Answers for 5.2

For use with pages 341–344

5.2 Skill Practice

1. degree: 4, type: quartic, leading coefficient: -5, constant term: 6

2. The behavior of the function as x approaches $+\infty$ and as x approaches $-\infty$.

3. polynomial function; $f(x) = -x^2 + 8$, degree: 2, type: quadratic, leading coefficient: -1

4. polynomial function; $f(x) = 8x^4 + 6x - 3$, degree: 4, type: quartic, leading coefficient: 8

5. polynomial function; $g(x) = \pi x^4 + \sqrt{6}$, degree: 4, type: quartic, leading coefficient: π

6. not a polynomial function

7. polynomial function; $h(x) = -\frac{5}{2}x^3 + 3x - 10$, degree: 3, type: cubic, leading coefficient: $-\frac{5}{2}$

8. not a polynomial function

9. -32 **10.** 76

11. 378 **12.** 645

13. 182 **14.** -147

15. 109 **16.** 75 **17.** 149

18. -491 **19.** -11 **20.** -1755

21. -78 **22.** 248

23. The coefficient of x^3 was left out;

-2	-4	0	9	-21	7
		8	-16	14	14
	-4	8	-7	-7	21

24. A

25. degree: even, leading coefficient: positive

26. degree: odd, leading coefficient: negative

27. degree: even, leading coefficient: negative

28. $+\infty, +\infty$ **29.** $-\infty, -\infty$

30. $+\infty, -\infty$ **31.** $-\infty, +\infty$

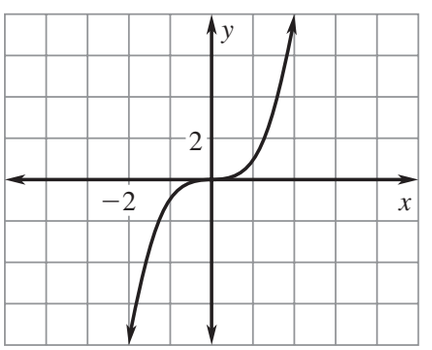
32. $+\infty, +\infty$ **33.** $+\infty, -\infty$

34. $-\infty, +\infty$ **35.** $+\infty, +\infty$

36. $+\infty, -\infty$

37. *Sample answer:* $f(x) = -x^5 - 2x^4 + 1$

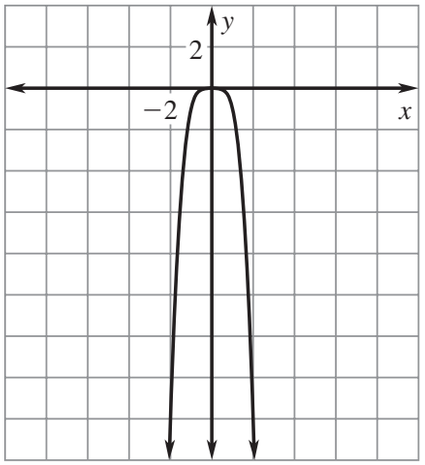
38.



Answers for 5.2 *continued*

For use with pages 341–344

39.



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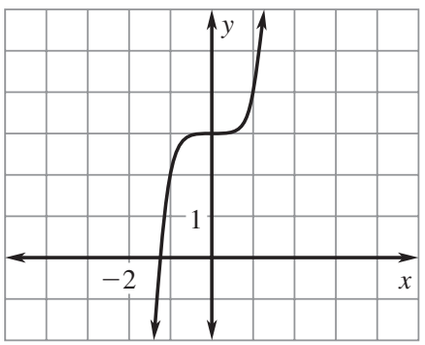

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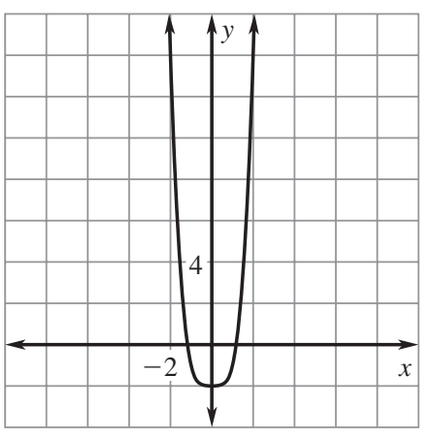

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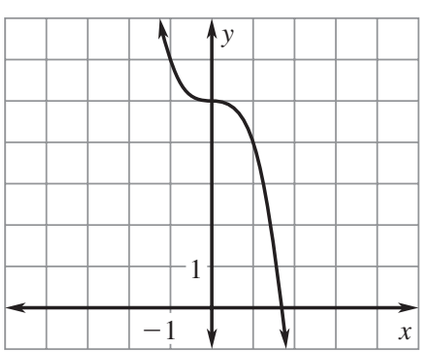

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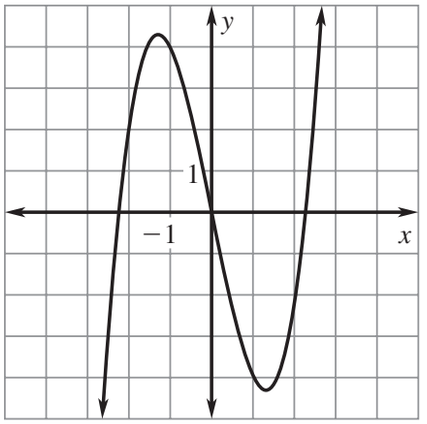

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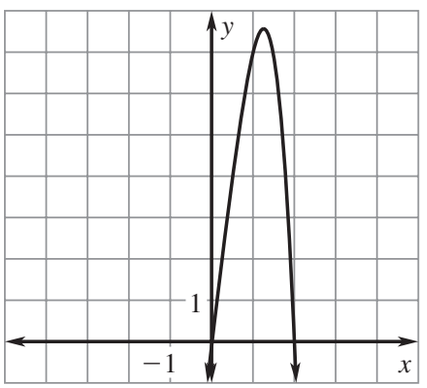

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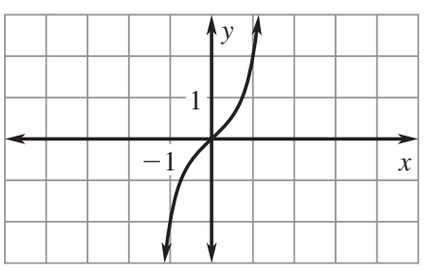

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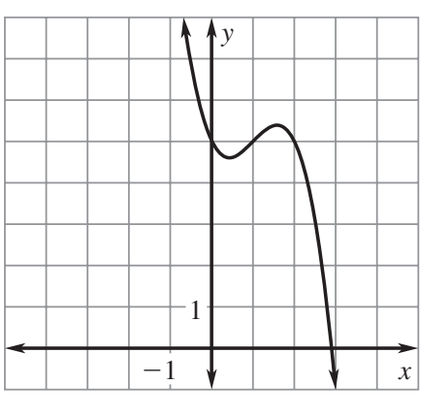

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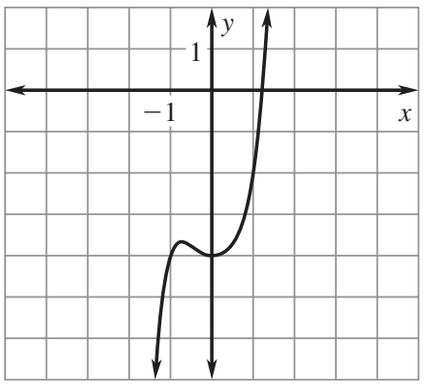

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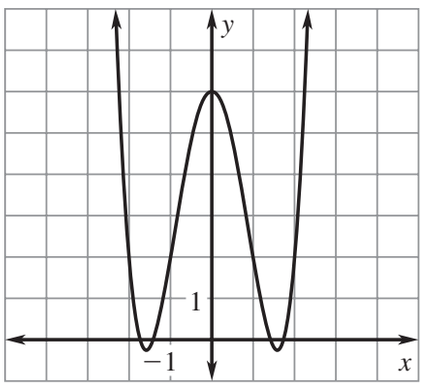

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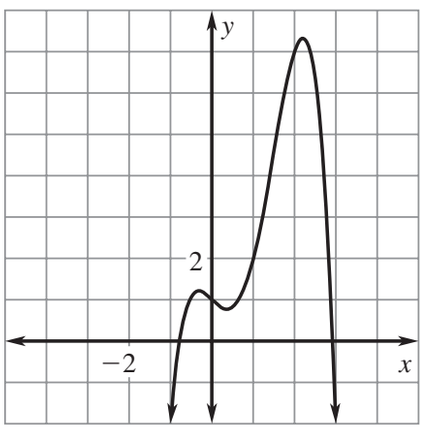


50. B

51. $g(x) \to -\infty$ as $x \to -\infty$ and $g(x) \to +\infty$ as $x \to +\infty$

52. −480. *Sample answer:* I used the standard form of a cubic equation, $f(x) = ax^3 + bx^2 + cx + d$, and substituted 2 for a and −5 for d. Then I put in 1 for x and set $f(x)$ equal to 0, and 2 for x and set $f(x)$ equal to 3. This left me with two equations with two variables, b and c. I used substitution to solve for the variables, which gave me the function $f(x) = 2x^3 - 7x^2 + 10x - 5$. Finally, I substituted −5 for x to get −480.

53. a.

x	$f(x)$	$g(x)$	$\frac{f(x)}{g(x)}$
10	1000	840	$\frac{25}{21}$
20	8000	7280	$\frac{100}{91}$
50	125,000	120,000	$\frac{25}{24}$
100	1,000,000	980,400	$\frac{2500}{2451}$
200	8,000,000	7,920,800	$\frac{10,000}{9901}$

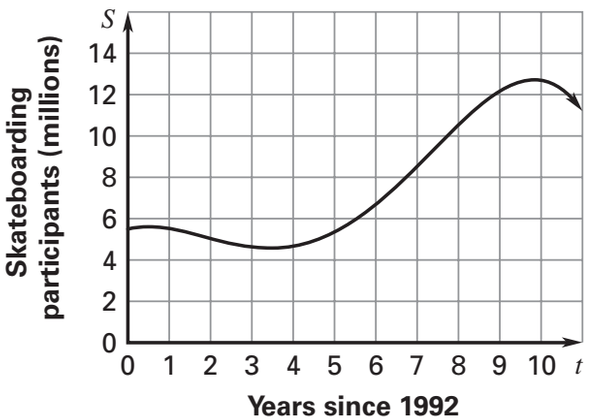
b. 1

c. $\infty \div \infty = 1$

5.2 Problem Solving

54. about 11 carats

55.



1998

56. a. 3, cubic

b.

t	0	1	2
M	21,600	21,264	21,396

t	3	4	5
M	21,930	22,800	23,940

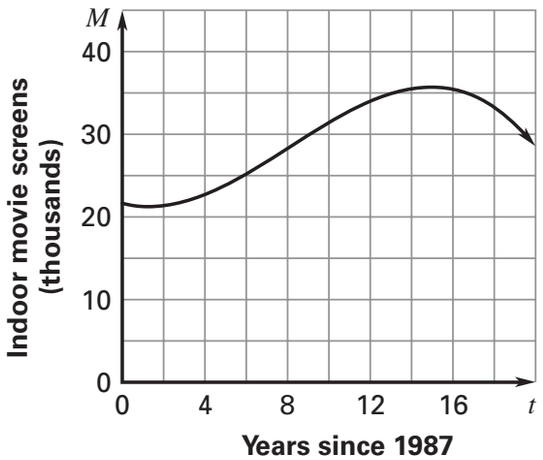
t	6	7	8
M	25,284	26,766	28,320

t	9	10	11
M	29,880	31,380	32,754

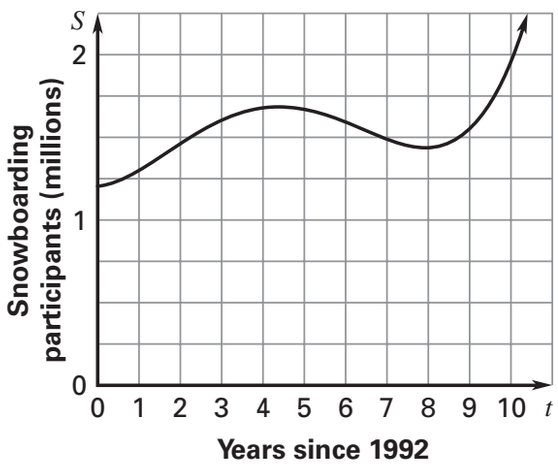
t	12	13	14
M	33,936	34,860	35,460

t	15	16
M	35,670	35,424

c.



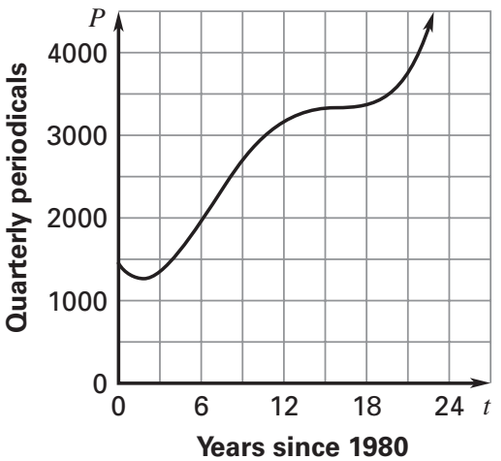
57.



2002

58. a. $P \to +\infty$ as $t \to -\infty$ and $P \to +\infty$ as $t \to +\infty$

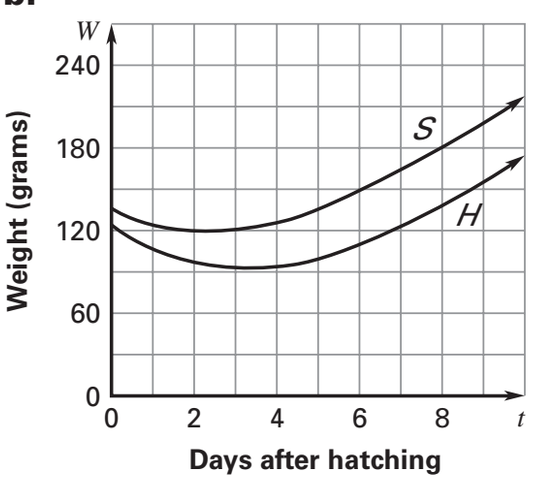
b.



c. 15,700 periodicals; no; *Sample answer:* It seems unreasonable for the number of periodicals to go from 4100 in 2002 to 15,700 in 2010.

59. a. 35.625 g

b.



c. Sarus. *Sample answer:* Substituting 3 into each equation gives the Sarus chick weighing about 120 grams and the Hooded chick weighing about 92 grams. The weight of the Sarus is closer to 130 than the weight of the Hooded chick.

60. a. $y = 0.0109x^3$

b. Stretch it by a factor of about 36.

5.2 Mixed Review

61. 0.5

62. 3.2

63. $-1 < y < 1$

64. 6, 8

65. $-3.5, -0.25$

66. $-9 < z < 4$

67. $y = 3x; -1$

68. $y = -7x; \frac{3}{7}$

69. $y = -0.4x; 7.5$

70. $y = 0.25x; -12$

71. $y = \frac{7}{9}x; -3\frac{6}{7}$

72. $y = -0.6x; 5$

73. $y = x^2 - 4x - 21$

74. $y = 8x^2 - 16x - 64$

75. $y = -3x^2 + 30x - 100$

76. $y = 2.5x^2 - 30x + 99.3$

77. $y = \frac{1}{2}x^2 - 4x + 8$

78. $y = -\frac{5}{3}x^2 - \frac{65}{3}x - 60$