John

AMERICAN BOOK COMPANY'S

ANSWER KEY

FOR

Passing the Minnesota MCA-II/GRAD Component Mathematics Test

March 2006

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Minnesota Academic Standards Covered on the Grade 11 MCA-II/GRAD Exam

Strand II – Number Sense

Sub-strand A. Number Sense

II.A – Use real numbers, represented in a variety of ways, to quantify information and to solve real-world and mathematical problems.

Sub-strand B. Computation and Operation

II.B.1 – Students will apply the correct order of operations and grouping symbols when using calculators.

II.B.2 – Students will translate calculator notational conventions to mathematical notation.

II.B.3 – Students will recognize the impact of units such as degrees and radians on calculations.

II.B.4 – Students will recognize that applying an inverse function with a calculator may lead to extraneous or incomplete solutions.

II.B.5 – Students will understand the limitations of calculators such as missing or additional features on graphs due to viewing parameters or misleading representations of zero or very large numbers.

II.B.6 – Students will understand that use of a calculator requires appropriate mathematical reasoning and does not replace the need for mental computation.

II.B.G7 – Students will apply the correct order of operations to simplify and evaluate numeric expressions.

II.B.G8 – Students will use rational numbers in complex ways to solve multi-step real-world and mathematical problems.

II.B.G9 – Students will use fractions, decimals and percents in multiple representations for estimation and computation to solve real-world and mathematical problems.

II.B.G10 – Students will use proportional reasoning to solve real-world and mathematical problems.

Strand III – Patterns, Functions and Algebra

Sub-strand A. Patterns and Functions

III.A.1 – Students will know the numeric, graphic and symbolic properties of linear, step, absolute value and quadratic functions.

III.A.2 – Students will model exponential growth and decay.

III.A.3 – Students will analyze the effects of coefficient changes on linear and quadratic functions and their graphs.

III.A.4 – Students will apply basic concepts of linear, quadratic and exponential expressions or equations in real- world problems.

III.A.5 – Students will distinguish functions from other relations using graphic and symbolic methods.

III.A.G6 – Students will generate a table of values from a formula or equation. Students will graph the result of a formula or linear equation in ordered pair format on a grid.

III.A.G7 – Students will translate a problem described verbally or by tables, diagrams or graphs, into suitable mathematical language, solve the problem mathematically and interpret the result in the original context.

Sub-strand B. Probability

IV.B.1 – Students will select and apply appropriate counting procedures to solve real-world and mathematical problems.

IV.B.2 – Students will calculate probabilities and relate the results in real-world and mathematical problems.

IV.B.3 – Students will use probability models in real-world and mathematical problems.

IV.B.4 – Students will determine the expected values of random variables for simple probability models.

IV.B.5 – Students will know the effect of sample size on experimental and simulation probabilities.

IV.B.6 – Students will calculate probabilities.

Strand V – Spatial Sense, Geometry and Measurement

Sub-strand A. Spatial Sense

V.A.1 – Students will use models and visualization to understand and represent various three-dimensional objects and their cross sections from different perspectives.

Sub-strand B. Geometry

V.B.1 – Students will know and use theorems about triangles and parallel lines in elementary geometry to justify facts about various geometrical figures and solve real-world and mathematical problems.

V.B.2 – Students will know and use theorems about circles to justify geometrical facts and solve real-world and mathematical problems.

V.B.3 – Students will use properties of two- and three-dimensional figures to solve real-world and mathematical problems.

V.B.4 – Students will apply the basic concepts of right triangle trigonometry to determine unknown sides or unknown angles when solving real-world and mathematical problems.

V.B.5 – Students will use coordinate geometry.

V.B.6 – Students will use numeric, graphic and symbolic representations of transformations to solve real-world and mathematical problems.

V.B.7 – Students will perform basic constructions with a straightedge and compass.

V.B.8 – Students will draw accurate representations of planar figures using a variety of tools.

Sub-strand C. Measurement

V.C. – Students will demonstrate an understanding of the interconnectedness of geometry, algebra and measurement.

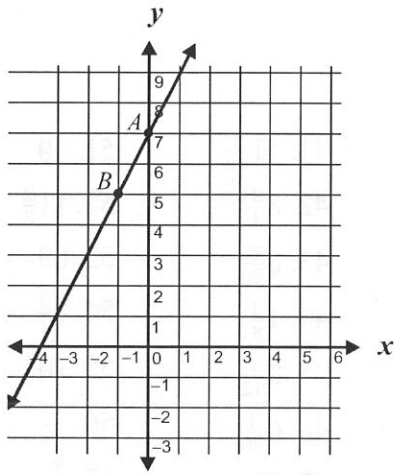
V.C.G1 – Students will make calculations involving time, length, area, volume, weight and mass choosing appropriate units to calculate, measure and record.

V.C.G2 – Students will use formulas to solve real world and mathematical problems.

Segment 4

61. C	64. B	67. A	70. C	73. A	76. C	79. C	82. A
62. C	65. C	68. D	71. B	74. B	77. A	80. C	83. $\frac{3}{10}$
63. C	66. D	69. B	72. D	75. B	78. B	81. A	

84.



(A) slope $= 2$, y-intercept $= (0, 7)$
(B) $y = 2x + 7$

85. 775

Chapter 1 Fractions, Decimals, and Percents

Page 21 Greatest Common Factor

1. 10: 1,2,5,10
   15: 1,3,5,15
   GCF: 5

2. 12: 1,2,3,4,6,12
   16: 1,2,4,8,16
   GCF: 4

3. 18: 1,2,3,6,9,18
   36: 1,2,3,4,6,9,12,18,36
   GCF: 18

4. 27: 1,3,9,27
   45: 1,3,5,9,15,45
   GCF: 9

5. 32: 1,2,4,8,16,32
   40: 1,2,4,5,8,10,20,40
   GCF: 8

6. 16: 1,2,4,8,16
   48: 1,2,3,4,6,8,12,16,24,48
   GCF: 16

7. 6: 1,2,3,6
   42: 1,2,3,6,7,14,21,42
   GCF: 6

8. 14: 1,2,7,14
   63: 1,3,7,9,21,63
   GCF: 7

9. 9: 1,3,9
   51: 1,3,17,51
   GCF: 3

10. 18: 1,2,3,6,9,18
    45: 1,3,5,9,15,45
    GCF: 9

11. 12: 1,2,3,4,6,12
    20: 1,2,4,5,10,20
    GCF: 4

12. 16: 1,2,4,8,16
    40: 1,2,4,5,8,10,20,40
    GCF: 8

Page 25 Changing Decimals to Fractions

1. $\frac{11}{20}$	3. $\frac{3}{25}$	5. $\frac{3}{4}$	7. $\frac{3}{10}$	9. $\frac{71}{100}$	11. $\frac{14}{25}$	13. $\frac{7}{20}$	15. $\frac{1}{8}$
2. $\frac{3}{5}$	4. $\frac{9}{10}$	6. $\frac{41}{50}$	8. $\frac{21}{50}$	10. $\frac{16}{25}$	12. $\frac{6}{25}$	14. $\frac{24}{25}$	16. $\frac{3}{8}$

Page 26 Changing Decimals with Whole Numbers to Mixed Numbers

1. $7\frac{1}{8}$	5. $16\frac{19}{20}$	9. $6\frac{7}{10}$	13. $13\frac{9}{10}$
2. $99\frac{1}{2}$	6. $3\frac{5}{8}$	10. $45\frac{17}{40}$	14. $32\frac{13}{20}$
3. $2\frac{13}{100}$	7. $4\frac{21}{50}$	11. $15\frac{4}{5}$	15. $17\frac{1}{4}$
4. $5\frac{1}{10}$	8. $15\frac{21}{25}$	12. $8\frac{4}{25}$	16. $9\frac{41}{50}$

Page 26 Decimal Word Problems

1. \$11.20	3. \$9.99	5. \$645.33	7. 1,211	9. \$896.05
2. \$18.75	4. \$2.45	6. \$26.24	8. 25.38	10. \$62.11

Page 27 Best Buy

1. 16 oz for \$1.76
2. 5 lb for \$9.45
3. 10 for \$5.99
4. 6 for \$4.80
5. 20 oz for \$0.60
6. 4 for \$1.36
7. 3 for \$5.88
8. 50 for \$9.50
9. 12 for \$2.64
10. 54 for \$9.28

Page 28 Changing Percents to Decimals and Decimals to Percents

1. 0.18	8. 1.19	15. 0.73	22. 15%	29. 4.4%	36. 4.2%
2. 0.23	9. 0.07	16. 0.25	23. 87%	30. 58%	37. 31%
3. 0.09	10. 0.55	17. 4.10	24. 153%	31. 86%	38. 509%
4. 0.63	11. 0.80	18. 0.01	25. 22%	32. 29%	39. 75%
5. 0.04	12. 0.17	19. 0.50	26. 35%	33. 6%	40. 30%
6. 0.45	13. 0.66	20. 0.99	27. 37.5%	34. 48%	41. 290%
7. 0.02	14. 0.13	21. 1.07	28. 64.8%	35. 308.9%	42. 60%

Page 33 Finding the Percent Increase or Decrease

1. 12%
2. 83%
3. $12\frac{1}{2}\%$
4. 20%
5. 54%
6. $13\frac{1}{2}\%$
7. 19%
8. 44%

Page 34 Sales Tax

1. \$44.94
2. \$18,544.70
3. \$6.36
4. \$12.60
5. \$37.86
6. \$1.87
7. \$116.38
8. \$19.08
9. \$2.46
10. \$97.15

Chapter 1 Review
Pages 35–36

1. 3
2. 4
3. 5
4. 8
5. 24
6. 45
7. 20
8. 24
9. $1\frac{1}{3}$
10. $10\frac{7}{8}$
11. $4\frac{7}{15}$
12. $\frac{4}{7}$
13. $4\frac{7}{8}$
14. $2\frac{7}{12}$
15. $7\frac{3}{8}$
16. $4\frac{9}{10}$
17. $4\frac{2}{3}$
18. $4\frac{3}{4}$
19. 8
20. $\frac{5}{9}$
21. $\frac{5}{8}$
22. $2\frac{4}{7}$
23. $\frac{1}{3}$
24. $\frac{5}{12}$
25. 19.019
26. 19.943
27. 164.964
28. 8.927
29. 1.757
30. 7.3
31. 0.1145
32. 1.4943
33. 0.12587
34. 320
35. 142
36. 0.235
37. $\frac{11}{20}$
38. $\frac{21}{25}$
39. $\frac{8}{25}$
40. $7\frac{3}{8}$
41. $9\frac{3}{5}$
42. $13\frac{1}{4}$
43. 5.12
44. 0.07
45. $10.\overline{6}$
46. 0.45
47. 2.19
48. 0.22
49. 0.0125
50. 52%
51. 64%
52. 109%
53. 62.5%
54. 165%
55. 565%
56. $\frac{1}{4}$
57. $\frac{3}{100}$
58. $\frac{17}{25}$
59. $1\frac{1}{50}$
60. 90%
61. 31.25%
62. 12.5%
63. 25%
64. $12\frac{5}{6}$ miles
65. $17\frac{1}{2}$ gallons
66. 23
67. \$315,840
68. \$13.50
69. \$16.00
70. 60%

Page 41 Order of Operations

1. 20
2. -18
3. 1
4. -2
5. 35
6. 4
7. 48
8. 23
9. -8
10. -80
11. 34
12. 93
13. 9
14. 1
15. 10
16. -8
17. -10
18. 121
19. 19
20. 25

Page 42 Scientific Notation for Large Numbers

1. 4.23×10^9
2. 6.43×10^7
3. 9.51×10^{11}
4. 1.23×10^4
5. 2.035×10^{10}
6. 9.0×10^3
7. 4.5×10^{11}
8. 6.2×10^3
9. 8.7×10^7
10. 1.05×10^8
11. 1.083×10^{12}
12. 3.04×10^5
13. 685,000,000
14. 13,000,000
15. 49,080
16. 7,102,000
17. 2500
18. 911,400
19. 58,700,000
20. 804,700,000
21. 381,000
22. 9,500,000,000,000
23. 1,504,000
24. 7,300,000,000

Page 43 Scientific Notation for Small Numbers

1. 2.54×10^{-6}
2. 5.08×10^{-9}
3. 8.004×10^{-6}
4. 4.7×10^{-4}
5. 5.478×10^{-9}
6. 5.9×10^{-7}
7. 4.712×10^{-8}
8. 2.5×10^{-4}
9. 5.01×10^{-8}
10. 6×10^{-7}
11. 8.75×10^{-11}
12. 4×10^{-5}
13. 0.000000118
14. 0.000023
15. 0.000000006205
16. 0.0000041
17. 0.0007632
18. 0.000000000548
19. 0.0000000275
20. 0.000000407
21. 0.0052
22. 0.00000701
23. 0.000044
24. 0.0343

Chapter 2 Review

Page 44

1. 1
2. 10
3. 7
4. -27
5. 3^4
6. 6^6
7. 11^3
8. 2^8
9. 0
10. 7
11. -22
12. -26
13. 4
14. -3
15. -1
16. 21
17. 2
18. 5
19. -2
20. 5.34×10^6
21. 5.874×10^{-8}
22. 1.451×10^3
23. 4.1×10^{-6}
24. 4.148×10^{-4}
25. 1.05×10^5
26. 0.00005204
27. 10,200,000
28. 810,000
29. 0.00020078
30. 0.0047

Page 52 Properties of Addition and Multiplication

1. Commutative Property of Addition
2. Associative Property of Addition
3. Distributive Property
4. Associative Property of Multiplication
5. Identity Property of Multiplication
6. Inverse Property of Multiplication
7. Identity Property of Multiplication
8. Identity Property of Addition
9. Inverse Property of Addition
10. Commutative Property of Multiplication
11. Identity Property of Addition
12. Distributive Property
13. Associative Property of Multiplication
14. Inverse Property of Addition

Chapter 3 Review
Pages 53–54

1. 10
2. 3
3. -1
4. 8
5. 6
6. -3
7. -6
8. 7
9. 6
10. -8
11. -13
12. 7
13. -4
14. -7
15. -5
16. -3
17. -1
18. -4
19. $w = \$450 + \$16.83v$
20. $x = c + 0.06c$
21. $w = \$8.00x + 0.07y$
22. D
23. A
24. C
25. C
26. $0.6b$
27. $x = s + 0.07s$
28. 36 board feet
29. 59°F

Chapter 4 Introduction to Graphing

Page 55 Absolute Value

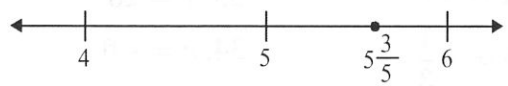
1. 9
2. -5
3. 25
4. -12
5. -64
6. 2
7. -3
8. 1
9. 4
10. 9
11. 8
12. 18
13. 6
14. 7
15. 2

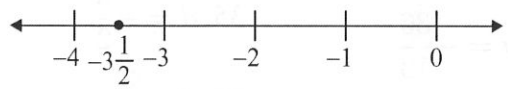
Page 57 Graphing Fractional Values

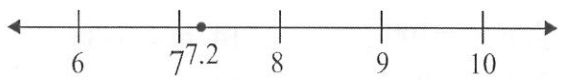
1. $A = \frac{3}{8}, B = \frac{7}{8}, C = 1\frac{1}{2}, D = 2\frac{1}{4}$
2. $E = -\frac{4}{5}, F = -\frac{2}{5}, G = \frac{3}{10}, H = \frac{7}{10}$
3. $I = -8\frac{2}{5}, J = -7\frac{3}{5}, K = -6\frac{4}{5}, L = -5\frac{1}{5}$
4. $M = 2\frac{1}{3}, N = 3\frac{2}{3}, P = 4\frac{1}{3}, Q = 5\frac{2}{3}$
5. $R = 15\frac{1}{3}, S = 16\frac{1}{2}, T = 17\frac{1}{6}, U = 17\frac{2}{3}$
6. $V = -1\frac{5}{7}, W = -\frac{4}{7}, X = \frac{1}{7}, Y = \frac{6}{7}$

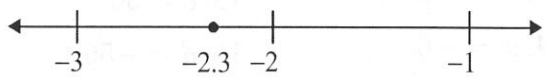
Chapter 4 Review

Page 62

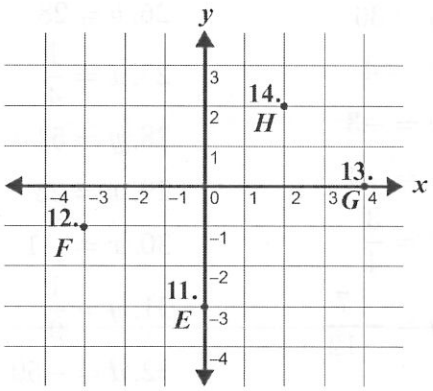
1. 

2. 

3. 

4. 

5. I
6. III
7. $A = (3, -3)$, IV
8. $B = (-2, -2)$, III
9. $C = (4, 3)$, I
10. $D = (-1, 3)$, II
11. see graph to the right
12. see graph to the right
13. see graph to the right
14. see graph to the right



Chapter 5 Solving One-Step Equations and Inequalities

Page 63 One-Step Algebra Problems with Addition and Subtraction

1. $n = 18$	4. $f = 15$	7. $w = 103$	10. $c = 28$	13. $d = 30$
2. $y = 43$	5. $x = 18$	8. $t = 46$	11. $k = 34$	14. $x = 41$
3. $v = 16$	6. $x = 9$	9. $m = 29$	12. $a = 28$	15. $y = 13$

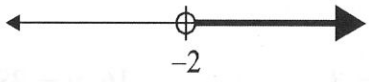
Page 65 One-Step Algebra Problems with Multiplication and Division

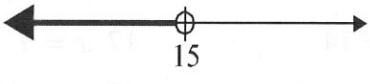
1. $x = 7$	5. $x = 27$	9. $y = 6$	13. $z = 30$	17. $t = 9$
2. $w = 55$	6. $d = 11$	10. $y = 3$	14. $n = 45$	18. $m = 54$
3. $h = 15$	7. $w = 27$	11. $r = 28$	15. $z = 6$	19. $p = 8$
4. $x = 144$	8. $r = 14$	12. $t = 12$	16. $d = 14$	20. $a = 12$

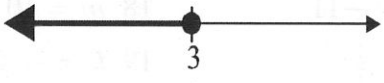
Page 65 One-Step Algebra Problems with Multiplication and Division

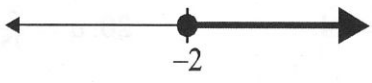
1. $x = \frac{3}{2}$	7. $x = 3$	13. $m = 12$	19. $d = \frac{3}{4}$	25. $a = 3$
2. $y = \frac{5}{4}$	8. $z = 16$	14. $h = \frac{21}{5}$	20. $z = 15$	26. $p = 8$
3. $t = \frac{2}{5}$	9. $x = 18$	15. $y = \frac{8}{3}$	21. $y = \frac{4}{9}$	27. $w = \frac{1}{5}$
4. $b = 12$	10. $p = \frac{5}{3}$	16. $t = 5$	22. $d = \frac{12}{7}$	28. $x = \frac{13}{5}$
5. $a = 8$	11. $n = \frac{9}{2}$	17. $b = \frac{2}{3}$	23. $w = \frac{13}{2}$	
6. $y = 2$	12. $x = \frac{11}{5}$	18. $c = \frac{14}{5}$	24. $g = 9$	

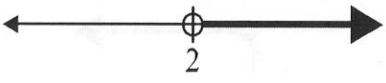
Page 69 Solving Inequalities by Addition and Subtraction

1. $x > -2$ 

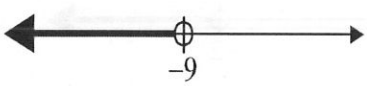
2. $x < 15$ 

3. $x \leq 3$ 

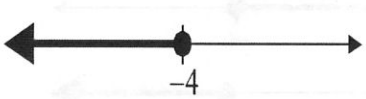
4. $x \geq -2$ 

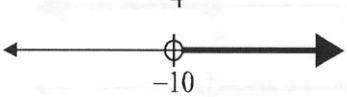
5. $x > 2$ 

6. $x \leq 9$ 

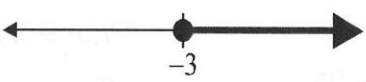
7. $x < -9$ 

8. $x \geq -9$ 

9. $x \leq -4$ 

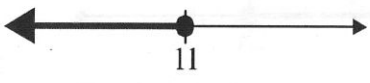
10. $x > -10$ 

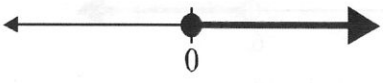
11. $x < 4$ 

12. $x \geq -3$ 

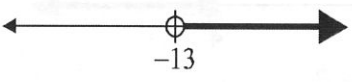
13. $x \leq -6$ 

14. $x > 32$ 

15. $x \leq 11$ 

16. $x \geq 0$ 

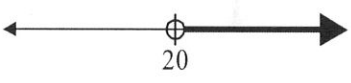
17. $x < 20$ 

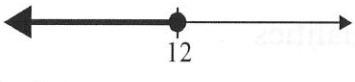
18. $x > -13$ 

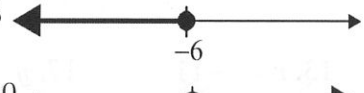
19. $x \leq 8$ 

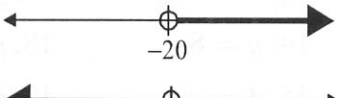
20. $x \geq 27$ 

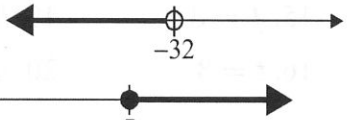
Page 70 Solving Inequalities by Multiplication and Division

1. $x > 20$ 

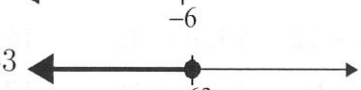
2. $x \leq 12$ 

3. $x \leq -6$ 

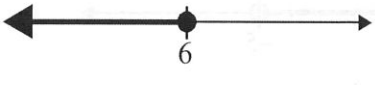
4. $x > -20$ 

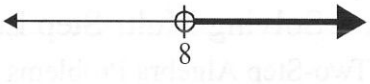
5. $x < -32$ 

6. $x \geq 7$ 

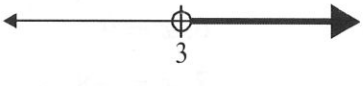
7. $x < -6$ 

8. $x \leq -63$ 

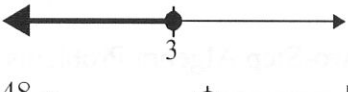
9. $x \leq 6$ 

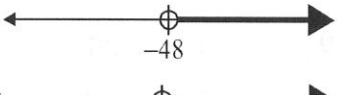
10. $x > 8$ 

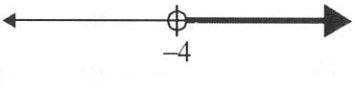
11. $x \geq -27$ 

12. $x > 3$ 

13. $x \leq 40$ 

14. $x \leq 3$ 

15. $x > -48$ 

16. $x > -4$ 

Page 74 More Two-Step Algebra Problems with Fractions

1. $x = 19$
2. $z = 23$
3. $b = -16$
4. $y = 30$
5. $d = -14$
6. $w = 42$
7. $x = 11$
8. $c = -5$
9. $h = 11$
10. $k = 37$
11. $a = -27$
12. $x = 62$
13. $t = -32$
14. $b = -15$
15. $f = 33$
16. $w = -40$
17. $t = 27$
18. $x = -20$
19. $g = 19$
20. $k = -31$
21. $y = -2$
22. $z = -22$
23. $w = -17$
24. $h = 15$

Page 75 Combining Like Terms

1. $19x$
2. $3y + 8$
3. $-2x + 13$
4. $10a - 16$
5. $12w + 3$
6. $-2x$
7. $10w - 15$
8. $-12t + 30$
9. $-3x + 6$
10. $11b + 12$
11. $3h - 3$
12. $-10k + 10$
13. $15a - 5$
14. $9c - 5$
15. $d - 3$
16. $3h - 7$
17. $8x + 7$
18. $4z + 5$
19. $2y + 12$
20. $12p - 4$
21. $10m + 3$

Page 75 Solving Equations with Like Terms

1. $w = 2$
2. $x = 2$
3. $y = -5$
4. $a = 1$
5. $t = 8$
6. $d = 2$
7. $c = -2$
8. $m = 2$
9. $x = 3$
10. $p = -1$
11. $y = -7$
12. $a = -2$

Page 76 Solving Equations with Like Terms

1. $a = 4$
2. $d = 15$
3. $x = 1$
4. $y = 3$
5. $w = 2$
6. $b = -4$
7. $m = -4$
8. $x = -3$
9. $p = 7$
10. $p = -5$
11. $y = 3$
12. $w = 1$
13. $b = 3$
14. $k = 5$
15. $m = -3$
16. $p = 6$
17. $z = 10$
18. $y = 6$
19. $w = -5$
20. $x = -5$
21. $x = 3$
22. $h = 11$
23. $t = -6$
24. $y = -5$
25. $x = 2$
26. $p = -6$
27. $d = -15$
28. $w = -17$
29. $y = -2$
30. $m = 4$

Page 77 Removing Parentheses

1. $7n + 42$
2. $16g - 40$
3. $55z - 22$
4. $-6y - 24$
5. $-9k + 15$
6. $4d - 32$
7. $-8x + 12$
8. $28 + 42p$
9. $-20w - 40$
10. $66x + 12$
11. $90 - 10y$
12. $9c - 81$
13. $-36t + 12$
14. $12y + 27$
15. $8b + 24$
16. $-7x - 14$
17. $-20 + 5y$
18. $-8b + 8$
19. $-16c - 12$
20. $5w + 40$
21. $-12x + 6$
22. $2z - 4$
23. $-28p - 28$
24. $-9t + 54$
25. $-20w - 40$
26. $-27 + 21p$
27. $9k + 27$
28. $-7b + 9$
29. $30t + 12$
30. $7v - 28$

Page 85 Inequality Word Problems

1. $x \geq \$80$ 2. $x \geq \$200.00$ 3. $x \leq 147$ lbs 4. $x \geq 89\%$ 5. $x \leq \$379$

Chapter 6 Review

Page 86

1. $a = 9$
2. $x = -72$
3. $w = 5$
4. $y = 50$
5. $c = 18$
6. $b = -45$
7. $d = 4$
8. $x = 36$
9. $w = -10$
10. $x = 1$
11. $f = 6$
12. $x = -1$
13. $w = 4$
14. $q = 4$
15. $k = 2$
16. $-12x + 21$
17. $22y + 55$
18. $-54b + 48$
19. $-24a + 16$
20. $-10c + 6$
21. $-35y + 5$
22. $3x - 15$
23. $\frac{1 - 7a}{2}$
24. $c = 11$
25. $x = 5$
26. $x \geq -2$
27. $x \geq 1$
28. $n = -22$
29. $y < -14$
30. $x \geq -\frac{5}{3}$
31. $x > 4$
32. $r \leq 1,850$
33. $p \leq 320$

Chapter 7 Rates, Ratios, and Proportions

Page 87 Rate

1. 125 mph
2. 62 mph
3. 52 mph
4. 45 mph
5. 61 mph
6. 5 mph
7. 82 mph
8. 524 mph
9. 65 mph
10. 42 mph
11. 64 mph
12. 45 mph

Page 88 More Rates

1. 250 words/minute
2. 4 feet/second
3. 3 minutes
4. 25.45 kilometers/day
5. 53 feet/second
6. \$21 million/year
7. 7 points/quarter
8. 467 customers/hour

Page 89 Ratio Problems

1. $\frac{14}{31}$
2. $\frac{7}{2}$
3. $\frac{25}{124}$
4. $\frac{1}{26}$
5. $\frac{4}{11}$
6. $\frac{\$3.00}{5}$
7. $\frac{23}{45}$
8. $\frac{4}{3}$

Chapter 8 Polynomials

Page 97 Adding and Subtracting Monomials

1. $7x^2$
2. $13t$
3. $7y^3$
4. $-2g$
5. $15y^2$
6. $2s^5$
7. $-6x$
8. $3w^2$
9. $10z^4$
10. k
11. $-2x^2$
12. $11t$
13. $3v^3$
14. $-x^3$
15. $5y^4$

Page 98 Adding Polynomials

1. $3y^2 + 3y + 6$
2. $7y^2 - y + 2$
3. $5x^3 + x^2 + 3x + 1$
4. $5p^2 - 3p + 6$
5. $w^2 + w$
6. $4t^2 + 3t - 5$
7. $t^4 + 2t^3 + 5t + 4$
8. $s^3 + s^2 + 2$
9. $4v^3 - v^2 + v - 4$
10. $7m^2 - 3m + 2$
11. $3x^2 + 2$
12. $t^2 + 2t + 4$
13. $3p^4 - 3p^2 - p + 7$
14. $13s^3 + 10s^2 + 3s$
15. $-10b^2 + 13b + 11$
16. $8c^2 - 8c - 4$
17. $7c^3 + 6c^2 + 4$
18. $-7x^3 + 3x^2 + 3$
19. $2x^2 + 2x - 7$
20. $-12y^2 - 6y + 6$
21. $3d^5 + 2d^4 - 6d^3 + 5$
22. $10t^5 + 6t^3 + 17$
23. $3p^2 - 11p + 4$
24. $20b^3 - 4b^2 + 10b + 14$
25. $w^3 - w + 7$
26. $26z^2 + 11z - 2$

Page 99 Subtracting Polynomials

1. $x^2 + 2x + 1$
2. $4y - 7$
3. $12t^3 - 8t^2 + 8$
4. $2w^2 + 9w$
5. $-a^5 - a^3 - a^2 + 4a$
6. $7c^4 + 15c^2 - 2$
7. $12x^2 - 13x - 8$
8. $9y^3 - 8y^2 - y - 19$
9. $-8h^2 - 11h - 3$
10. $14k^3 - k^2 - 13$
11. $-5x^2 + 2$
12. $12p^2 - 5p + 2$
13. $-8m - 10$
14. $11y^3 - 2y^2 - y$
15. $-g^2 + 3g + 8$
16. $2w^3 + 4w^2 + 5w$
17. $9x^3 - x^2 - 11$
18. $3a^2 - a - 1$
19. $-3c^2 + 8c + 17$
20. $-9v^2 + 10v - 6$
21. $-3b^3 + 3b^2 + 13$
22. $11x^3 + 9x^2 - 4$
23. $-3y^2 + 2y + 1$
24. $-4z^2 - 13$

Page 100 Multiplying Monomials

1. $54a^6$
2. $10x^9$
3. $12y^5$
4. $20t^4$
5. $8p^7$
6. $72b^3$
7. $9c^6$
8. $18d^{10}$
9. $30k^5$
10. $7m^6$
11. $22z^8$
12. $18w^9$
13. $20x^7$
14. $15n^5$
15. $8w^8$
16. $50s^9$
17. $16d^{10}$
18. $40y^8$
19. $21t^{15}$
20. $12p^{11}$
21. $2x^6$
22. $-35s^7$
23. $54a^6$
24. $-4x^2$
25. $3y^5$
26. $-15b^7$
27. $-18c^5$
28. $-32t^6$
29. $-80d^8$
30. $6g^9$
31. $-49s^7$
32. $2d^4$
33. $-22p^6$
34. $15x^{10}$
35. $56z^8$
36. $20w^9$
37. $-30y^6$
38. $-63x^8$
39. a^5
40. $-21k^3$
41. $15t^6$
42. $27x^{10}$

Page 103 Multiplying Two Binomials

1. $y^2 - 4y - 21$
2. $2x^2 + 22x + 36$
3. $12b^2 - 25b + 12$
4. $6g^2 - 52g - 18$
5. $-28k^2 - k + 15$
6. $24v^2 + 26v - 8$
7. $40p^2 + 38p + 6$
8. $-6h^2 + 3h + 45$
9. $w^2 - 11w + 28$
10. $6x^2 - 11x - 2$
11. $10t^2 + t - 3$
12. $16y^2 - 81$
13. $3a^2 + 23a + 30$
14. $3z^2 - 20z + 32$
15. $30c^2 + 37c + 10$
16. $y^2 - 9$
17. $8w^2 - 8w - 30$
18. $7x^2 - 27x - 4$
19. $24t^2 - 60t + 36$
20. $30b^2 + 46b + 12$
21. $20z^2 + 18z + 4$
22. $11w^2 + 25w - 24$
23. $45d^2 - 36d - 81$
24. $9g^2 - 16g - 4$
25. $8p^2 + 26p + 21$
26. $m^2 - 25$
27. $16b^2 - 24b + 8$
28. $3z^2 + 14z + 15$
29. $7y^2 - 26y + 15$
30. $27x^2 + 6x - 5$
31. $3t^2 + 31t + 10$
32. $16w^2 - 58w - 63$
33. $8s^2 + 30s - 8$
34. $32k^2 + 28k - 9$
35. $h^2 + 10h - 24$
36. $21x^2 + 58x + 21$
37. $4v^2 - 36$
38. $4x^2 + 10x - 24$
39. $6k^2 + 6k - 12$
40. $6w^2 + 28w + 22$
41. $40y^2 - 74y + 30$
42. $6d^2 + 7d - 13$

Page 104 Finding the Numbers

1. $10, 4$
2. $7, 3$
3. $9, 9$
4. $10, 2$
5. $3, 4$
6. $3, 5$
7. $5, 5$
8. $6, 8$
9. $6, 6$
10. $9, 8$
11. $8, 7$
12. $6, 3$
13. $8, 5$
14. $9, 7$
15. $8, 2$
16. $4, 4$
17. $4, 5$
18. $9, 4$
19. $10, 5$
20. $6, 5$

Page 105 More Finding the Numbers

1. $5, -7$
2. $5, -1$
3. $6, -2$
4. $-4, -2$
5. $-5, 8$
6. $11, -1$
7. $9, -3$
8. $10, -2$
9. $-8, 3$
10. $-7, 4$
11. $6, -8$
12. $4, -5$
13. $-2, -1$
14. $-5, 6$
15. $-3, -4$
16. $8, -2$
17. $8, -3$
18. $-2, -2$
19. $6, -7$
20. $-4, -2$

Page 109 Simplifying Expressions with Exponents

1. $y^2 + 6y + 9$
2. $8x^2 + 32x + 32$
3. $96b^2 - 144b + 54$
4. $180g^2 + 120g + 20$
5. $16k^2 + 24k + 9$
6. $12h^2 + 60h + 75$
7. $-128v^2 + 64v - 8$
8. $100p^2 + 40p + 4$
9. $24h^2 + 120h + 150$
10. $6w^2 - 84w + 294$
11. $72x^2 + 24x + 2$
12. $81x^2 + 36x + 4$
13. $25t^2 + 30t + 9$
14. $48y^2 - 216y + 243$
15. $8a^2 + 96a + 288$
16. $36z^2 - 192z + 256$
17. $75c^2 + 60c + 12$
18. $36t^2 + 216t + 324$

Chapter 8 Review

Page 110

1. $12a^2$
2. $63x^3y^9$
3. $-6z^3 - 18z^2$
4. $20b^5$
5. $-2x^2$
6. $2p - 6$
7. $-45t^3 - 270t^2 - 405t$
8. $12w^4y^7$
9. $12g^2 + 36g + 27$
10. $5d^4$
11. $9x^2 + 47x + 10$
12. $16y^3 - 36y^2 + 8y$
13. $16a^6b^5$
14. $45w^{15}$
15. $20x^3$
16. $4p^5$
17. $12s^5t^5$
18. $8d^2 + 46d + 63$
19. $-12w^3 + 28w^2 - 20w$
20. $14z^6$
21. $\frac{7}{4}g^7h^5$
22. $-15y^3$
23. $2a^6v^8$
24. $144y^2 - 240y + 100$
25. $8x^6y^6$
26. $20x^2$
27. $b^2 - 10b - 1$
28. $7k^2 + 6k + 9$
29. $6q^7r^6$
30. $7w^2 - 60w + 32$
31. $7pq^2$
32. $2(4x - 9)$
33. $6x(x - 3)$
34. $8b(2b^2 + 1)$
35. $5(3a^3 + 8)$
36. $4y^4(5y^2 - 3)$
37. $5a(1 - 3a)$
38. $(x + 7)(x - 1)$
39. $2(b - 3)(b + 2)$
40. $(t + 8)(t + 2)$

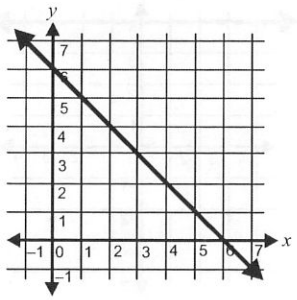
Chapter 9 Solving Quadratic Equations

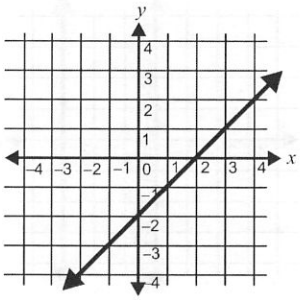
Page 112 Solving Quadratic Equations

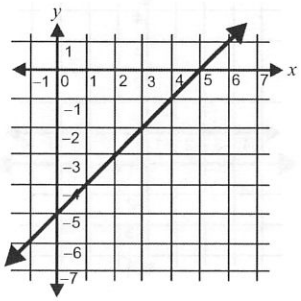
1. $\{-3, 2\}$
2. $\{-2, 4\}$
3. $\{-5, 3\}$
4. $\{1, 4\}$
5. $\{2, 7\}$
6. $\{-1, 4\}$
7. $\{-5, 4\}$
8. $\{-4, -2\}$
9. $\{3, 4\}$
10. $\{-4, 7\}$
11. $\{2, 3\}$
12. $\{-5, 2\}$
13. $\{-8, 1\}$
14. $\{-2, -1\}$
15. $\{-6, 7\}$
16. $\{-3, 2\}$
17. $\{-4, -3\}$
18. $\{-5, 3\}$
19. $\{-2, 5\}$
20. $\{-8,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

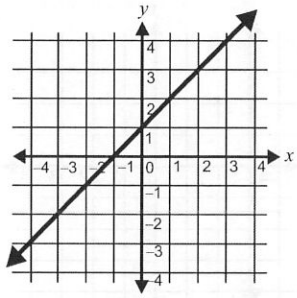
Chapter 10 Graphing and Writing Equations and Inequalities

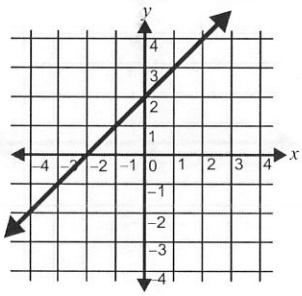
Page 120 Graphing Linear Equations

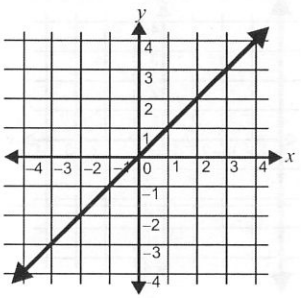
1. 

3. 

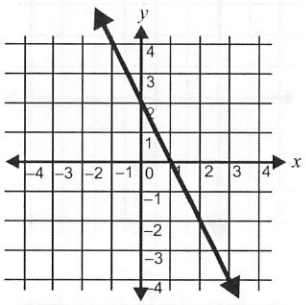
5. 

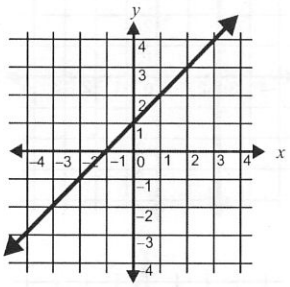
2. 

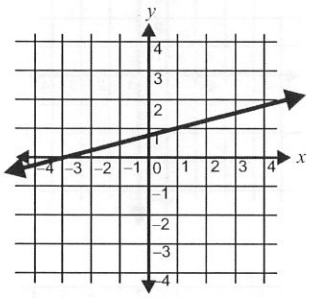
4. 

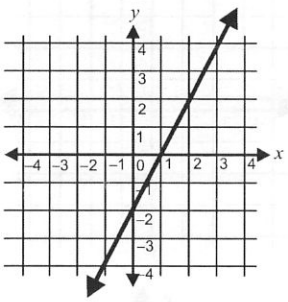
6. 

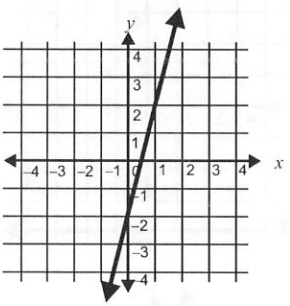
Page 120 Graphing Linear Equations

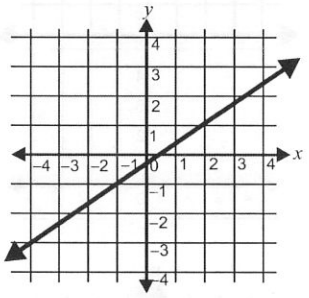
1. 

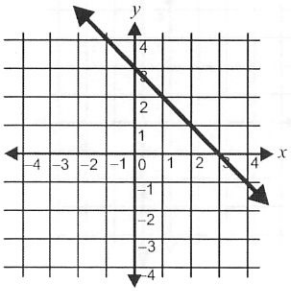
4. 

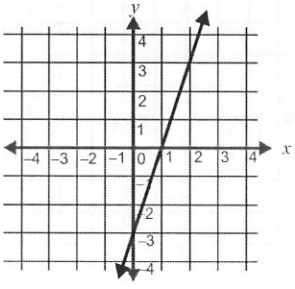
7. 

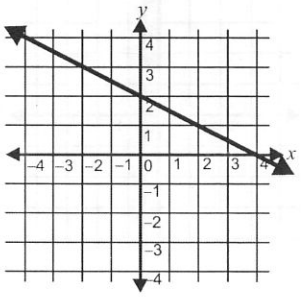
2. 

5. 

8. 

3. 

6. 

9. 

Page 122 Finding the Distance Between Two Points

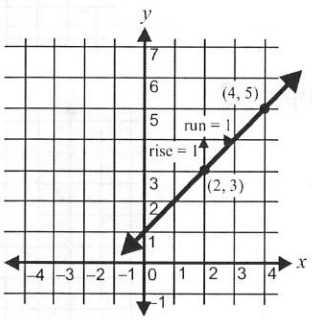
1. $\sqrt{10}$	4. $2\sqrt{2}$	7. $2\sqrt{5}$	10. $3\sqrt{10}$	13. $6\sqrt{2}$
2. $2\sqrt{13}$	5. $\sqrt{74}$	8. $5\sqrt{2}$	11. $8\sqrt{2}$	14. $2\sqrt{37}$
3. 5	6. $3\sqrt{3}$	9. $2\sqrt{10}$	12. $2\sqrt{13}$	15. $\sqrt{65}$

Page 123 Finding the Midpoint of a Line Segment

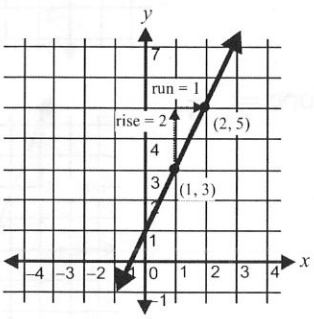
1. $(-1, 7)$	4. $(4, 7)$	7. $(-2, -8)$	10. $(1, -3)$	13. $(7, 11)$
2. $(-2, 0)$	5. $(7, 10)$	8. $(1, 5)$	11. $(-6, 6)$	14. $(7, 1)$
3. $(6, 9)$	6. $(2, 5)$	9. $(1\frac{1}{2}, -1)$	12. $(9, 7)$	15. $(3, 2)$

Page 127 Understanding Slope

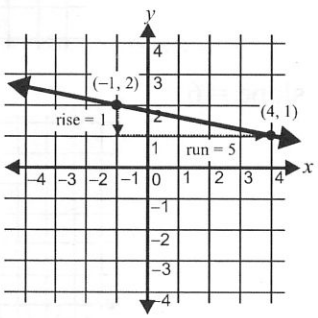
1. slope = 1



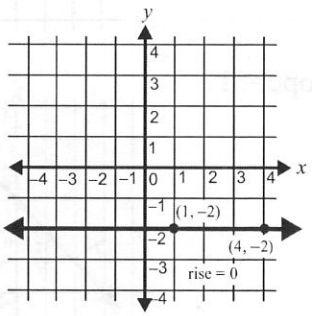
2. slope = 2



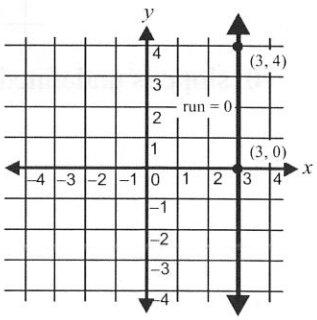
3. slope = $-\frac{1}{5}$



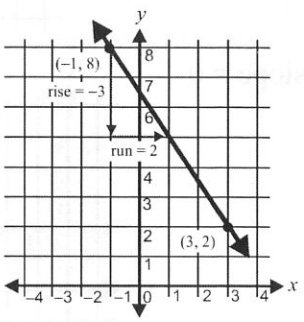
4. slope = 0



5. slope is undefined

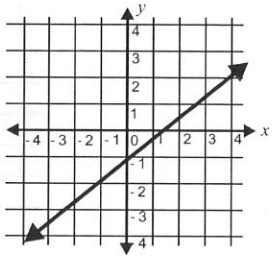


6. slope = $-\frac{3}{2}$



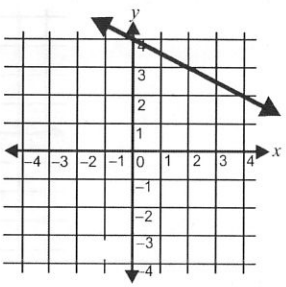
Page 128 Slope-Intercept Form of a Line

1. $y = \frac{4}{5}x - 1$

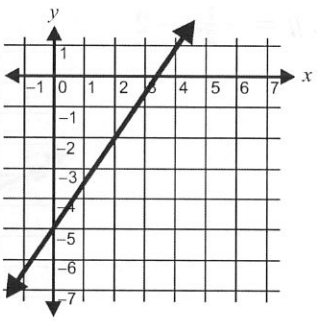


30

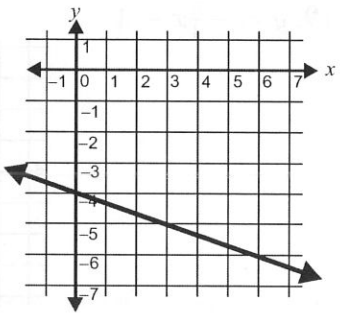
2. $y = -\frac{1}{2}x + 4$



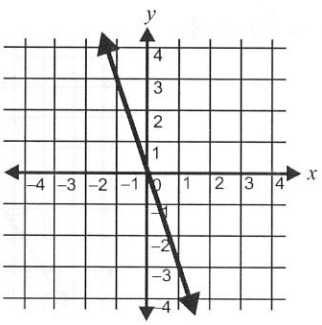
3. $y = \frac{3}{2}x - 5$



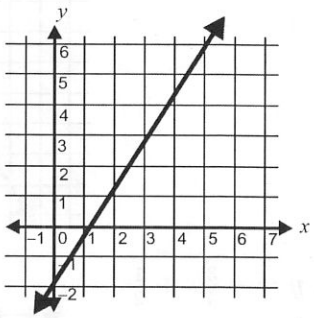
4. $y = -\frac{1}{3}x - 4$



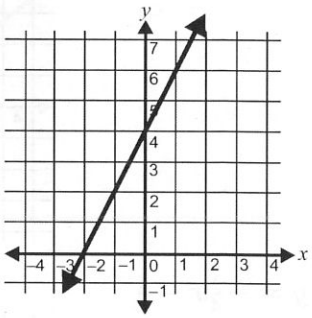
5. $y = -3x$



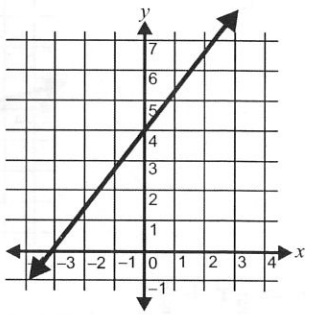
6. $y = \frac{8}{5}x - 2$



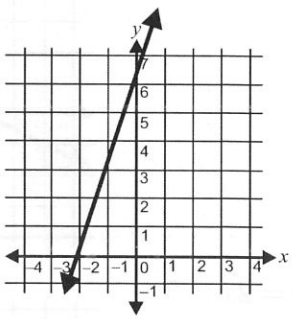
7. $y = 2x + 4$



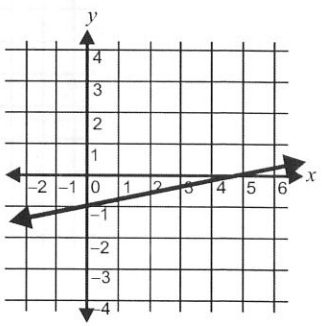
8. $y = \frac{4}{3}x + 4$



9. $y = 3x + 6$



10. $y = \frac{1}{5}x - 1$

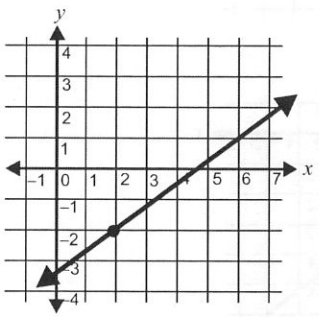


Page 128 Verify That a Point Lies on a Line

1. yes	3. yes	5. yes	7. yes	9. yes	11. yes
2. yes	4. no	6. no	8. no	10. yes	12. no

Page 129 Graphing a Line Knowing a Point and Slope

1.



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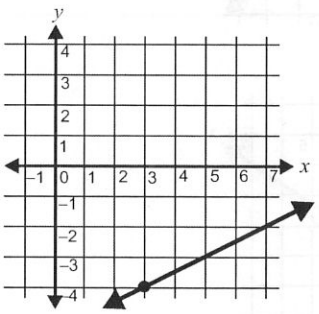

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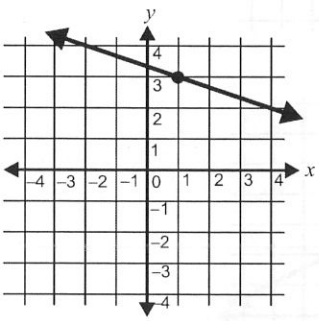

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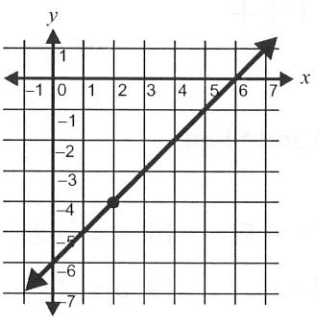

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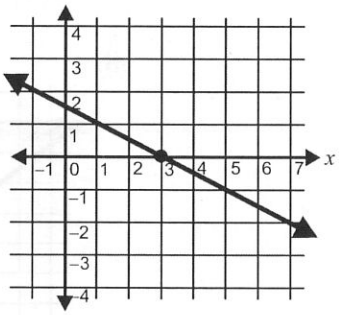

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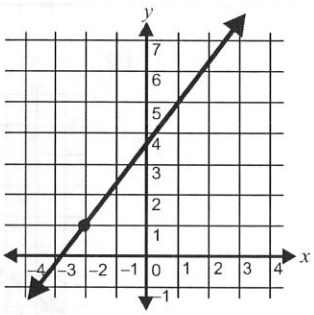

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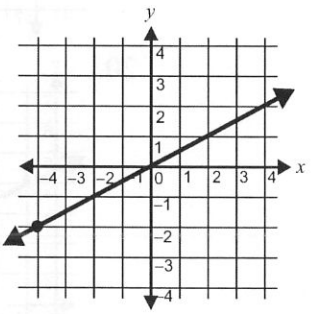

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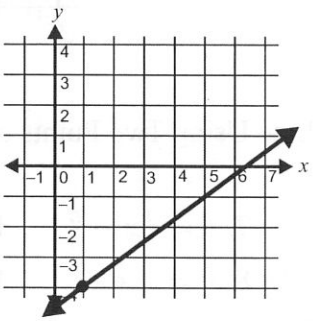

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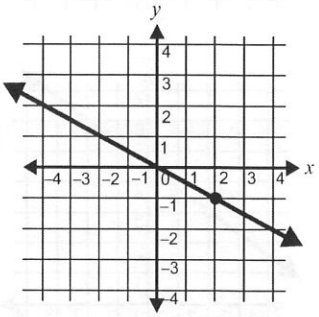

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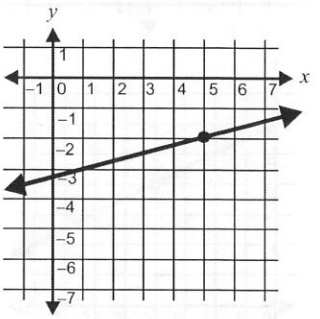

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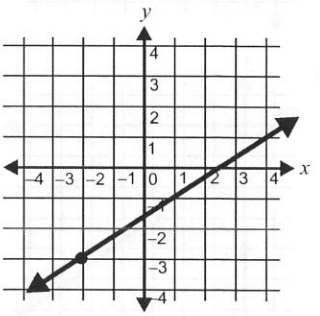

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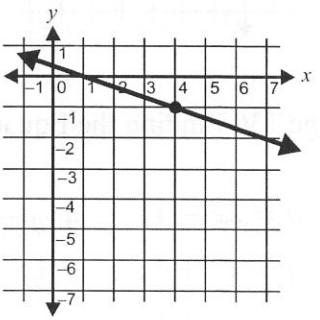

Page 131 Graphing Inequalities

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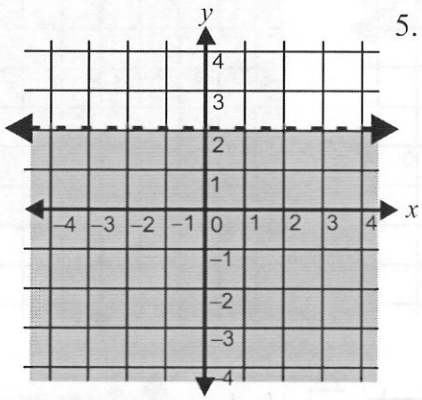

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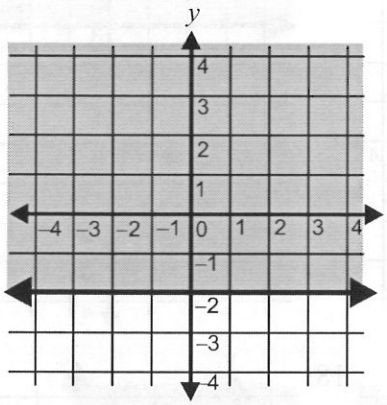

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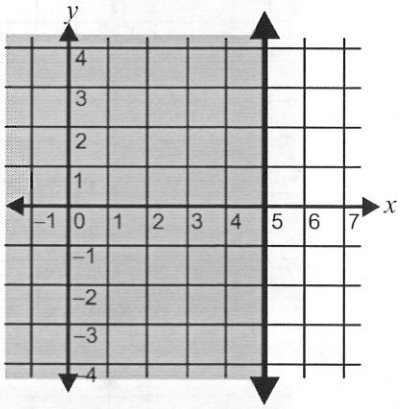

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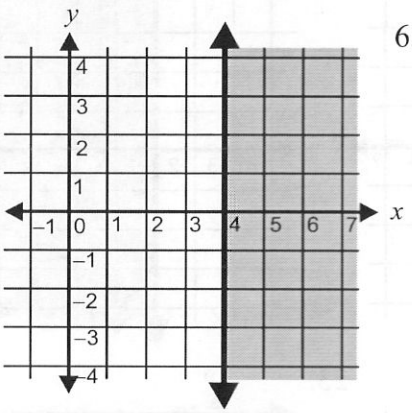

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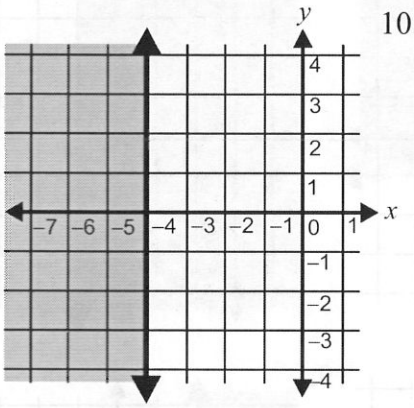

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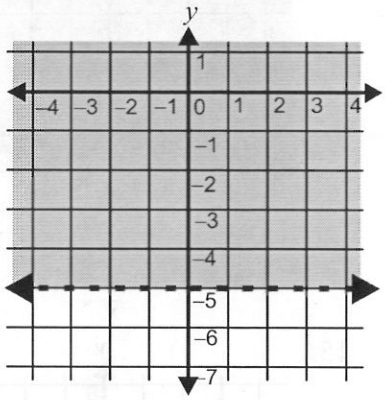

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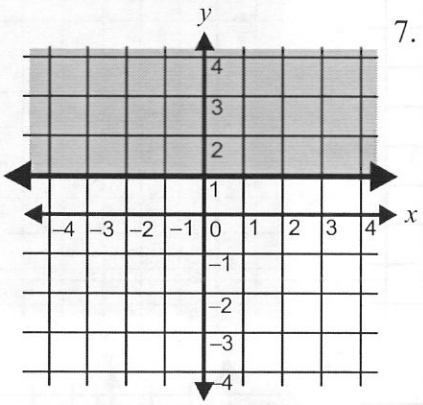

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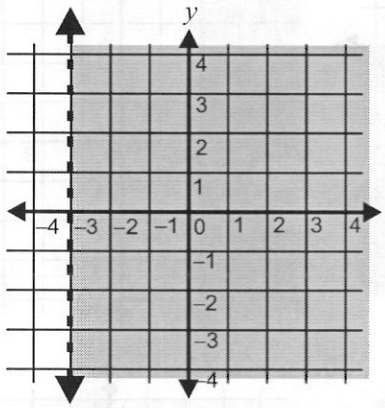

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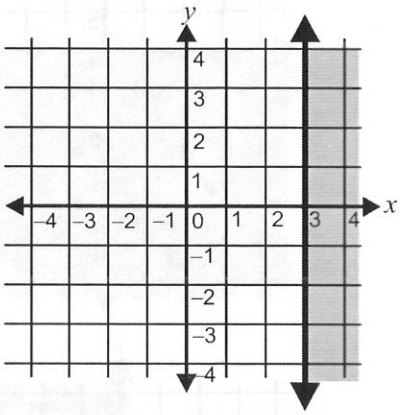

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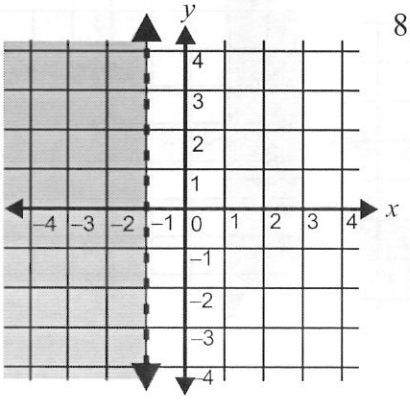

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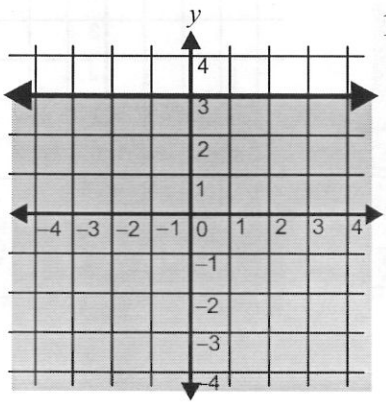

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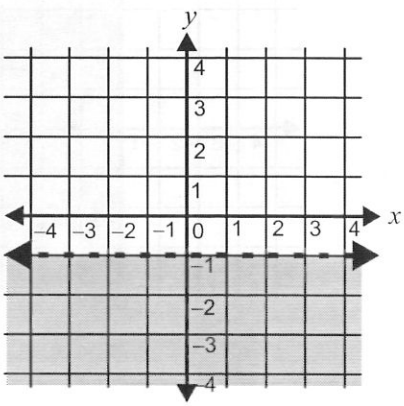

Page 132 Graphing Inequalities

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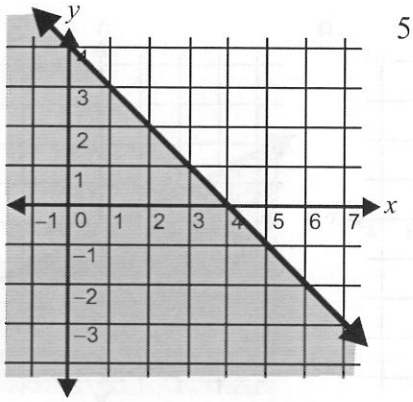

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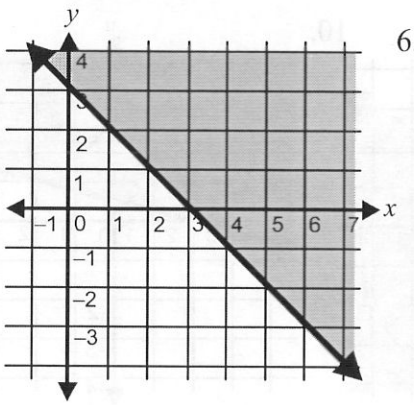

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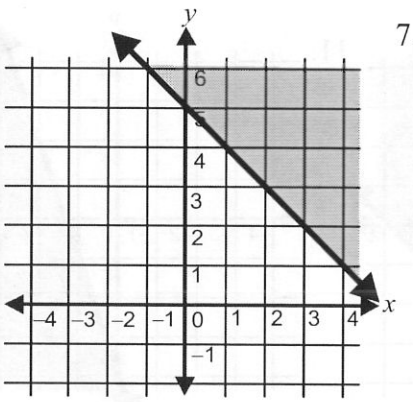

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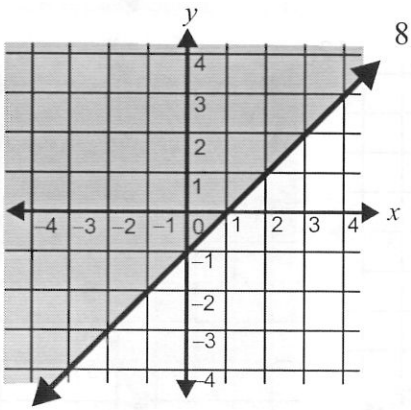

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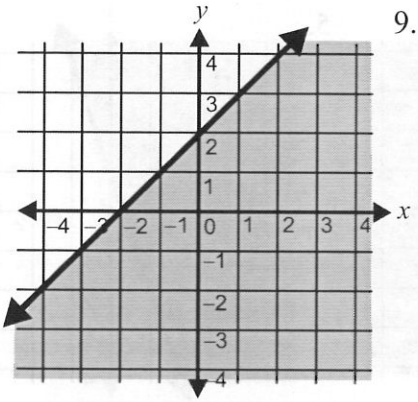

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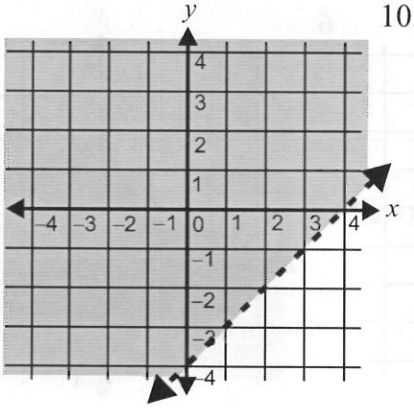

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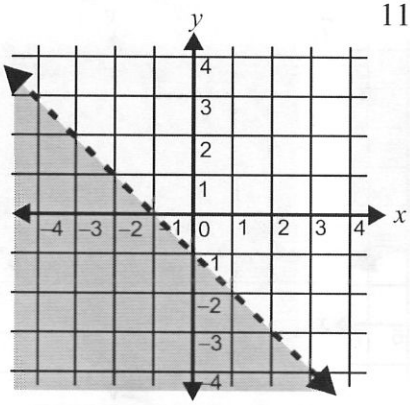

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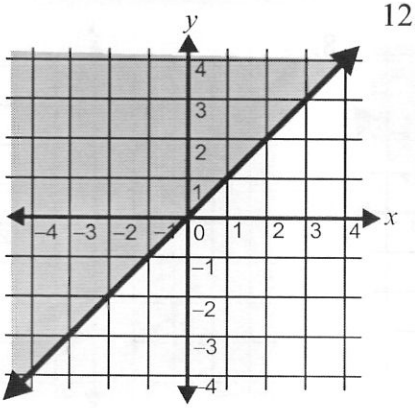

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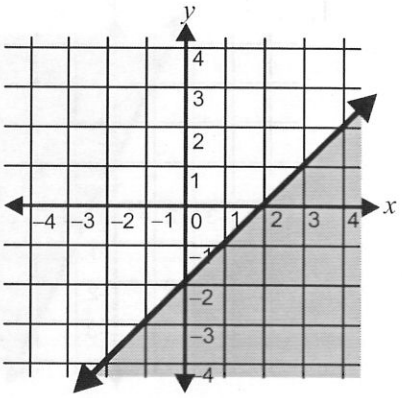

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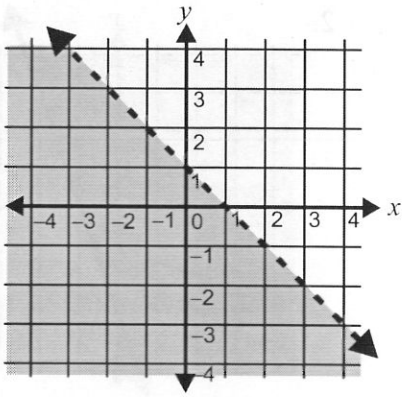

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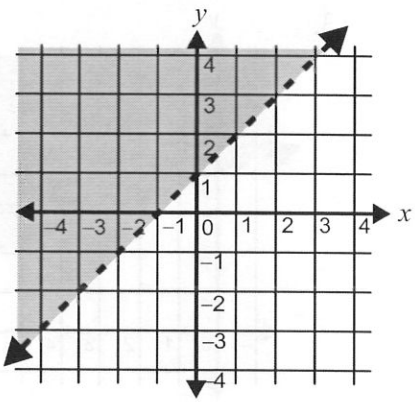

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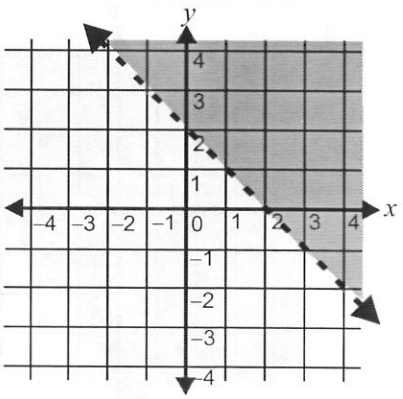
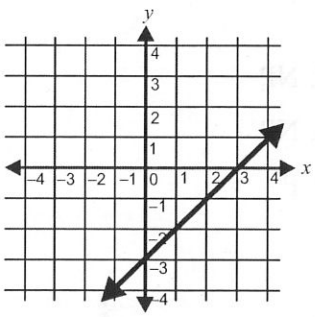
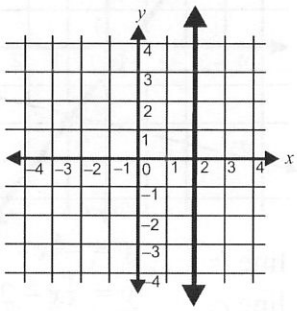


Chapter 10 Review
Page 134

1. 

2. B

3. D

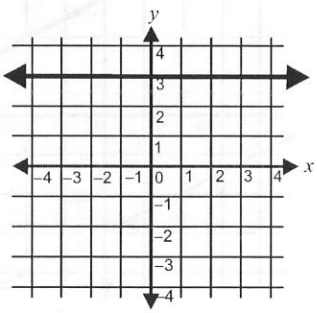
4. 

5. slope $= -2$

6. slope $= \frac{6}{5}$

7. $(5, 0)$

8. $(0, 14)$

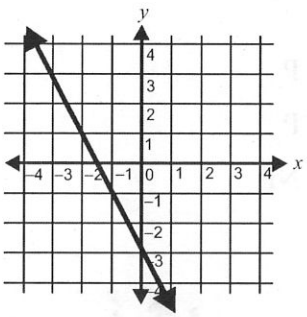
9. 

10. $y = -\frac{3}{2}x + 2$

11. slope $= -\frac{1}{2}$

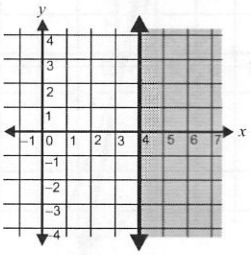
12. $\left(-\frac{6}{5}, 0\right)$

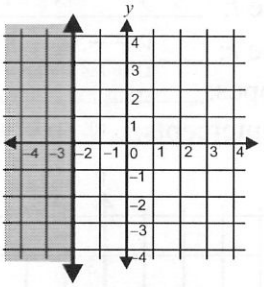
13. $(0, -3)$

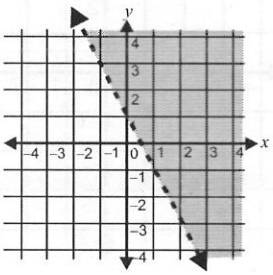
14. 

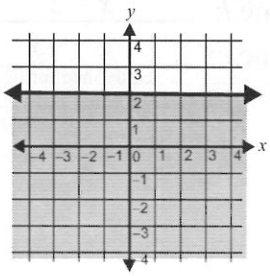
15. C

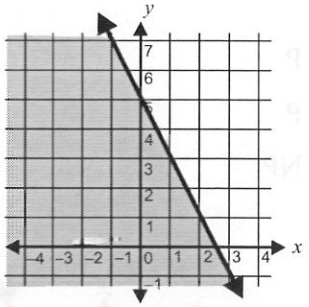
16. $y = \frac{3}{4}x + 2$

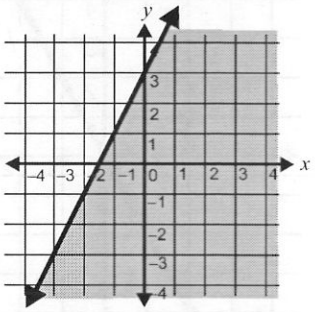
17. 

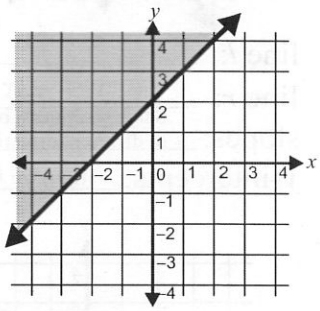
18. 

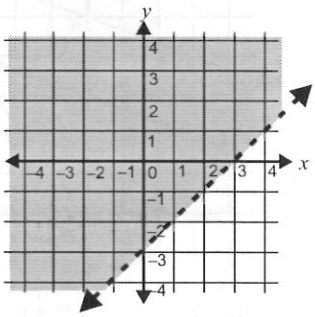
19. 

20. 

21. 

22. 

23. 

24. 

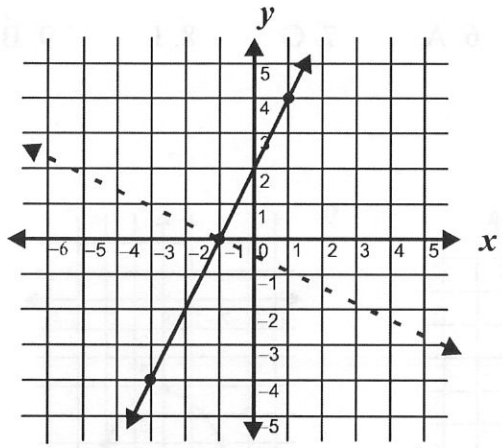
25. 5

26. $5\sqrt{2}$

27. $(1, 7)$

28. $(2, -2)$

Page 139 Equations of Perpendicular Lines

1. 

Slope of perpendicular line $= -\frac{1}{2}$
Equation of perpendicular line: $y = -\frac{1}{2}x - \frac{1}{2}$

2. $y = -\frac{1}{5}x + \frac{7}{5}$

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

4. $y = \frac{1}{3}x + \frac{5}{3}$

5. $y = 2x + 10$

6. $y = -x + 3$

7. $y = -\frac{3}{2}x + \frac{15}{2}$

8. $y = x - 6$

9. $y = -\frac{1}{4}x + \frac{7}{8}$

10. $y = 6x - \frac{13}{4}$

11. $y = 8x - 58$

12. $y = -\frac{5}{4}x + \frac{25}{4}$

13. $y = \frac{3}{7}x - \frac{12}{7}$

14. $y = -2x + \frac{9}{2}$

15. $y = 9x + 6$

Page 140 Writing an Equation From Data

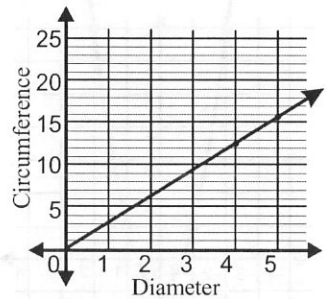
1. $y = 10,000x + 45,000$

2. $y = \frac{7}{4}x + \frac{3}{2}$

3. $y = -400x + 4,900$

4. $y = -11x + 73$

Page 142 Graphing Linear Data

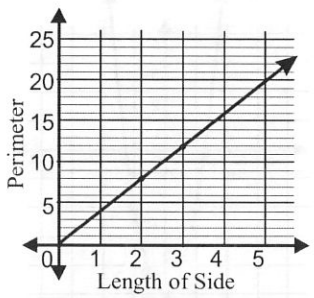
1. 

2. circumference = about 9.5 inches

3. about 1 inch

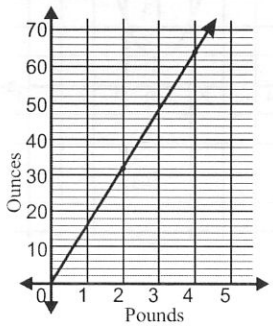
4. slope = 3.14

5. The slope of circumference over diameter gives the value of π.

6. 

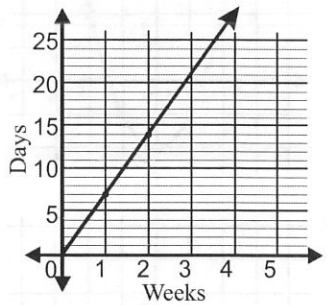
7. Perimeter = 16 inches

8. slope = 4

9. 

10. 2.5 pounds

11. The slope represents ounces per pound.

12. 

13. about 17.5 days

Page 146 Identifying Graphs of Real-World Situations

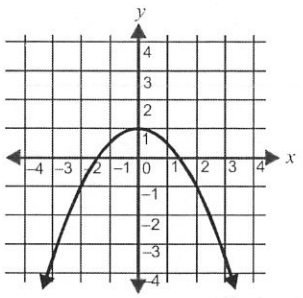
1. A 2. B 3. D 4. D

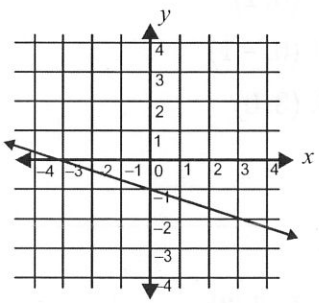
Page 147 Identifying Graphs of Real-World Situations

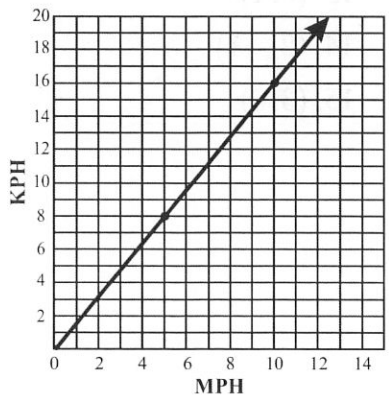
1. B 2. D 3. C 4. A

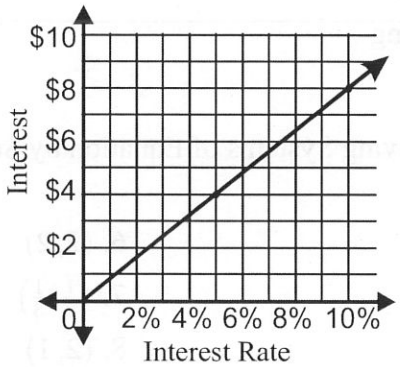
Chapter 11 Review

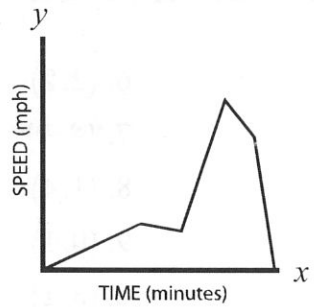
Pages 148–149

1. $y = 125x + 75$
2. $y = 50x + 70$
3. 

4. D
5. C
6. 

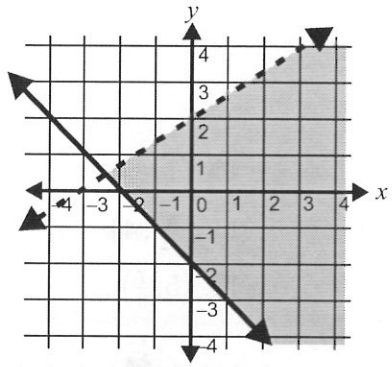
7. B
8. parabola
9. 

10. about 14 mph
11. about 8 mph
12. about 19 mph
13. 

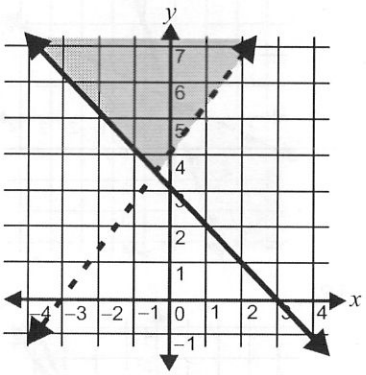
14. about \$6.50
15. slope $= \frac{4}{5}$
16. The slope gives the amount of interest per 1% interest rate.
17. 

Page 156 Graphing Systems of Inequalities

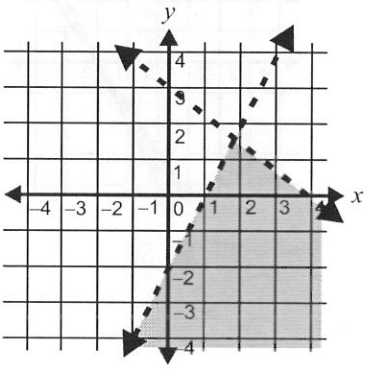
1.



2.



3.



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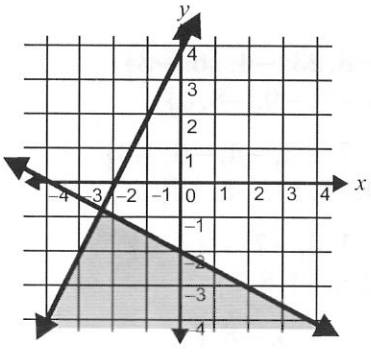

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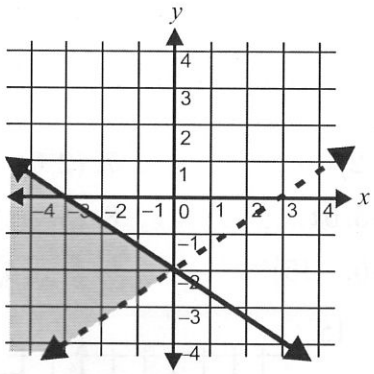

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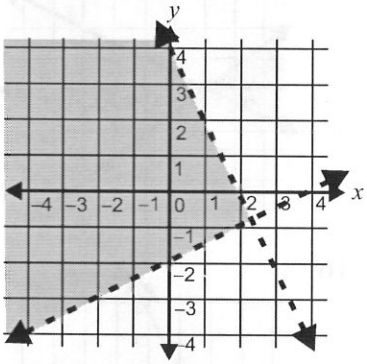

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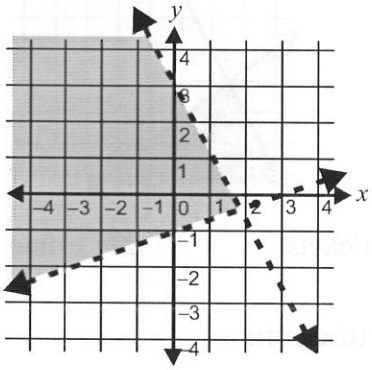

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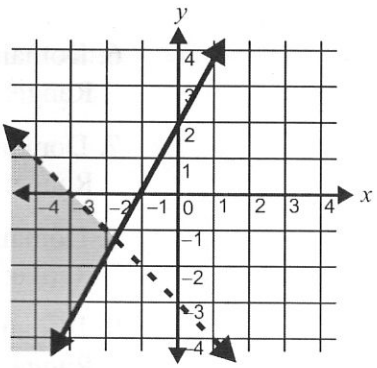

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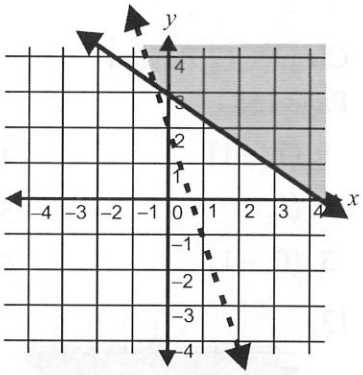

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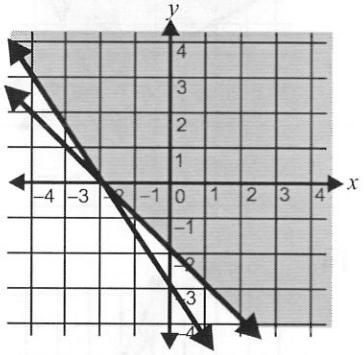

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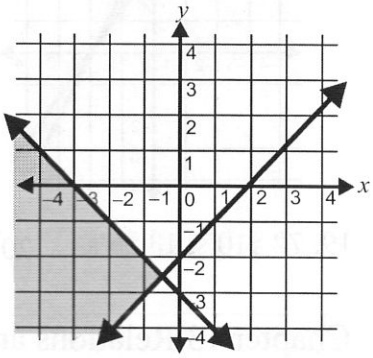

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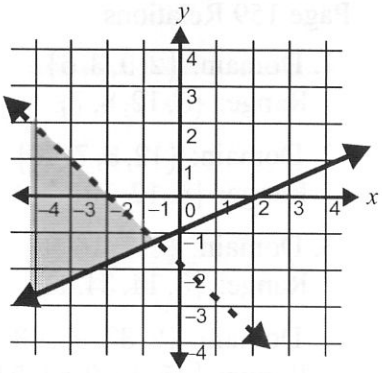


Page 160 Relations

1. $\{5, 10, 15, 20\}$
2. $\{3, 2, 1, 0, 1\}$
3. $\{2, 5, 11, 14\}$
4. $\{-2, -1, 0, -1, -2\}$
5. $\{1, -1, -5, -7\}$
6. $\{-22, -12, -2, 8, 18\}$
7. $\{7, 4, 1, 4, 7\}$
8. $\{1, 2, 3, 4\}$
9. $\{2, 4, 6, 8\}$
10. $\{-1, 2, 8, 11\}$
11. $\{2, 6, 14, 18\}$
12. $\{3, 1, -1, 1, 3\}$

Page 161 Functions

1. F	3. NF	5. NF	7. F	9. F	11. NF	13. F	15. NF	17. NF	19. NF
2. F	4. F	6. F	8. NF	10. F	12. NF	14. F	16. F	18. NF	20. NF

Page 162 Function Notation

1. 29	3. 4	5. 23	7. 31	9. -3
2. -10	4. 16	6. 4	8. 60	10. -11

Page 164 Recognizing Functions

1. Function
2. Not a Function
3. Function
4. Function
5. Not a Function
6. Function

Page 165 Function Tables

1. rule: $2(n-5)$:

n	$f(n)$
1	-10
2	-8
3	-6
4	-4

2. rule: $3x(x-4)$

x	$f(x)$
0	0
1	-9
2	-12
3	-9

3. rule: $\frac{2-n}{2}$

n	$f(n)$
0	1
2	0
4	-1
6	-2
8	-3

4. rule: $2x(x-1)$

x	$f(x)$
1	0
2	4
3	12
4	24

5. rule: $\frac{1}{n+3}$

n	$f(n)$
1	$\frac{1}{4}$
2	$\frac{1}{5}$
3	$\frac{1}{6}$
4	$\frac{1}{7}$

6. rule: $4x - x$

x	$f(x)$
-2	-6
-1	-3
0	0
1	3
2	6

7. rule: $n(n+2)$

n	$f(n)$
1	3
2	8
3	15
4	24

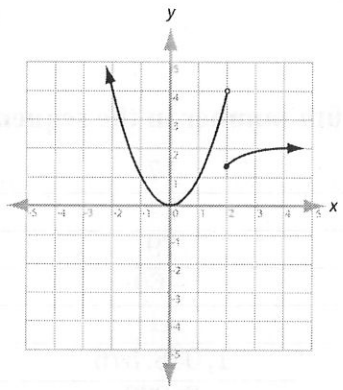
8. rule: $2x - 3$

x	$f(x)$
1	-1
2	1
3	3
4	5

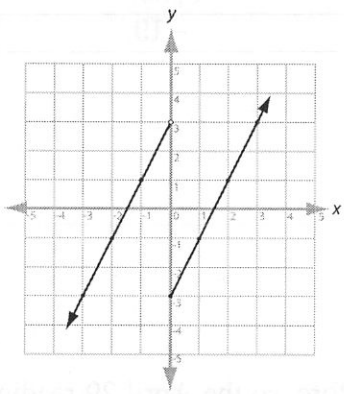
9. rule: $3 - 2n$

n	$f(n)$
-2	7
-1	5
0	3
1	1
2	-1

3.



4.



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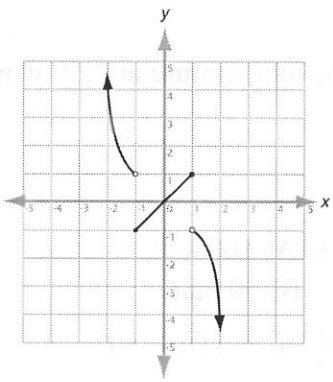
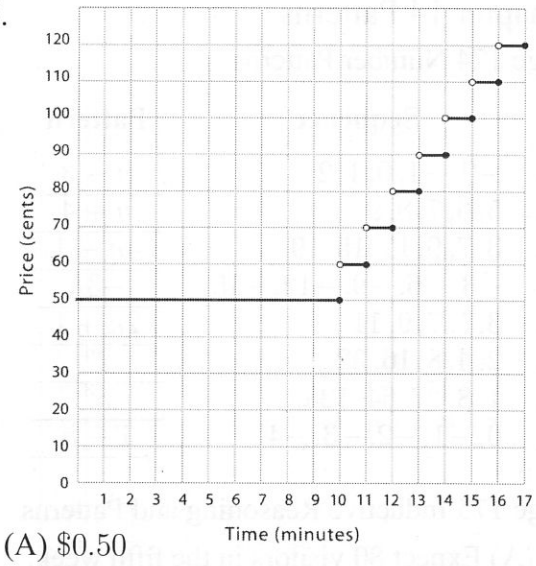
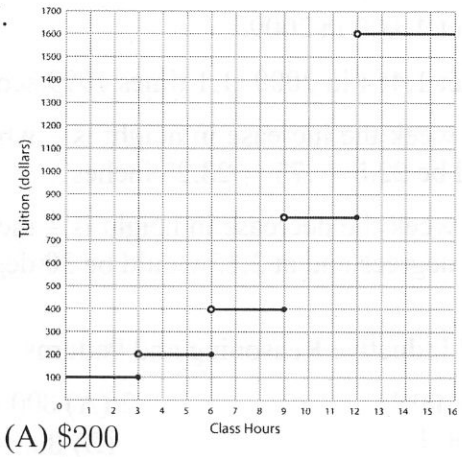


6.



(A) \$0.50
(B) \$0.50
(C) \$1.00

7.



(A) \$200
(B) \$800
(C) \$1,600

Chapter 13 Review
Page 172

1. $\{-1, 2, 4, 6\}$
2. $\{-2, -4, 6, -8\}$
3. $\{0, 5, 10, 15, 20\}$
4. F
5. F
6. NF
7. NF
8. F
9. 6
10. -9
11. $\frac{1}{7}$
12. -3
13. 24
14. 32

15. rule: $\frac{1}{2}(4 - 2n)$

n	$f(n)$
0	2
1	1
2	0
3	-1
4	-2

16. rule: $2n(n + 1)$

n	$f(n)$
0	0
1	4
2	12
3	24
4	40

17. rule: $6n - 3$

n	$f(n)$
2	9
3	15
4	21
5	27
6	33

Chapter 15 Statistics

Page 180 Range

1. 23 2. 44 3. 84 4. 54 5. 62 6. 35

Page 180 Mean

1. 86 2. 13.9 3. 4.5 4. 41.6

Page 181 Finding Data Missing From the Mean

1. 97%
2. $92.00
3. 85 cookies
4. 8 pounds
5. 23 pounds
6. 96 pounds
7. 15 ounces
8. 4 ounces
9. 10 points

Page 182 Median

1. 11 2. 38 3. 10.5 4. 51 5. 25 6. 5

Page 182 Mode

1. 56 2. 16 3. 4 4. 7 5. 22 6. 95

Page 183 Stem-and-Leaf Plots

1.

Stem	Leaves
1	0,5,6
2	0,1,2,4,5,8,9
3	1,2,2,2,2,3,4,4,5,5,5,5,6,6,6,8,9
4	0,0,1,1,1,1,2,2,3,5,5,5,6,7,7,8,8,9,9
5	0,0,1,1,2,2,2,2,2,5,5,5,6,8,9,9
6	3,5,9

2. 69
3. 10
4. 52
5. 26
6. 10

Page 184 More Stem-and-Leaf Plots

1. 58 2. 50 3. 58 4. 42 5. 90 6. 98

7.

I-85	Stem	I-75
7,6	5	3,5,6,6,7,7,8,8,8,9,9
9,9,9,9,8,7,5,5,5,4,3,2,0	6	0,1,1,2,2,3,3,3,3,4,5,7,7,9,9
9,8,7,5,5,4,3,1,1,0	7	0,2
1,0	8	
2	9	

8. 61.5 9. 69 10. 63 11. 69 12. 92

Chapter 15 Review

Page 192

Data Set Number	Mean	Median	Mode	Range
❶	21	20	20	6
❷	18	13		42
❸	$275.00	$280.00	$280.00	$198.00

4. 115 points
5. $400
6. 14 pizzas
7. $13\frac{1}{3}$ ounces
8. 10 points
6. 93 inches
10. $322\frac{1}{3}°F$
11. 349°F
12. 104°F because it is an outlier

Chapter 16 Data Interpretation

Pages 193–194 Tally Charts and Frequency Tables

1.

Speed	Tally	Frequency
0-9		0
10-19	𝍸	3
20-29	𝍸 ||	7
30-39	𝍸 𝍸 𝍸 |||	18
40-49	𝍸 𝍸 𝍸 ||||	19
50-59	𝍸 𝍸 𝍸	15
60-69	||	2

2.

Grade	Tally	Frequency
A	𝍸 ||	7
B	𝍸 𝍸 𝍸 ||	17
C	𝍸 𝍸 𝍸 𝍸	20
D	𝍸 ||||	9
F	|||	3

Page 197 Reading Schedules

1. True
2. 9:35
3. 18th and Miami
4. 18 min
5. 1st and Hyatt
6. False
7. 7:47

Page 199 Voting Methods

1.(A) blue
(B) purple
(C) rank #3 is yellow
rank #4 is green

2. candidate 3

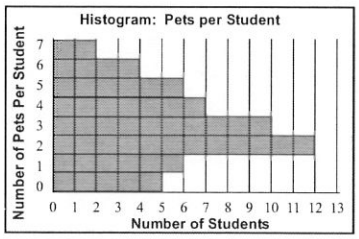
3.(A) Pizza
(B) second is hot dogs
third is hamburgers

Chapter 16 Review
Pages 200–201

1.

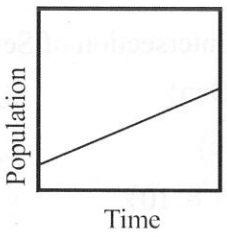
Number of Pets	Frequency
7	2
6	4
5	6
4	7
3	10
2	12
1	6
0	5

2.

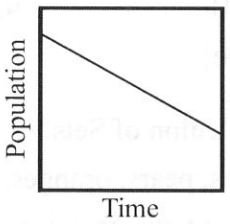


3. 33
4. 2
5. 40
6. 11.2 million metric tons
7. 37.6 million metric tons
8. 14.8 million metric tons
9. 1.8 billion
10. 144 million
11. Africa

12.



13.



Chapter 17 Probability

Page 204 Probability

1. 2%
2. 33%
3. 29%
4. 31%
5. 50%
6. 13.3%
7. 21%
8. 50%
9. 50%
10. 5%
11. 0.8%
12. 25%

Page 206 Independent and Dependent Events

1. $\frac{3}{22}$
2. $\frac{1}{6}$
3. $\frac{1}{2}$
4. $\frac{5}{11}$
5. $\frac{1}{3}$
6. $\frac{1}{11}$
7. $\frac{7}{23}$
8. $\frac{1}{25}$
9. $\frac{1}{5}$
10. $\frac{2}{21}$

Chapter 17 Review
Pages 213–215

1. $\frac{3}{10}$
2. $\frac{1}{3}$
3. $\frac{5}{6}$
4. $\frac{27}{512}$
5. $\frac{1}{8,000}$
6. $\frac{1}{16}$
7. $\frac{1}{81}$
8. $\frac{3,125}{59,049}$
9. $\frac{64}{729}$
10. $\frac{1}{59,049}$
11. $\frac{1}{59,049}$
12. $\frac{5}{4}$
13. $\frac{2}{9}$, dependent
14. $\frac{6}{29}$, independent
15. $\frac{1}{3}$, independent
16. $\{15\}$
17. {Felix, Mark, Kate, Carol, Jack}
18. {p, r, f, t}
19. $\emptyset$
20. {red, white, blue, black, grey}
21. $\{1, 2, 3, 4, 5, 6, 8, 10, 12\}$
22. D
23. L
24. A
25. K
26. I
27. N
28. O
29. E
30. M
31. J
32. F
33. H
34. B
35. G
36. C

Chapter 18 Permutations and Combinations

Page 218 Permutations

1. 120
2. 720
3. 5,040
4. 6
5. 24
6. 24
7. 120
8. 6
9. 6
10. 24
11. 40,320

Page 225 Subtracting Units of Time

1. 1 day 19 hours
2. 30 minutes
3. 2 minutes 40 seconds
4. 1 hour 45 minutes
5. 32 minutes 32 seconds
6. 2 days 16 hours
7. 6 months
8. 1 day 15 hours
9. 1 day 7 hours 55 minutes
10. 2 hours 25 minutes
11. 2 hours 15 minutes
12. 1 hours 33 minutes
13. 4 minutes 50 seconds
14. 3 days 18 hours 35 minutes
15. 3 week 6 days
16. 1 hour 35 minutes
17. 1 hour 15 minutes
18. 1 hour 40 minutes

Page 226 Changing Minutes to Hours

1. $\frac{1}{2}$	8. $\frac{11}{12}$	15. $2\frac{1}{3}$	22. $3\frac{2}{3}$	29. $3\frac{1}{3}$
2. $\frac{5}{6}$	9. $\frac{2}{3}$	16. $1\frac{1}{4}$	23. $7\frac{1}{2}$	30. $5\frac{1}{3}$
3. $\frac{1}{4}$	10. $\frac{5}{12}$	17. $1\frac{5}{6}$	24. $3\frac{5}{12}$	31. $1\frac{1}{3}$
4. $\frac{1}{3}$	11. $2\frac{1}{12}$	18. 5	25. $4\frac{3}{4}$	32. 3
5. $\frac{3}{4}$	12. $2\frac{1}{6}$	19. $6\frac{1}{2}$	26. $5\frac{3}{4}$	33. $4\frac{1}{6}$
6. $\frac{1}{6}$	13. 6	20. $1\frac{5}{12}$	27. $2\frac{1}{4}$	34. 5
7. $\frac{7}{12}$	14. $2\frac{1}{2}$	21. $3\frac{1}{6}$	28. $4\frac{2}{3}$	35. $7\frac{1}{6}$

Page 227 Changing Hours to Digital Time

1. 1:30	5. 4:20	9. 1:15	13. 7:20	17. 4:10
2. 2:45	6. 6:45	10. 4:40	14. 2:06	18. 5:20
3. 3:15	7. 2:40	11. 8:30	15. 5:05	19. 8:15
4. 6:30	8. 5:30	12. 9:45	16. 6:40	20. 7:45

Page 227 Time Word Problems

1. 10:45 a.m.
2. 5:45 p.m.
3. 10:15 p.m.
4. 2:40 p.m.
5. 11:10 a.m.
6. 5:15 p.m.

Chapter 20 Review

Page 237

1. pound	6. 4, 200	11. 0.12 km	16. 5, 000 mL
2. inches	7. 126	12. 9, 000 mg	17. 5 g
3. liters	8. 6.8	13. 20 L	18. 0.055 L
4. milligrams	9. $2\frac{1}{4}$	14. 0.0015 g	19. 0.3 m
5. 32	10. 0.00073	15. 150 mm	

Chapter 21 Angles and Triangles

Page 239 Corresponding, Alternate Interior, and Alternate Exterior Angles

1. I	4. S	7. V	10. E	13. S
2. C	5. S	8. I	11. V	14. V
3. E	6. C	9. C	12. S	15. S

Page 241 Congruent Figures

1. congruent, all corresponding angles and sides are congruent
2. not congruent, corresponding angles are not congruent
3. congruent, all corresponding angles and sides are congruent
4. not congruent, corresponding angles are not congruent
5. not congruent, corresponding sides are not equal
6. not congruent, corresponding sides are not congruent

Page 242 Similar and Congruent

1. N	3. C	5. N	7. S	9. C	11. S	13. C
2. S	4. C	6. C	8. C	10. N	12. N	14. N

Page 244 Similar Triangles

1. 10	3. 9	5. 4	7. 12
2. 24	4. 8	6. 9	8. 12

Page 245 Pythagorean Theorem

1. 7.07	4. 8.06	7. 10.44
2. 8.94	5. 6.71	8. 9.90
3. 4.47	6. 6.40	9. 5.00

Page 253 Introduction to Trigonometric Ratios

1. $24°$
2. $45°$
3. $44°$
4. $45°$
5. $-56°$ or $304°$
6. $180°$
7. $-37°$ or $323°$
8. $90°$
9. $69°$
10. $89°$
11. $45°$
12. $84°$
13. $0°$
14. $114°$
15. $90°$

Page 253 Introduction to Trigonometric Ratios

1. $\sin A = 0.766$
   $\cos A = 0.643$
   $\tan A = 1.192$
   $\sin B = 0.643$
   $\cos B = 0.766$
   $\tan B = 0.839$
2. $\sin A = 0.707$
   $\cos A = 0.707$
   $\tan A = 1.000$
   $\sin B = 0.707$
   $\cos B = 0.707$
   $\tan B = 1.000$
3. $\sin A = 0.208$
   $\cos A = 0.978$
   $\tan A = 0.213$
   $\sin B = 0.978$
   $\cos B = 0.208$
   $\tan B = 4.705$
4. $\sin A = 0.469$
   $\cos A = 0.883$
   $\tan A = 0.532$
   $\sin B = 0.883$
   $\cos B = 0.469$
   $\tan B = 1.881$
5. $\sin A = 0.951$
   $\cos A = 0.309$
   $\tan A = 3.078$
   $\sin B = 0.309$
   $\cos B = 0.951$
   $\tan B = 0.325$
6. $\sin A = 0.809$
   $\cos A = 0.588$
   $\tan A = 1.376$
   $\sin B = 0.588$
   $\cos B = 0.809$
   $\tan B = 0.727$

Page 254 Introduction to Trigonometric Ratios

1. $\angle B = 45°$
   $b = 14.142$
   $c = 10$
2. $\angle A = 50°$
   $b = 16.782$ 26.108
   $c = 26.108$
3. $\angle B = 60°$
   $b = 13.856$
   $c = 16$
4. $\angle A = 77.5°$
   $a = 4.511$
   $c = 4.620$
5. $\angle A = 80°$
   $a = 4.924$
   $b = 0.868$
6. $\angle B = 40°$
   $a = 6.500$
   $b = 5.454$

Page 255 Introduction to Trigonometric Ratios

1. $x = 232.992$ ft
   $y = 199.714$ ft
2. $0.911°$
3. $27.181°$

Page 263 Area of a Rhombus or a Kite

1. 42 in^2
2. 15 cm^2
3. 52.5 ft^2
4. 4 ft^2
5. 49 in^2
6. 17.5 in^2
7. 50 in^2
8. 6 ft^2
9. 400 ft^2
10. 9.375 ft^2

Page 264 Area of Polygons

1. 48 in^2
2. 60 ft^2
3. 87.5 cm^2
4. 120 ft^2
5. 800 cm^2
6. 1.28 in^2
7. 84 in^2
8. 2, 250 ft^2
9. 52.5 ft^2

Page 265 Parts of a Circle

Note: A line segment named as $\overline{AB}$ can also be correctly named as $\overline{BA}$, an angle named as $\angle ABC$ can also be correctly named as $\angle CBA$, and an arc named as ABC can also be corrected named as CBA. The answers below give only one of the two possible names for each question.

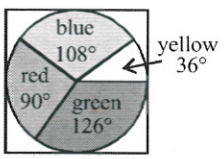
1. $\overline{TS}$ and $\overline{SR}$
2. ZSR
3. P
4. $\angle TSR$
5. $\angle YPZ$

Page 267 Central Angles

1.

blue	108°
red	90°
yellow	36°
green	126°

2.



3.

Mr. Perry	35%
Mrs. Nance	25%
Miss Murphy	20%
Mr. Bard	12%
Mr. Olson	5%
All Others	3%

4.

Mr. Perry	126°
Mrs. Nance	90°
Miss Murphy	72°
Mr. Bard	43.2°
Mr. Olson	18°
All Others	10.8°

5. 90°
6. 60°
7. 180°
8. 270°
9. 30°
10. 60°

Page 268 Arc Lengths

1. 37
2. 26
3. 26
4. 117
5. 180
6. 243
7. 180
8. 154
9. 45°
10. 25°
11. 65°
12. 90°
13. 180
14. 90°
15. 90
16. 140

Page 269 Circumference

1. 50.24 in
2. 43.96 ft
3. 6.28 cm
4. 37.68 m
5. 25.12 ft
6. $18\frac{6}{7}$ ft
7. $37\frac{5}{7}$ in
8. $18\frac{6}{7}$ m
9. $31\frac{3}{7}$ cm
10. $50\frac{2}{7}$ in

Chapter 23 Solid Geometry

Page 278 Volume of Rectangular Prisms and Cubes

1. 72 ft^3
2. 1,872 mm^3
3. 240 cm^3
4. 1,200 m^3
5. 90 ft^3
6. 4,480 in^3
7. 675 in^3
8. 343 in^3
9. 64 ft^3

Page 280 Volume of Spheres, Cones, Cylinders, and Pyramids

1. 401.92 in^3
2. 18 cm^3
3. 523.33 m^3
4. 33.49 ft^3
5. 126 m^3
6. 188.4 mm^3
7. 33.49 m^3
8. 160 in^3
9. 1,469.52 m^3
10. 27 ft^3

Page 281 Two-Step Volume Problems

1. 1,536 in^3
2. 297 in^3
3. 4,383 cm^3
4. 175.84 in^3
5. ~~165 cm^3~~ 147 cm^3
6. 932.58 m^3

Page 283 Surface Area of Cubes and Rectangular Prisms

1. 24 ft^2
2. 610 cm^2
3. 30 m^2
4. 294 mm^2
5. 176 ft^2
6. 258 cm^2
7. 280 in^2
8. 136 ft^2
9. 150 m^2
10. 356 cm^2

Page 284 Surface Area of Pyramids

1. 16 ft^2
2. 180 mm^2
3. 400 m^2
4. 176 cm^2
5. 33 m^2
6. 261 in^2
7. 88 m^2
8. 125 in^2
9. 8.75 ft

Page 285 Surface Area of Cylinders

1. 87.92 m^2
2. 351.68 ft^2
3. 226.08 cm^2
4. 75.36 in^2
5. 175.85 ft^2
6. 1,381.6 m^2
7. 351.68 ft^2
8. 282.6 cm^2
9. 31.4 m^2

Page 286 Surface Area of Spheres

1. 50.24 in^2
2. 452.16 m^2
3. 7.065 yd^2
4. ~~200.96 cm^2~~
5. 7,850 mm^2
6. 0.785 ft^2
7. 615.44 cm^2
8. 0.502 km^2
9. 28.26 in^2
10. 1.4 ft^2
11. 1,256 mm^2
12. 78.5 yd^2

Chapter 24 Transformations

Page 298 Drawing Geometric Figures on a Cartesian Coordinate Plane

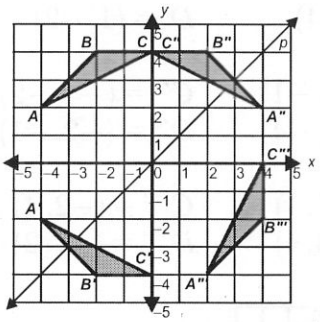
1. $A = (-1, -1)$
   $B = (-2, 4)$
   $C = (2, 2)$
   $D = (2, 0)$
2. $E = (-6, 2)$
   $F = (-3, 2)$
   $G = (-3, -4)$
   $H = (-6, -4)$
3. $I = (3, -5)$
   $J = (5, -1)$
   $K = (6, -7)$
4. $L = (-6, 6)$
   $M = (-1, 6)$
   $N = (2, 3)$
   $O = (-3, 3)$
5. $P = (-5, -3)$
   $Q = (0, 0)$
   $R = (0, -3)$
6. $S = (1, -7)$
   $T = (0, -5)$
   $V = (2, -4)$
   $X = (4, -5)$
   $Y = (3, -7)$

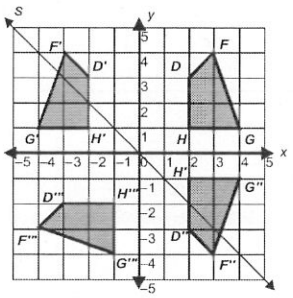
Page 299 More Drawing Geometric Figures on a Cartesian Coordinate Plane

1. square
2. isosceles triangle
3. parallelogram
4. right triangle
5. pentagon
6. square
7. triangle
8. rectangle

Pages 301–302 Reflections

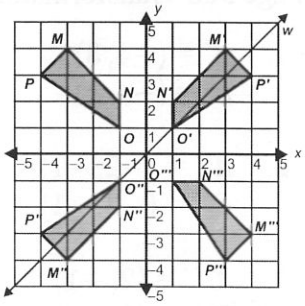
1. $A' = (-4, -2)$ $B' = (-2, -4)$ $C' = (0, -4)$
2. $A'' = (4, 2)$ $B'' = (2, 4)$ $C'' = (0, 4)$
3. $A''' = (2, -4)$ $B''' = (4, -2)$ $C''' = (4, 0)$





4. $D' = (-2, 3)$ $F' = (-3, 4)$ $G' = (-4, 1)$ $H' = (-2, 1)$
5. $D'' = (2, -3)$ $F'' = (3, -4)$ $G'' = (4, -1)$ $H'' = (2, -1)$
6. $D''' = (-3, -2)$ $F''' = (-4, -3)$ $G''' = (-1, -4)$ $H''' = (-1, -2)$

7. $M' = (3, 4)$ $N' = (1, 2)$ $O' = (1, 1)$ $P' = (4, 3)$
8. $M'' = (-3, -4)$ $N'' = (-1, -2)$ $O'' = (-1, -1)$ $P'' = (-4, -3)$
9. $M''' = (4, -3)$ $N''' = (2, -1)$ $O''' = (1, -1)$ $P''' = (3, -4)$

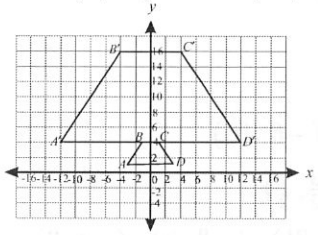


Page 307 Dilations

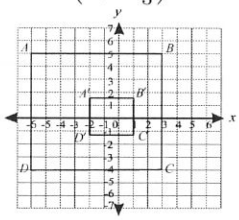
C

Page 308 Dilations

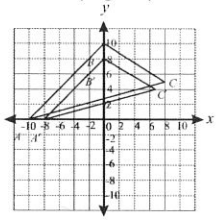
1. $A' = (-12, 4)$ $B' = (-4, 16)$
$C' = (4, 16)$ $D' = (12, 4)$



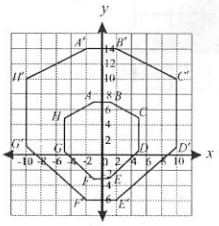
2. $A' = \left(-2, \frac{5}{3}\right)$ $B' = \left(1, \frac{5}{3}\right)$
$C' = \left(1, -\frac{4}{3}\right)$ $D' = \left(-2, -\frac{4}{3}\right)$



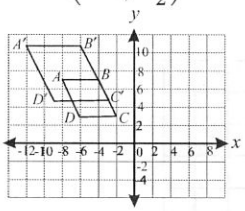
3. $A' = (-8, 0)$ $B' = (0, 8)$
$C' = \left(6\frac{2}{5}, 4\right)$



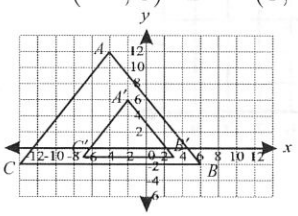
4. $A' = (-2, 14)$ $B' = (2, 14)$
$C' = (10, 10)$ $D' = (10, 1)$
$E' = (2, -6)$ $F' = (-2, -6)$
$G' = (-10, 1)$ $H' = (-10, 10)$



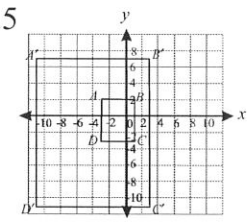
5. $A' = \left(-12, 10\frac{1}{2}\right)$ $B' = \left(-6, 10\frac{1}{2}\right)$
$C' = \left(-3, 4\frac{1}{2}\right)$ $D' = \left(-9, 4\frac{1}{2}\right)$



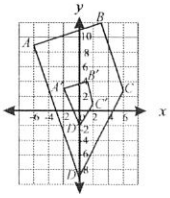
6. $A' = (-2, 6)$ $B' = (3, -1)$ $C' = (-7, -1)$



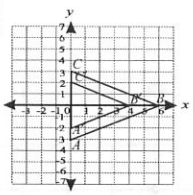
7. 3.5



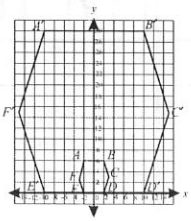
8. $\frac{1}{3}$



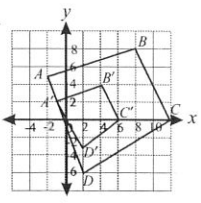
9. $\frac{2}{3}$



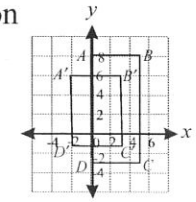
10. 5



11. Not a dilation



12. Not a dilation



Practice Test 1

Pages 313–330

Segment 1

1. A	3. D	5. A	7. D	9. B	11. C	13. B	15. A	17. C	19. D
2. D	4. C	6. D	8. A	10. D	12. D	14. D	16. B	18. C	

20. $C = \pi d = 3.14 \times 36 = 113.04$
There are 24 panels, so the entire circumference of 113.04 feet is divided into 24 arcs with a length of $\frac{113.4}{24} = 4.71$ feet.
The length of the arc is 4.71 feet.

Segment 2

21. D	23. B	25. D	27. B	29. D	31. D	33. B	35. C	37. C
22. C	24. C	26. A	28. A	30. D	32. D	34. D	36. B	38. 17

39.(A) $\begin{aligned} 3x + 5y &= 736 \\ x + y &= 190 \end{aligned}$

(B) $\begin{aligned} 3x + 5y &= 736 \\ x + y &= 190 \end{aligned} \rightarrow \begin{aligned} 3x + 5y &= 736 \\ -3x - 3y &= -570 \\ \hline 0x + 2y &= 166 \\ 2y &= 166 \\ y &= 83 \end{aligned} \rightarrow \begin{aligned} x + y &= 190 \\ x + 83 &= 190 \\ x &= 190 - 83 \\ x &= 107 \end{aligned}$

$x = 107$ and $y = 83$

40.(A) The median speed is 20 mph, the middle point on the box-and-whisker plot. The range is $39 - 10 = 29$ mph, the difference between the highest and lowest recorded speeds.

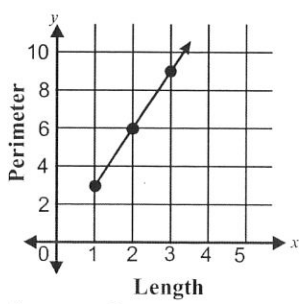
(B) Three of the four quartiles are to the right of 15, so $\frac{3}{4}$ or 75% of the drivers exceeded the 15 mph speed limit.

(C) Since 20 mph is the median speed, approximately half of the 36 drivers would be expected to be driving 20 mph or faster. The expected number of tickets issued would be $36 \div 2 = 18$. The approximate expected number of warning tickets issued is 18.

Segment 3

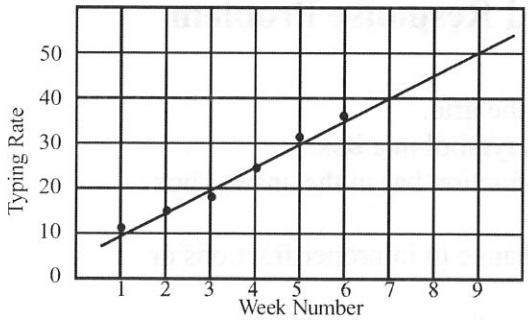
41. B	43. B	45. D	47. C	49. C	51. A	53. C	55. B	57. D	59. 70
42. C	44. A	46. D	48. B	50. C	52. B	54. B	56. A	58. C	

60.(A)



(B) slope = 3

(B)



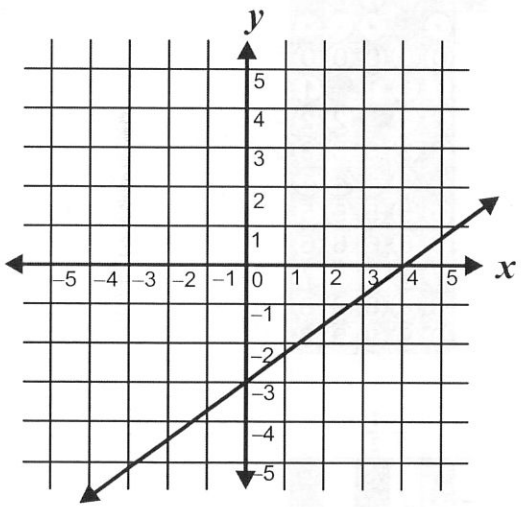
(C) week 8

Segment 3

41. A	43. B	45. C	47. A	49. A	51. C	53. C	55. C	57. A
42. B	44. C	46. D	48. B	50. C	52. A	54. A	56. B	58. 44

59.(A) slope $= \frac{3}{4}$ and y-intercept $= (0, -3)$

(B)



60. Since there are 360 degrees in an entire circle, there is $\frac{1}{5}$ of 360 degrees in $\frac{1}{5}$ of a circle.
$\frac{1}{5} \times 360^\circ = 72^\circ$
Measure of $\angle P = 72^\circ$

Segment 4

61. B	64. D	67. B	70. C	73. B	76. C	79. B	82. A
62. C	65. A	68. B	71. C	74. C	77. C	80. C	83. D
63. C	66. C	69. C	72. A	75. C	78. A	81. B	84. A

85. Krista's claim is not valid. Although only 9 of the units she assembled were defective, she assembled fewer units than each of the other workers. Approximately 7% of the units Krista assembled were defective, whereas only about 5% of the other workers' units were defective.

Grade 11 Blank Grids

You may give this sheet to your students throughout the book for practice.