.01$ ;  
push “ENTER” four  
times. d. \$3050.48;  
this is \$8.85 more.

57.  $A = 400(1.005)^{4t}$   
where  $t$  is the number of  
years 59. \$1724.48

61. \$1799.78 63.  
\$2402.21

**8.1 MIXED REVIEW** (p. 472) 71.  $\frac{1}{8}$  73.  $\frac{1}{32}$  75.  $\frac{343}{1728}$

77.  $\frac{16}{25}$  79. 2.18 81. -3 83. 3.16 85. 3 87. 3.04 89. 1.73

91.  $4x^2 + 6x - 11$ ; all real numbers 93.  $24x^3 - 44x^2$ ;  
all real numbers 95.  $24x^2 - 11$ ; all real numbers

97.  $\frac{6x - 11}{4x^2}$ ; all nonzero real numbers

99.  $36x - 77$ ; all real numbers