56. not a real number **57.** 5 **58.** $3\sqrt[3]{3}$ **59.** $y\sqrt[3]{y^2}$ **60.** $2\sqrt[4]{5}$ **61.** $13\sqrt[3]{2}$ **62.** $x\sqrt[4]{2}$ **63.** 4 **64.** $\frac{1}{5}$ **65.** 5 **66.** $\frac{1}{3}$

67. 16 **68.** $\frac{1}{81}$ **69.** $20x^{11/12}$ **70.** $3x^{1/4}$ **71.** $25x^4$ **72.** $\sqrt{y}$ **73.** $8x^3 + 10x^2 - 20x - 4$; degree 3 **74.** $8x^4 - 5x^3 + 6$; degree 4

75. $12x^3 + x^2 - 21x + 10$ **76.** $6x^2 - 7x - 5$ **77.** $16x^2 - 25$ **78.** $4x^2 + 20x + 25$ **79.** $9x^2 - 24x + 16$ **80.** $8x^3 + 12x^2 + 6x + 1$

81. $125x^3 - 150x^2 + 60x - 8$ **82.** $-x^2 - 17xy - 3y^2$; degree 2 **83.** $24x^3y^2 + x^2y - 12x^2 + 4$; degree 5 **84.** $3x^2 + 16xy - 35y^2$

85. $9x^2 - 30xy + 25y^2$ **86.** $9x^4 + 12x^2y + 4y^2$ **87.** $49x^2 - 16y^2$ **88.** $a^3 - b^3$ **89.** $3x^2(5x + 1)$ **90.** $(x - 4)(x - 7)$

91. $(3x + 1)(5x - 2)$ **92.** $(8 - x)(8 + x)$ **93.** prime **94.** $3x^2(x - 5)(x + 2)$ **95.** $4x^3(5x^4 - 9)$ **96.** $(x + 3)(x - 3)^2$ **97.** $(4x - 5)^2$

98. $(x^2 + 4)(x + 2)(x - 2)$ **99.** $(y - 2)(y^2 + 2y + 4)$ **100.** $(x + 4)(x^2 - 4x + 16)$ **101.** $3x^2(x - 2)(x + 2)$ **102.** $(3x - 5)(9x^2 + 15x + 25)$

103. $x(x - 1)(x + 1)(x^2 + 1)$ **104.** $(x^2 - 2)(x + 5)$ **105.** $(x + 9 + y)(x + 9 - y)$ **106.** $\frac{16(1 + 2x)}{x^{3/4}}$

107. $(x + 2)(x - 2)(x^2 + 3)^{1/2}(-x^4 + x^2 + 13)$ **108.** $\frac{6(2x + 1)}{x^{3/2}}$ **109.** $x^2, x \neq -2$ **110.** $\frac{x - 3}{x - 6}, x \neq -6, 6$ **111.** $\frac{x}{x + 2}, x \neq -2$

112. $\frac{(x + 3)^3}{(x - 2)^2(x + 2)}, x \neq 2, -2$ **113.** $\frac{2}{x(x + 1)}, x \neq 0, 1, -1, -\frac{1}{3}$ **114.** $\frac{x + 3}{x - 4}, x \neq -3, 4, 2, 8$ **115.** $\frac{1}{x - 3}, x \neq 3, -3$

116. $\frac{4x(x - 1)}{(x + 2)(x - 2)}, x \neq 2, -2$ **117.** $\frac{2x^2 - 3}{(x - 3)(x + 3)(x - 2)}, x \neq 3, -3, 2$ **118.** $\frac{11x^2 - x - 11}{(2x - 1)(x + 3)(3x + 2)}, x \neq \frac{1}{2}, -3, -\frac{2}{3}$ **119.** $\frac{3}{x}, x \neq 0, 2$

120. $\frac{3x}{x - 4}, x \neq 0, 4, -4$ **121.** $\frac{3x + 8}{3x + 10}, x \neq -3, -\frac{10}{3}$

Chapter P Test

1. $6x^2 - 27x$ **2.** $-6x + 17$ **3.** $\{5\}$ **4.** $\{1, 2, 5, a\}$ **5.** $6x^2y^3 + 4xy + 2y^2$ **6.** $\frac{5y^8}{x^6}$ **7.** $3r\sqrt{2}$ **8.** $11\sqrt{2}$ **9.** $\frac{3(5 - \sqrt{2})}{23}$

10. $2x\sqrt[3]{2x}$ **11.** $\frac{x + 3}{x - 2}, x \neq 2, 1$ **12.** 2.5×10^1 **13.** $2x^3 - 13x^2 + 26x - 15$ **14.** $25x^2 + 30xy + 9y^2$ **15.** $\frac{2(x + 3)}{x + 1}, x \neq 3, -1, -4, -3$

16. $\frac{x^2 + 2x + 15}{(x + 3)(x - 3)}, x \neq 3, -3$ **17.** $\frac{11}{(x - 3)(x - 4)}, x \neq 3, 4$ **18.** $\frac{3 - x}{3}, x \neq 0$ **19.** $(x - 3)(x - 6)$ **20.** $(x^2 + 3)(x + 2)$

21. $(5x - 3)(5x + 3)$ **22.** $(6x - 7)^2$ **23.** $(y - 5)(y^2 + 5y + 25)$ **24.** $(x + 5 + 3y)(x + 5 - 3y)$ **25.** $\frac{2x + 3}{(x + 3)^{3/5}}$

26. $-7, -\frac{4}{5}, 0, 0.25, \sqrt{4}, \frac{22}{7}$ **27.** commutative property of addition **28.** distributive property of multiplication over addition **29.** 7.6×10^{-4}

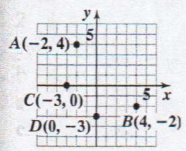
30. $\frac{1}{243}$ **31.** 1.32×10^{10} **32. a.** 43.08%;overestimates by 0.08% **b.** $R = \frac{-0.28n + 47}{0.28n + 53}$ **c.** $\frac{2}{3}$;Three women will receive bachelor's degrees for every two men.; It describes the projections exactly.

CHAPTER 1

Section 1.1

Check Point Exercises

1.



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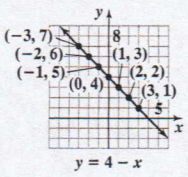

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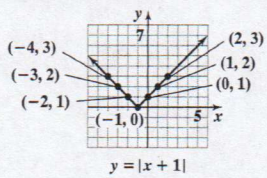
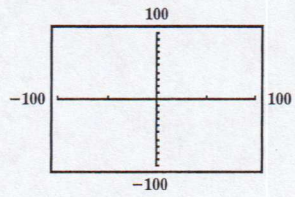


4. minimum x-value: -100; maximum x-value: 100; distance between tick marks on x-axis: 50; minimum y-value: -100; maximum y-value: 100; distance between tick marks on y-axis: 10

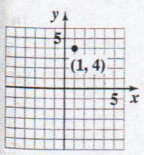


5. a. x-intercept: -3; y-intercept: 5
b. no x-intercept; y-intercept: 4
c. x-intercept: 0; y-intercept: 0

6. a. 65% **b.** 60% **c.** overestimates by 5%

Exercise Set 1.1

1.



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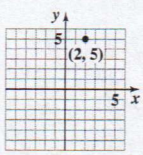

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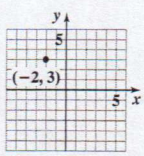
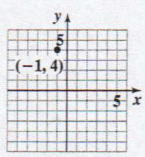


4.



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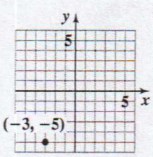

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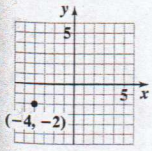

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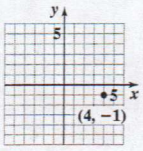

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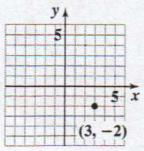

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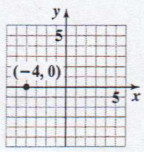

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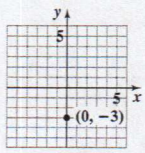

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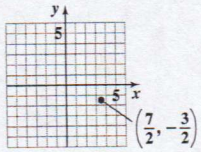

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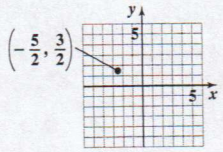

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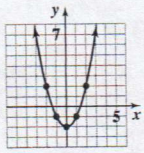
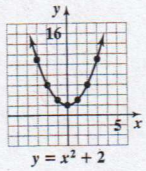


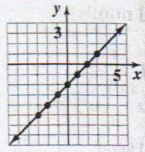
$y = x^2 - 2$

14.



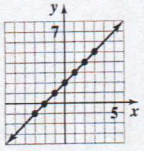
$y = x^2 + 2$

15.



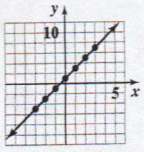
$y = x - 2$

16.



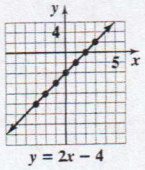
$y = x + 2$

17.



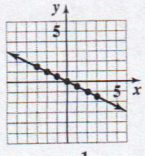
$y = 2x + 1$

18.



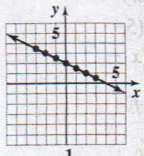
$y = 2x - 4$

19.



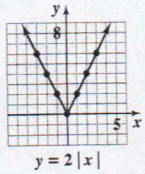
$y = -\frac{1}{2}x$

20.



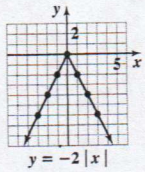
$y = -\frac{1}{2}x + 2$

21.



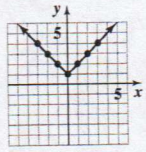
$y = 2|x|$

22.



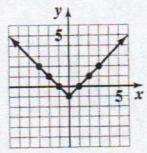
$y = -2|x|$

23.



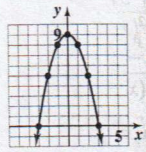
$y = |x| + 1$

24.



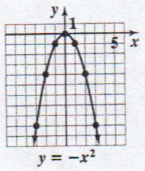
$y = |x| - 1$

25.



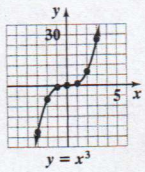
$y = 9 - x^2$

26.



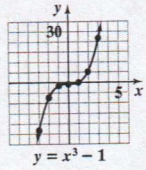
$y = -x^2$

27.



$y = x^3$

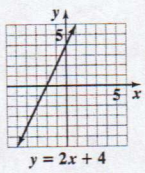
28.



$y = x^3 - 1$

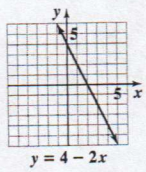
29. c **30.** d **31.** b **32.** a
33. c **34.** b **35.** no **36.** yes
37. (2, 0) **38.** (0, 2) **39.** (−2, 4) and (1, 1)
40. −2 and 1 **41. a.** 2 **b.** −4
42. a. 1 **b.** 2 **43. a.** 1, −2 **b.** 2
44. a. 1, −1 **b.** 1 **45. a.** −1 **b.** none
46. a. none **b.** 2

47. $y = 2x + 4$



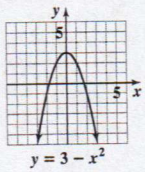
$y = 2x + 4$

48. $y = 4 - 2x$



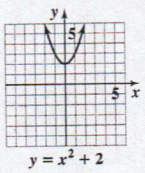
$y = 4 - 2x$

49. $y = 3 - x^2$



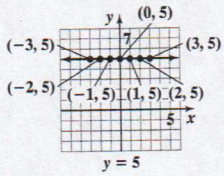
$y = 3 - x^2$

50. $y = x^2 + 2$



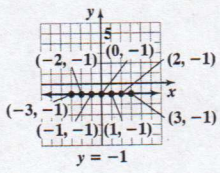
$y = x^2 + 2$

51.



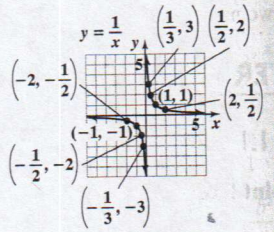
$y = 5$

52.

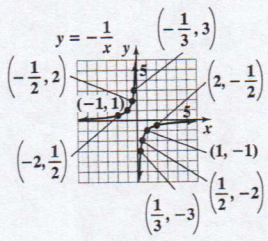


$y = -1$

53.



54.



55. a. 20% **b.** 18%; underestimates by 2% **c.** Answers will vary.; approximately 45%
d. 44%; It's less than the estimate. **e.** 1990; 14%
56. a. 50% **b.** 50%; The model provides an exact description of the data.
c. Answers will vary.; approximately 22% **d.** 20%; It's less than the estimate. **e.** 1980; 72%
57. 8; 1 **58.** 65; 8 **59.** about 1.9 **60.** about 1.1 **67.** makes sense **68.** does not make sense
69. does not make sense **70.** does not make sense **71.** false **72.** false **73.** true
74. false **75.** a **76.** d **77.** b **78.** c **79.** b **80.** a **81.** c **82.** b **83.** true **84.** $-x + 10$ **85.** $9x - 24$

Section 1.2

Check Point Exercises

1. {6} **2.** {5} **3.** {1} **4.** {3} **5.** ∅ **6.** 11 **7.** ∅; inconsistent equation **8.** 3.7; by the point (3.7, 10)

Exercise Set 1.2

1. {11} **2.** {11} **3.** {7} **4.** $\left\{\frac{25}{3}\right\}$ **5.** {13} **6.** {8} **7.** {2} **8.** {−19} **9.** {9} **10.** {−1} **11.** {−5} **12.** {−4}
13. {6} **14.** {3} **15.** {−2} **16.** $\left\{-\frac{81}{11}\right\}$ **17.** {12} **18.** {30} **19.** {24} **20.** {15} **21.** {−15} **22.** {−20} **23.** {5}
24. {7} **25.** $\left\{\frac{33}{2}\right\}$ **26.** {1} **27.** {−12} **28.** {−19} **29.** $\left\{\frac{46}{5}\right\}$ **30.** $\left\{\frac{25}{7}\right\}$ **31. a.** 0 **b.** $\left\{\frac{1}{2}\right\}$ **32. a.** 0 **b.** $\left\{\frac{5}{12}\right\}$
33. a. 0 **b.** {−2} **34. a.** 0 **b.** $\left\{\frac{1}{4}\right\}$ **35. a.** 0 **b.** {2} **36. a.** 0 **b.** {3} **37. a.** 0 **b.** {4} **38. a.** 0 **b.** {8}
39. a. 1 **b.** {3} **40. a.** −4 **b.** {−3} **41. a.** −1 **b.** ∅ **42. a.** 2 **b.** ∅ **43. a.** 1 **b.** {2} **44. a.** −3, 2 **b.** {−8}