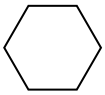
Selected Answers

CHAPTER 1

SKILL REVIEW (p. 2) **1.** 8 **2.** –8 **3.** 8 **4.** 8 **5.** –9 **6.** –5 **7.** –1 **8.** 1 **9.** 20 **10.** 29 **11.** 2 **12.** 25 **13.** 6.32 **14.** 7.07 **15.** 18.03 **16.** 4.24

1.1 PRACTICE (pp. 6–9)

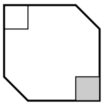
3.



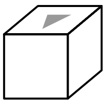
5. Each number is 3 times the previous number; 162.

7. Each number is $\frac{1}{4}$ the previous number; 1.
9. Each number is 0.5 greater than the previous number; 9.0.
11. 3 times the middle integer

13.



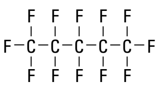
15.



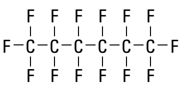
17. Each number is half the previous number; 0.625.

19. Each number is 5 less than the previous number; –15. **21.** Numbers after the first are found by adding consecutive whole numbers; 21. **23.** Numbers after the first are found by adding a zero after the decimal point of the previous number; 1.00001. **25.** 28 blocks **27.** The distance is 4 times the figure number. **29.** even **31.** $n^2 - 1$
33. 121; 12,321; 1,234,321; 123,454,321; the square of the *n*-digit number consisting of all 1's is the number obtained by writing the digits from 1 to *n* in increasing order, then the digits from *n* – 1 to 1 in decreasing order. This pattern does not continue forever. **35–39.** *Sample answers* are given.
35. 2 + (–5) = –3, which is not greater than 2.
37. (–4)(–5) = 20 **39.** Let *m* = –1; $\frac{-1+1}{-1} = 0$.
41. *Sample answer:* 3

43.



C_5F_{12}

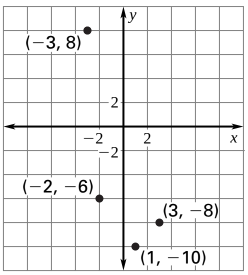


C_6F_{14}

45. The *y*-coordinate is $\frac{1}{2}$ more than the opposite of the *x*-coordinate; $-2\frac{1}{2}$.

1.1 MIXED REVIEW (p. 9)

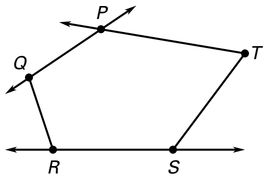
53–59 odd:



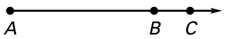
61. 25 **63.** –49 **65.** 169 **67.** 125 **69.** 40,000.4 **71.** +3

1.2 PRACTICE (pp. 13–16) **3.** false **5.** false **7.** true **9.** false **11.** true **13.** true **15.** false **17.** *K* **19.** *M* **21.** *L* **23.** *J* **25.** *N*, *P*, and *R*; *N*, *Q*, and *R*; *P*, *Q*, and *R* **27.** *A*, *W*, and *X*; *A*, *W*, and *Z*; *A*, *X*, and *Y*; *A*, *Y*, and *Z*; *W*, *X*, and *Y*; *W*, *X*, and *Z*; *W*, *Y*, and *Z*; *X*, *Y*, and *Z* **29.** *G* **31.** *H* **33.** *E* **35.** *H* **37.** *K*, *N*, *Q*, and *R* **39.** *M*, *N*, *P*, and *Q* **41.** *L*, *M*, *P*, and *S* **43.** *M*, *N*, *R*, and *S* **45.** on the same side of *C* as point *D* **47.** *A*, *B*, and *C* are collinear and *C* is between *A* and *B*.
49–51. Sample figures are given.

49.



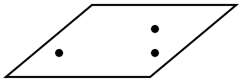
51.



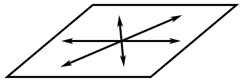
53. the intersection of a line and a plane **55.** *B* **57.** *H* **59.** $\overleftrightarrow{DH}$

61–67. Sample figures are given.

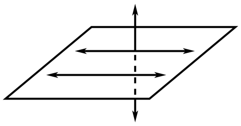
61.



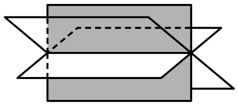
63.



65.

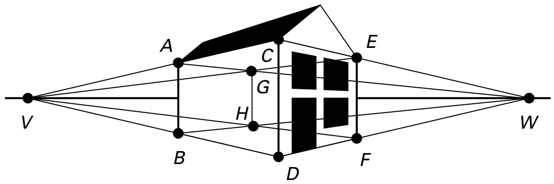


67.



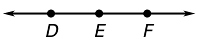
69. $\overleftrightarrow{CE}$, $\overleftrightarrow{DF}$

70–72.



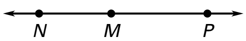
1.2 MIXED REVIEW (p. 16) **77.** Each number is 6 times the previous number; 1296. **79.** Numbers after the first are found by adding an 8 immediately before the decimal point of the previous number and a 1 immediately after the decimal point; 88,888.11111. **81.** –2 **83.** 13 **85.** 5 **87.** 11 **89.** 11 **91.** 13 **93.** 8.60 **95.** 4.24

1.3 PRACTICE (pp. 21–24) **5.** $5\sqrt{5}$ **7.** $\sqrt{61}$ **9.** 5
11. $\overline{JK}$ and $\overline{KL}$ are not congruent; $JK = \sqrt{137}$, $KL = 2\sqrt{34}$.
13–17. Answers may vary slightly. **13.** 3 cm **15.** 2.4 cm
17. 1.8 cm **19.**



; *DE* + *EF* = *DF*

21.



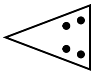
; *NM* + *MP* = *NP* **23.** 3 **25.** 3

27. 6 **29.** 9 **31.** 4; 20, 3, 23 **33.** 1; $2\frac{1}{2}$, $4\frac{1}{2}$, 7
35. $DE = \sqrt{85}$, $EF = 6\sqrt{2}$, $DF = 5$ **37.** $AC = 3\sqrt{5}$, $BC = 3\sqrt{5}$, $CD = 2\sqrt{10}$; $\overline{AC}$ and $\overline{BC}$ have the same length.
39. $LN = 3\sqrt{13}$, $MN = \sqrt{109}$, $PN = 3\sqrt{10}$; no two segments have the same length. **41.** $\overline{PQ} \cong \overline{QR}$; $PQ = QR = \sqrt{170}$

SELECTED ANSWERS

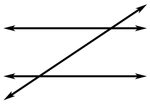
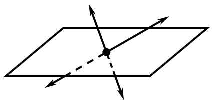
43. $\overline{PQ} \cong \overline{QR}$; $PQ = QR = 2\sqrt{85}$ **45.** about 896 ft **47.** *Sample answer:* about 63 mi **49–51.** Answers are rounded to the nearest whole unit. **49.** 5481 units **51.** 8079 units **53.** 115 yards, 80 yards, 65 yards

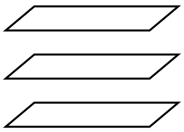
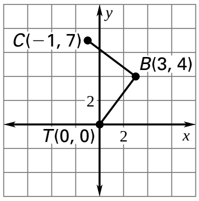
1.3 Mixed Review (p. 24)

61.  **63.** false **65.** true **67.** true **69.** $\overrightarrow{NM}$, $\overrightarrow{NQ}$ **71.** $\overrightarrow{NM}$ and $\overrightarrow{NQ}$

Quiz 1 (p. 25)

1. 8 **2.** 6

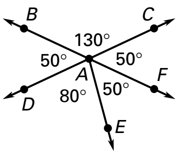
3.  **4.**  **5.** 

6.  **7.** 

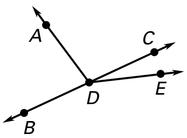
; $TB = 5$ ft, $BC = 5$ ft

1.4 Practice (pp. 29–32)

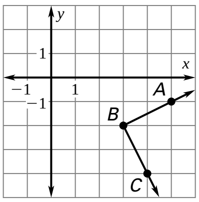
9. E, $\overrightarrow{ED}$, $\overrightarrow{EF}$; about 35° **11.** J, $\overrightarrow{JH}$, $\overrightarrow{JK}$; about 75° **13.** straight **15.** obtuse **17.** X, $\overrightarrow{XF}$, $\overrightarrow{XT}$ **19.** Q, $\overrightarrow{QR}$, $\overrightarrow{QS}$ **21.** $\angle C$, $\angle BCD$, $\angle DCB$ **23.** 55° **25.** 140° **27.** 180°

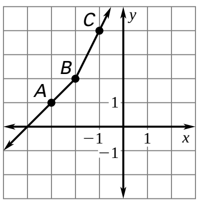
29–33. 

29. 50° **31.** 180° **33.** 130° **35.** acute; about 40° **37.** obtuse; about 150°

39. 

41–43. Coordinates of sample points are given.

41. 

; **43.** 

;

right; (4, –3), (0, 0) obtuse; (–3, 3), (0, 0)

45–49. Estimates may vary. **45.** about 150° **47.** about 140° **49.** about 135° **51.** 12 points **53.** 40 points

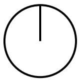
1.4 Mixed Review (p. 32)

61. 3 **63.** –12 **65.** –27 **67.** 15 **69.** –5 **71.** false **73.** false **75.** $\sqrt{89}$ **77.** $\sqrt{221}$ **79.** $3\sqrt{2}$

1.5 Practice (pp. 38–41)

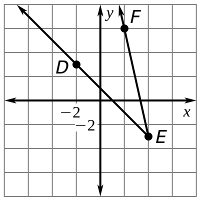
5. (5, –7) **7.** (3, 8) **9.** (–2, –6) **11.** $m\angle RQS = 40°$, $m\angle PQR = 80°$ **13.** $m\angle PQS = 52°$, $m\angle PQR = 104°$ **17.** (–4, 3) **19.** $\left(4, 6\frac{1}{2}\right)$ **21.** (–3, 3) **23.** (–0.625, 3.5) **25.** (–4, –4) **27.** (1, 10) **29.** (14, –21) **31.** $\overline{AC}$ and $\overline{BC}$, $\angle A$ and $\angle B$ **33.** $\overline{XW}$ and $\overline{XY}$, $\angle ZXW$ and $\angle ZXY$ **37.** $m\angle PQS = 22°$, $m\angle PQR = 44°$ **39.** $m\angle RQS = 80°$, $m\angle PQR = 160°$ **41.** $m\angle RQS = 45°$, $m\angle PQR = 90°$ **43.** No; yes; the angle bisector of an angle of a triangle passes through the midpoint of the opposite side if the two sides of the triangle contained in the angle are congruent. **45.** 19 **47.** 8 **49.** 42 **51.** 54 **53.** 65°, 65°, 25°, 25° **55.** *Sample answer:* $\overline{AB}$ and $\overline{AL}$, $\overline{AC}$ and $\overline{AK}$, $\overline{AN}$ and $\overline{AM}$, $\overline{AE}$ and $\overline{AI}$, $\overline{NE}$ and $\overline{MI}$, $\overline{ND}$ and $\overline{MJ}$, $\angle BAC$, $\angle CAN$, $\angle NAG$, $\angle GAM$, $\angle MAK$, and $\angle KAL$; $\angle DNE$, $\angle ENF$, $\angle HMI$, and $\angle JMI$ **57.** Yes; $x_1 + \frac{1}{2}(x_2 - x_1) = x_1 + \frac{1}{2}x_2 - \frac{1}{2}x_1 = \frac{1}{2}x_1 + \frac{1}{2}x_2 = \frac{x_1 + x_2}{2}$. Similarly, $y_1 + \frac{1}{2}(y_2 - y_1) = \frac{y_1 + y_2}{2}$.

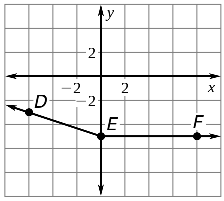
1.5 Mixed Review (p. 42)

61.  **63.** $\sqrt{233}$ **65.** $2\sqrt{130}$ **67.** $\sqrt{97}$ **69.** 20° **71.** 115°

Quiz 2 (p. 42)

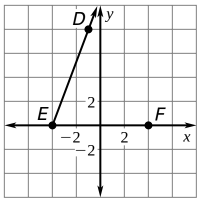
1. If Q is in the interior of $\angle PSR$, then $m\angle PSQ + m\angle QSR = m\angle PSR$. **2–5.** Coordinates of sample points are given.

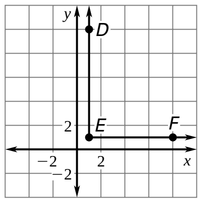
2. 

; **3.** 

;

acute; (2, 2), (0, 0) obtuse; (0, 0), (4, –6)

4. 

; **5.** 

;

acute; (0, 2), (0, –2) right; (2, 2), (0, 0)

6. 21°, 42°

1.6 Practice (pp. 47–50)

5. 20° **7.** 40° **9.** yes **11.** yes **13.** no **15.** always **17.** always **19.** never **21.** 80° **23.** 123° **25.** 167° **27.** 154° **29.** 23 **31.** $x = 29$, $y = 50$ **33.** $x = 48$, $y = 31$ **35.** $x = 8$, $y = 12$ **37.** supplementary **39.** complementary **41.** 88°; 80°; 65°; 57°; 50°; 41°; 35°; 28°; 14°; 4° **43.** $m\angle A = 22.5°$; $m\angle B = 67.5°$ **45.** $m\angle A = 73°$, $m\angle B = 17°$ **47.** $m\angle A = 89°$, $m\angle B = 1°$ **49.** $m\angle A = 129°$, $m\angle B = 51°$ **51.** $m\angle A = 157°$, $m\angle B = 23°$ **53.** 122°, 156° **55.** 135°, 45°

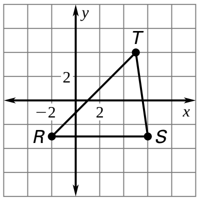
1.6 Mixed Review (p. 50)

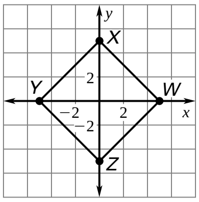
61. 8 **63.** $-10\sqrt{2}$, $10\sqrt{2}$ **65.** –10, 10 **67.** C **69.** A **71.** (–4, 6) **73.** (–7, 1) **75.** (2.6, 7)

1.7 Practice (pp. 55–57)

3. 36 square units **5.** 28.3 square units **7.** 25.1 in.^2 **9.** 32 units, 60 square units **11.** 16 units, 12 square units **13.** 48 units, 84 square units **15.** 54 units, 126 square units **17.** 60 units, 225 square units

19. $10 + 5\sqrt{2}$ units, 12.5 square units **21.** 15 cm^2 **23.** 64 ft^2 **25.** 36 m^2 **27.** 6 square units **29.** 12.6 square units

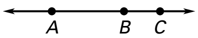
31.


; **33.**


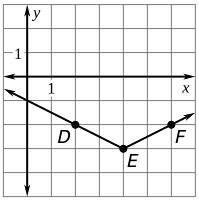
;

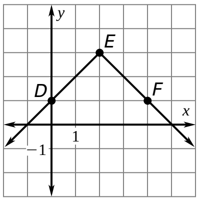
28 square units 50 square units

35. 352 $in.^2$ **37.** 10 m by 10 m **39.** about 3 times **41.** 26 in. **43.** 6 ft **45.** $10\sqrt{2} \approx 14.1$ cm **47.** ≈ 796.2 yd^2

1.7 MIXED REVIEW (p. 58) **51.**


53–55. Coordinates of sample points are given.

53.


; **55.**


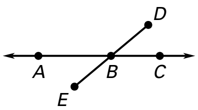
;

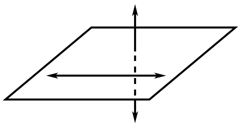
obtuse; (0, 0), (0, –2) right; (0, 0), (0, 2)

57. $\left(2\frac{1}{2}, 1\frac{1}{2}\right)$ **59.** $\left(-2\frac{1}{2}, 1\frac{1}{2}\right)$ **61.** (7, 3)

QUIZ 3 (p. 58) **1.** 49° **2.** 53° **3.** 158° **4.** 55° **5.** 15°, 75° **6.** 1017.4 m^2, 113.0 m **7.** 71.5 $in.^2$ **8.** 46 cm^2, 29.2 cm **9.** 40 square units **10.** at least 21 rolls

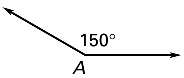
CHAPTER 1 REVIEW (pp. 60–62) **1.** Each number is 7 more than the previous number. **3.** Each number is 3 times the previous number. **5.** If 1 is added to the product of four consecutive positive integers, n through $n + 3$, the sum is equal to the square of $[n(n + 3) + 1]$.

7.


9.


11. $\overline{PQ} \cong \overline{QR}$; $PQ = QR = 2\sqrt{2}$

13. $\overline{PQ}$ and $\overline{QR}$ are not congruent; $PQ = \sqrt{13}$, $QR = \sqrt{10}$.

15. obtuse;


17. 105° **19.** 70° **21.** (1, 2)

23. $m\angle RQS = 50°$, $m\angle PQR = 100°$ **25.** $m\angle RQS = 46°$, $m\angle PQR = 92°$ **27.** sometimes **29.** sometimes **31.** 56.52 in., 254.34 $in.^2$ **33.** 56 ft

CHAPTER 2

SKILL REVIEW (p. 70)

1. *D* **2.** *B* **3.** *F* **4.** *E* **5.** 142° **6.** 142° **7.** 38°

2.1 PRACTICE (pp. 75–77) **3.** hypothesis: the dew point equals the air temperature; conclusion: it will rain **5.** If an angle is a right angle, then its measure is 90°. **7.** false **9.** If an object weighs 2000 pounds, then it weighs one ton. **11.** If three points lie on the same line, then the points are collinear. **13.** If a fish is a hagfish, then it lives in salt water. **15.** False; let $x = -3$. The hypothesis is true because $(-3)^4 = 81$. However, the conclusion is false, so the conditional statement is false. **17.** True **19.** If $\angle 2$ is acute, then $\angle 2$ measures 38°. **21.** If I go to the movies, then it is raining. **23.** if-then form: If three noncollinear points are distinct, then there is exactly one plane that they lie in; inverse: If three noncollinear points are not distinct, then it is not true that there is exactly one plane that they lie in; converse: If exactly one plane contains three noncollinear points, then the three points are distinct; contrapositive: If it is not true that there is exactly one plane that contains three noncollinear points, then the three points are not distinct. **25.** one **27.** a line **29.** Postulate 5: Through any two points there exists exactly one line. **31.** Postulate 8: Through any three noncollinear points there exists exactly one plane. **33.** Postulate 11: If two planes intersect, then their intersection is a line. **35.** Postulate 6: A line contains at least two points. **37.** Postulate 8: Through any three noncollinear points there exists exactly one plane. **41.** Yes; points *A* and *B* could lie on the line intersecting two planes. **43.** Yes; the plane that runs from the front of the room to the back of the room through points *A* and *B* contains both points and a point on the front wall. **45.** inverse: If $x \neq 4$, then $6x - 6 \neq x + 14$; converse: If $6x - 6 = x + 14$, then $x = 4$; contrapositive: If $6x - 6 \neq x + 14$, then $x \neq 4$. **47.** if-then form: If one feels the impulse to soar, then one can never consent to creep. **a.** hypothesis: one feels the impulse to soar; conclusion: one can never consent to creep **b.** If one does not feel the impulse to soar, then one can consent to creep. **49.** if-then form: If a man is early to bed and early to rise, then the man will be healthy, wealthy, and wise. **a.** hypothesis: a man is early to bed and early to rise; conclusion: the man is healthy, wealthy, and wise **b.** If a man is not early to bed and early to rise, then the man is not healthy, wealthy, and wise. **51.** inverse: If you do not want a great selection of used cars, then do not come and see Bargain Bob's Used Cars; converse: If you come and see Bargain Bob's Used Cars, then you want a great selection of used cars; contrapositive: If you do not come and see Bargain Bob's Used Cars, then you do not want a great selection of used cars.

MIXED REVIEW (p. 78) **61.** obtuse **63.** right **65.** (1, –2) **67.** (–1.5, 1.5) **69.** (6, –1) **71.** 113.04 m^2; 37.68 m **73.** 1501.5625 mm^2; 155 mm

2.2 PRACTICE (pp. 82–85) **3.** No; for a statement to be a biconditional statement it must contain the phrase "if and only if." **5.** yes **7.** conditional statement: If you scored a touchdown, then the football crossed the goal line; converse: If the football crossed the goal line, then you scored a touchdown. **9.** False; the points do not lie on the same line.

SELECTED ANSWERS

11. True; $\angle DBA$ and $\angle EBC$ each are supplementary to right angle $\angle DBC$, so each measures 90°. **13.** false **15.** false **17.** false **19.** true **21.** conditional statement: If a ray bisects an angle, then it divides the angle into two congruent angles; converse: If an angle is divided into two congruent angles, then it is bisected by a ray. **23.** conditional statement: If a point is a midpoint of a segment, then it divides the segment into two congruent segments; converse: If a point divides a segment into two congruent segments, then the point is the midpoint of the segment. **25.** Two angles measuring 30° and 60° are complementary, but they do not measure 42° and 48°. **27.** A rectangle with width 2 cm and length 3 cm has four sides, but it is not a square. **29.** False; *PQ* and *PS* are equal if they are both 5 cm. **31.** true **33.** if-then form: If two circles have the same diameter, then they have the same circumference; converse: If two circles have the same circumference, then they have the same diameter; true; biconditional statement: Two circles have the same circumference if and only if they have the same diameter. **35.** if-then form: If an animal is a leopard, then it has spots; converse: If an animal has spots, then it is a leopard; false; counterexample: A giraffe has spots, but it is not a leopard. **37.** if-then form: If a leopard has pale gray fur, then it is a snow leopard; converse: If a leopard is a snow leopard, then it has pale gray fur; true; biconditional statement: A leopard is a snow leopard if and only if it has pale gray fur. **39.** No; *v* can be any number if $9v - 4v = 2v + 3v$. **41.** Yes; $x^3 - 27 = 0$ if and only if $x = 3$. **43.** No; *z* can be any number if $7 + 18z = 5z + 7 + 13z$. **47.** quadrupled **49.** The statements from Exercises 47 and 48 can both be written as true biconditionals. The sides of the square are doubled if and only if the area is quadrupled, and the sides of a square are doubled if and only if the perimeter is doubled, are both true. **51.** true **53.** False; winds are classified as 9 on the Beaufort scale if the winds measure 41–47 knots.

2.2 MIXED REVIEW (p. 85) **59.** 3°; 93° **61.** 76°; 166° **63.** 36 ft^2; 30 ft **65.** 200.96 in.^{2}; 50.24 in. **67.** If a rectangle is a square, then the sides of the rectangle are all congruent.

2.3 PRACTICE (pp. 91–94) **3.** converse **5.** If you like this movie, then you enjoy scary movies. **7.** Yes; if *f* is true, then by the Law of Detachment, *g* is true. If *g* is true, then by the Law of Detachment, *h* is true. Therefore, if *f* is true, then *h* is true. **9.** Points *X, Y,* and *Z* do not lie on the same line. **11.** If points *X, Y,* and *Z* are not collinear, then points *X, Y,* and *Z* do not lie on the same line. **13.** If points *X, Y,* and *Z* do not lie on the same line, then points *X, Y,* and *Z* are not collinear. **15.** *p*: Alberto finds a summer job; *q*: Alberto will buy a car; inverse: $\sim p \rightarrow \sim q$, If Alberto does not find a summer job, then he will not buy a car; contrapositive: $\sim q \rightarrow \sim p$, If Alberto does not buy a car, then he did not find a summer job. **17.** *p*: the car is running; *q*: the key is in the ignition; inverse: $\sim p \rightarrow \sim q$, If the car is not running, then the key is not in the ignition; contrapositive: $\sim q \rightarrow \sim p$, If the key is not in the ignition, then the car is not running. **19.** *p*: Gina walks to the store; *q*: Gina buys a newspaper; inverse: $\sim p \rightarrow \sim q$, If Gina does not walk to the store, then she will not buy a newspaper; contrapositive: $\sim q \rightarrow \sim p$, If Gina does not buy a newspaper, then she did not walk to the store. **21.** inductive reasoning; Inductive reasoning depends on previous examples and patterns to form a conjecture. Dana came to her conclusion based on previous examples. **23.** valid; *p*: the sum of the measures of $\angle A$ and $\angle C$ is 90°. *q*: $\angle A$ and $\angle C$ are complementary. $p \rightarrow q$ is true and *p* is true, so *q* is true. **25.** valid; It can be concluded that $\angle B$ is acute, since the measure of $\angle B$ is between the measures of $\angle A$ and $\angle C$. **27.** It can be concluded that $y \leq 3$. Since the hypothesis is true, $2 \times 3 + 3 < 4 \times 3 < 5 \times 3$, the conclusion is true, $y \leq x$. **29.** No conclusions can be made because the hypothesis is not true for the given value of *x*. **31.** If the stereo is on, then the neighbors will complain. **33.** may not **35.** may have **37.** $\angle 1$ and $\angle 2$ are supplementary angles; therefore, their measures add up to 180°. **39.** $\angle 4$ and $\angle 3$ are vertical angles; therefore, their measures are equal. **41.** $\angle 5$ and $\angle 6$ are supplementary angles; therefore, their measures add up to 180°. **45.** True; the mall is open; therefore, Angela and Diego went shopping and, therefore, Diego bought a pretzel. **47.** False; the mall is open; therefore, Angela and Diego went shopping and, therefore, Angela bought a pizza. We cannot conclude that she also bought a pretzel. **49.** D, B, A, E, C; the robot extinguishes the fire.

2.3 MIXED REVIEW (p. 94) **57.** *Sample answer: F* **59.** *Sample answer: B* **61.** 41° **63.** $3f + 4g + 7$

QUIZ 1 (p. 95) **1.** The statement is already in if-then form; converse: If tomorrow is June 5, then today is June 4. Both the statement and its converse are true, so they can be combined to form a biconditional statement: Today is June 4 if and only if tomorrow is June 5. **2.** if-then form: If a time period is a century, then it is a period of 100 years; converse: If a time period is 100 years, then it is a century. Both the statement and its converse are true so they can be combined to form a biconditional statement: A time period is a century if and only if it is a period of 100 years. **3.** if-then form: If two circles have the same diameter, then they are congruent; converse: If two circles are congruent, then they have the same diameter. Both the statement and its converse are true, so they can be combined to form a biconditional statement: Two circles are congruent if and only if they have the same diameter. **4.** Yes; John backs the car out; therefore, he drives into the fence. **5.** Yes; John backs the car out; therefore, he drives into the fence and, therefore, his father is angry.

2.4 PRACTICE (pp. 99–101) **5.** A **7.** E

9. $W = 1.42T - 38.5$ (Given)
$W + 38.5 = 1.42T$ (Addition property of equality)
$\frac{W + 38.5}{1.42} = T$ (Division property of equality)
If $W = -24.3$°F, then $T = 10$°F.

11. $BC = EF$ **13.** $PQ = RS$

15. Distributive property; Subtraction property of equality; Subtraction property of equality

17. $q + 9 = 13$ (Given)
$q = 4$ (Subtraction prop. of equality)

19. $7s + 20 = 4s - 13$ (Given)
$3s + 20 = -13$ (Subtraction prop. of equality)
$3s = -33$ (Subtraction prop. of equality)
$s = -11$ (Division prop. of equality)

21. $-2(-w + 3) = 15$ (Given)
$2w - 6 = 15$ (Distributive prop.)
$2w = 21$ (Addition prop. of equality)
$w = 10.5$ (Division prop. of equality)

23. $3(4v - 1) - 8v = 17$ (Given)
$12v - 3 - 8v = 17$ (Distributive prop.)
$4v - 3 = 17$ (Simplify.)
$4v = 20$ (Addition prop. of equality)
$v = 5$ (Division prop. of equality)

25. Given; Given; Transitive property of equality; Definition of right angles; Definition of perpendicular lines

27. B lies between A and C (Given)
$AB + BC = AC$ (Segment Addition Post.)
$AB = 3$, $BC = 8$ (Given)
$3 + 8 = AC$ (Substitution prop. of equality)
$AC = 11$ (Simplify.)

29. $c(r + 1) = n$ (Given)
$cr + c = n$ (Distributive prop.)
$cr = n - c$ (Subtraction prop. of equality)
$r = \frac{n - c}{c}$ (Division prop. of equality)

31. To find Donald's old wage, solve the formula $c(r + 1) = n$ for c.
$c(r + 1) = n$ (Given)
$c = \frac{n}{r + 1}$ (Division prop. of equality)
$c = \frac{12.72}{0.06 + 1}$ (Substitution prop. of equality)
$c = \$12.00$ (Simplify.)

2.4 MIXED REVIEW (p. 101) **35.** 9.90 **37.** 10.20 **39.** 8.60 **41.** (–7, –7) **43.** (12, –13) **45.** 42°; 132° **47.** false **49.** false

2.5 PRACTICE (pp. 104–107) **3.** By the definition of midpoint, Point D is halfway between B and F. Therefore, $\overline{BD} \cong \overline{FD}$. **5.** By the Transitive Property of Segment Congruence, if $\overline{CE} \cong \overline{BD}$ and $\overline{BD} \cong \overline{FD}$, then $\overline{CE} \cong \overline{FD}$.

7. Given; Definition of congruent segments; Transitive property of equality; Definition of congruent segments

9. $PR = 46$ (Given)
$PQ + QR = PR$ (Segment Addition Post.)
$2x + 5 + 6x - 15 = 46$ (Substitution prop. of equality)
$8x - 10 = 46$ (Simplify.)
$8x = 56$ (Addition prop. of equality)
$x = 7$ (Division prop. of equality)

11. $\overline{XY} \cong \overline{WX}$, $\overline{YZ} \cong \overline{WX}$ (Given)
$\overline{XY} \cong \overline{YZ}$ (Transitive Prop. of Segment Cong.)
$XY = YZ$ (Definition of congruent segments)
$4x + 3 = 9x - 12$ (Substitution prop. of equality)
$-5x + 3 = -12$ (Subtraction prop. of equality)
$-5x = -15$ (Subtraction prop. of equality)
$x = 3$ (Division prop. of equality)

17. $XY = 8$, $XZ = 8$ (Given)
$XY = XZ$ (Transitive prop. of equality)
$\overline{XY} \cong \overline{XZ}$ (Definition of congruent segments)
$\overline{XY} \cong \overline{ZY}$ (Given)
$\overline{XZ} \cong \overline{ZY}$ (Transitive Prop. of Segment Cong.)

19. yes; by the Transitive Property of Segment Congruence

2.5 MIXED REVIEW (p. 107) **29.** *Sample answer:* $2 + 3 = 5$ **31.** 116° **33.** 65° **35.** If Matthew does not win first place, then Matthew did not win the wrestling match. **37.** $p \rightarrow q$; If the car is in the garage, then Mark is home. **39.** $\sim p \rightarrow \sim q$; If the car is not in the garage, then Mark is not home.

2.6 PRACTICE (pp. 112–115) **3.** $\angle A$ **5.** yes **7.** no **9.** yes

11. A is an angle. (Given)
$m\angle A = m\angle A$ (Reflexive prop. of equality)
$\angle A \cong \angle A$ (Definition of congruent angles)

13. 31° **15.** 158° **17.** 61° **19.** $\angle 1 \cong \angle 3$, $\angle 2 \cong \angle 4$

21. $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

23. $m\angle 3 = 120°$, $\angle 1 \cong \angle 4$, $\angle 3 \cong \angle 4$ (Given)
$\angle 1 \cong \angle 3$ (Transitive Prop. of Angle Cong.)
$m\angle 1 = m\angle 3$ (Definition of congruent angles)
$m\angle 1 = 120°$ (Substitution prop. of equality)

25. $\angle QVW$ and $\angle RWV$ are supplementary. (Given)
$\angle QVW$ and $\angle QVP$ are a linear pair. (Definition of linear pair)
$\angle QVP$ and $\angle QVW$ are supplementary. (Linear Pair Post.)
$\angle QVP \cong \angle RWV$ (Congruent Supplements Theorem)

27. $4w + 10 + 13w = 180$
$17w + 10 = 180$
$17w = 170$
$w = 10$
$2(x + 25) + 2x - 30 = 180$
$2x + 50 + 2x - 30 = 180$
$4x + 20 = 180$
$4x = 160$
$x = 40$

29. Yes; $\angle 2 \cong \angle 3$ and $\angle 1$ and $\angle 4$ are supplementary to congruent angles. $\angle 1 \cong \angle 4$ by the Congruent Supplements Theorem.

SELECTED ANSWERS

2.6 MIXED REVIEW (p. 116) **39.** 172° **41.** All definitions are true biconditionals. So the conditionals If two lines are perpendicular, then they intersect to form a right angle and If two lines intersect to form a right angle, then the two lines are perpendicular are both true.
43. $x = \frac{1}{2}$ **45.** $z = \frac{1}{3}$

QUIZ 2 (p. 116)
1. $x - 3 = 7$ (Given)
$x = 10$ (Addition prop. of equality)
2. $x + 8 = 27$ (Given)
$x = 19$ (Subtraction prop. of equality)
3. $2x - 5 = 13$ (Given)
$2x = 18$ (Addition prop. of equality)
$x = 9$ (Division prop. of equality)
4. $2x + 20 = 4x - 12$ (Given)
$-2x + 20 = -12$ (Subtraction prop. of equality)
$-2x = -32$ (Subtraction prop. of equality)
$x = 16$ (Division prop. of equality)
5. $3(3x - 7) = 6$ (Given)
$9x - 21 = 6$ (Distributive prop.)
$9x = 27$ (Addition prop. of equality)
$x = \frac{27}{9}$, or 3 (Division prop. of equality)
6. $-2(-2x + 4) = 16$ (Given)
$4x - 8 = 16$ (Distributive prop.)
$4x = 24$ (Addition prop. of equality)
$x = 6$ (Division prop. of equality)
7. $\overline{BA} \cong \overline{BC}$, $\overline{BC} \cong \overline{CD}$ (Given)
$\overline{BA} \cong \overline{CD}$ (Transitive Prop. of Segment Cong.)
$\overline{AE} \cong \overline{DF}$ (Given)
$BA + AE = BE$ (Segment Addition Post.)
$BA = CD$ (Definition of congruent segments)
$AE = DF$ (Definition of congruent segments)
$CD + DF = BE$ (Substitution prop. of equality)
$CD + DF = CF$ (Segment Addition Post.)
$BE = CF$ (Transitive prop. of equality)
$\overline{BE} \cong \overline{CF}$ (Definition of congruent segments)
8. $\overline{EH} \cong \overline{GH}$, $\overline{FG} \cong \overline{GH}$ (Given)
$\overline{EH} \cong \overline{FG}$ (Transitive Prop. of Segment Cong.) **9.** 38°

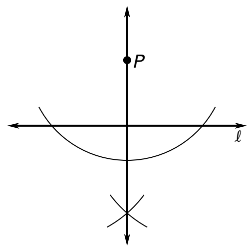
CHAPTER 2 REVIEW (pp.118–120)
1. if-then form: If there is a teacher's meeting, then we are dismissed early; hypothesis: there is a teacher's meeting; conclusion: we are dismissed early; inverse: If there is not a teacher's meeting, then we are not dismissed early; converse: If we are dismissed early, then there is a teacher's meeting; contrapositive: If we are not dismissed early, then there is not a teacher's meeting. **3.** exactly one **5.** No; $x^2 = 25$ does not necessarily mean that $x = 5$. x could also $= -5$. **7.** If the measure of $\angle A$ is 90°, then $\angle A$ is a right angle. **9.** $\angle A$ is not a right angle. **11.** If there is a nice breeze, then we will sail to Dunkirk. **13.** C **15.** D
17. $5(3y + 2) = 25$ (Given)
$15y + 10 = 25$ (Distributive prop.)
$15y = 15$ (Subtraction prop. of equality)
$y = 1$ (Division prop. of equality)
19. $23 + 11d - 2c = 12 - 2c$ (Given)
$23 + 11d = 12$ (Addition prop. of equality)
$11d = -11$ (Subtraction prop. of equality)
$d = -1$ (Division prop. of equality)
21. $\angle 1$ and $\angle 2$ are complementary. (Given)
$\angle 3$ and $\angle 4$ are complementary. (Given)
$\angle 1 \cong \angle 3$ (Given)
$\angle 2 \cong \angle 4$ (Congruent Complements Theorem)

ALGEBRA REVIEW (pp. 124–125) **1.** no **2.** yes **3.** yes **4.** no **5.** no **6.** yes **7.** no **8.** no **9.** no **10.** yes **11.** yes **12.** yes **13.** –5 **14.** $-\frac{2}{13}$ **15.** $\frac{1}{2}$ **16.** $\frac{1}{7}$ **17.** $-\frac{11}{2}$ **18.** 2 **19.** –2 **20.** 0 **21.** $-\frac{13}{9}$ **22.** –1 **23.** $-\frac{14}{9}$ **24.** $-\frac{23}{11}$ **25.** $\frac{7}{12}$ **26.** $-\frac{9}{8}$ **27.** $-\frac{1}{4}$ **28.** $y = -2x + 5$ **29.** $y = -3x - 12$ **30.** $y = -\frac{2}{3}x + 8$ **31.** $y = -\frac{13}{7}x + 13$ **32.** $y = \frac{1}{3}x - 2$ **33.** $y = -12x - 8$ **34.** $y = -2x - 14$ **35.** $y = -x - 2$ **36.** $y = -3x + 7$ **37.** $y = -2x - 5$ **38.** $y = \frac{1}{2}x + 2$ **39.** $y = -\frac{1}{3}x + 1.5$ **40.** $y = -x + 3$ **41.** $y = -3x - 12$ **42.** $y = 4x - 21$ **43.** $y = -2x$ **44.** $y = 5x + 8$ **45.** $y = 3x - 1$ **46.** $y = -x + 4$ **47.** $y = -6x - 21$ **48.** $y = 2x + 8$ **49.** $y = 2x - 29$ **50.** $y = \frac{1}{3}x - \frac{5}{3}$ **51.** $y = -\frac{5}{12}x + \frac{3}{2}$

CHAPTER 3

SKILL REVIEW (p. 128) **1.** 133 **2.** 47 **3.** $-\frac{1}{4}$ **4.** 18 **5.** 20 **6.** $\frac{77}{2}$ **7.** Definition of a right angle **8.** Vertical angles are congruent. **9.** $\angle 2$ and $\angle 3$ form a linear pair. **10.** Definition of congruent angles **11.** Subtraction property of equality **12.** Distributive property

3.1 PRACTICE (pp. 132–134) **3.** B **5.** A **7.** $\angle 3$ and $\angle 5$, or $\angle 4$ and $\angle 6$ **9.** $\angle 3$ and $\angle 6$, or $\angle 4$ and $\angle 5$ **11.** perpendicular **13.** parallel **15.** $\overleftrightarrow{QU}$, $\overleftrightarrow{QT}$, $\overleftrightarrow{RV}$, or $\overleftrightarrow{RS}$ **17.** *UVW* **19.** 1 **21.** corresponding **23.** consecutive interior **25.** alternate exterior **27.** III; 3 **29.** V; 5 **31.** M; 1000 **33.** yes **35.** no **37.** *Sample answer:* The two lines of intersection are coplanar, since they are both in the third plane. The two lines do not intersect, because they are in parallel planes. Since they are coplanar and do not intersect, they are parallel.
39.



3.1 MIXED REVIEW (p. 134) **47.** $m\angle ABD = 80°$, $m\angle ABC = 160°$ **49.** 77°, 167° **51.** 2°, 92° **53.** 22°, 112° **55.** 30°, 120° **57.** $x + 13 - 13 = 23 - 13$, Subtraction property of equality; $x = 10$, Simplify. **59.** $4x + 11 - 11 = 31 - 11$, Subtraction property of equality; $4x = 20$, Simplify; $\frac{4x}{4} = \frac{20}{4}$, Division property of equality; $x = 5$, Simplify. **61.** *Sample answer:* $2x - 2 + 3 = 17$, Distributive property; $2x + 1 = 17$, Simplify; $2x + 1 - 1 = 17 - 1$, Subtraction property of equality; $2x = 16$, Simplify; $\frac{2x}{2} = \frac{16}{2}$, Division property of equality; $x = 8$, Simplify.

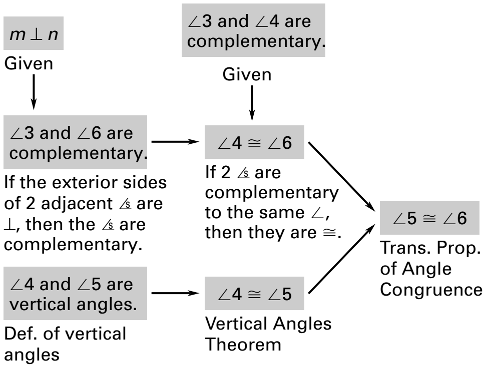
3.2 PRACTICE (pp. 138–141) **3.** Vertical Angles Theorem **5.** Theorem 3.2 **7.** 90 **9.** 20 **11.** 90 **13.** 35 **15.** *Sample answer:* ∠1, ∠2, ∠3, and ∠4 are right angles. **17. a.** right angle **b.** 90° **c.** Angle Addition **d.** $m\angle 3$ **e.** $m\angle 4$ **f.** 90°

19.

Statements	Reasons
2. ∠1 ≅ ∠3	3. If two angles are congruent, then their measures are equal.
5. $m\angle 1 = 90°$	4. Given
6. $90° = m\angle 3$	
7. ∠3 is a right angle.	

21. If ∠4 ≅ ∠6, then ∠5 ≅ ∠6 because ∠5 ≅ ∠4 and because of the Transitive Property of Angle Congruence.

23.



25. No; *Sample answer:* If one of the angles is a right angle, then the crosspieces are perpendicular, so all four angles will be right angles.

3.2 MIXED REVIEW (p. 141) **29.** 38° **31.** 39° **33.** ∠1 and ∠5, ∠3 and ∠7, ∠2 and ∠6, ∠4 and ∠8 **35.** ∠1 and ∠8, ∠2 and ∠7

3.3 PRACTICE (pp. 146–148) **3.** Alternate Exterior Angles Theorem **5.** Consecutive Interior Angles Theorem **7.** 133 **9.** $m\angle 1 = 82°$; *Sample answer:* by the Corresponding Angles Postulate. $m\angle 2 = 98°$; *Sample answer:* ∠1 and ∠2 form a linear pair. **11.** $x = 113$, by the Linear Pair Postulate; $y = 113$, by the Alternate Exterior Angles Theorem. **13.** $x = 90$, $y = 90$; *Sample answer:* by the Perpendicular Transversal Theorem **15.** $x = 100$; *Sample answer:* by the Linear Pair Postulate. $y = 80$; *Sample answer:* by the Alternate Exterior Angles Theorem **17.** $m\angle 2 = m\angle 3 = m\angle 6 = m\angle 7 = 73°$, $m\angle 4 = m\angle 5 = m\angle 8 = 107°$ **19.** 23 **21.** 28 **23.** 12 **25.** 7

27.

Statements	Reasons
1. $p \parallel q$	2. Alternate Interior Angles Theorem
3. $m\angle 1 = m\angle 3$	5. Linear Pair Postulate
4. ∠2 and ∠3 form a linear pair.	7. Definition of supplementary ∠s
6. $m\angle 1 + m\angle 2 = 180°$	

29. *Sample answer:* It is given that $p \perp q$, so ∠1 is a right angle because perpendicular lines form right angles. It is given that $q \parallel r$, so ∠1 ≅ ∠2 by the Corresponding Angles Postulate. Then, ∠2 is a right angle because it is congruent to a right angle. Finally, $p \perp r$ because the sides of a right angle are perpendicular.

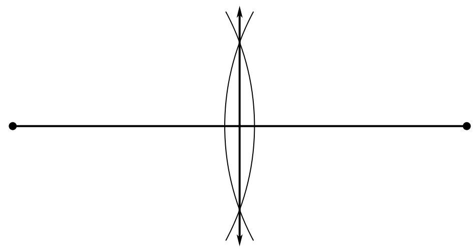
3.3 MIXED REVIEW (p. 149) **33.** 130° **35.** 79° **37.** 69° **39.** If an angle is acute, then the measure of the angle is 19°. **41.** If I go fishing, then I do not have to work. **43.** 21°

QUIZ 1 (p. 149) **1.** ∠6 **2.** ∠5 **3.** ∠6 **4.** ∠7 **5.** *Sample answer:* Since ∠1 and ∠2 are congruent angles that form a linear pair, this shows that $m\angle 1$ and $m\angle 2$ are both 90°. This shows that the two lines are perpendicular so that ∠3 and ∠4 are right angles. **6.** 69 **7.** 75 **8.** 12 **9.** 35°; the top left corner is assumed to be a right angle; ∠3 and ∠2 are complementary, Definition of complementary angles; $m\angle 3 + m\angle 2 = 90°$, Definition of complementary angles; $m\angle 2 = 90° - 55° = 35°$, Substitution; $m\angle 1 = m\angle 2$, Corresponding Angles Postulate

3.4 PRACTICE (pp. 153–156) **3.** yes; Alternate Exterior Angles Converse **5.** no **7.** yes; Corresponding Angles Converse **9.** 45; Consecutive Interior Angles Converse **11.** yes; Alternate Exterior Angles Converse **13.** no **15.** no **17.** 45 **19.** yes; Corresponding Angles Converse **21.** no **23.** yes; Angle Addition Postulate and Alternate Exterior Angles Converse **25.** no **27.** $j \parallel n$ because $31° + 69° = 100°$ and $32° + 68° = 100°$. **29.** 32° **33.** ∠1 ≅ ∠4 and ∠2 ≅ ∠3. *Sample answer:* The angles marked as congruent are alternate interior angles, so $r \parallel s$ by the Alternate Interior Angles Converse. Then ∠1 ≅ ∠4 by the Alternate Interior Angles Theorem and ∠2 ≅ ∠3 by the Vertical Angles Theorem. **35.** *Sample answer:* It is given that $a \parallel b$, so ∠1 and ∠3 are supplementary by the Consecutive Interior Angles Theorem. Then, $m\angle 1 + m\angle 3 = 180°$ by the definition of supplementary angles. Then, $m\angle 2 + m\angle 3 = 180°$ by substitution, and $c \parallel d$ by the Consecutive Interior Angles Converse.

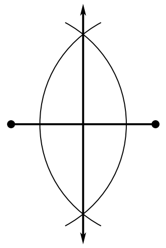
3.4 MIXED REVIEW (p. 156)

41.



SELECTED ANSWERS

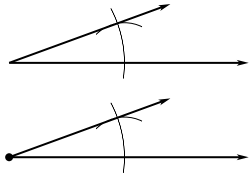
43.



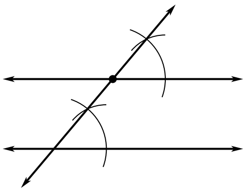
45. $\angle 5$ **47.** $\angle 7$

3.5 PRACTICE (pp. 160–163) **3.** Theorem 3.12 **5.** $\ell_1 \parallel \ell_2$ because of the Alternate Interior Angles Converse. **7.** *Sample answer:* Given line ℓ and exterior point P, draw any line n through P that intersects ℓ. Then copy $\angle 1$ at P so that $\angle 1 \cong \angle 2$. Line m will be parallel to line ℓ. **9.** Theorem 3.12 **11.** Corresponding Angles Converse **13.** Alternate Interior Angles Converse **15.** $85° + 95° = 180°$, so $k \parallel j$ by the Consecutive Interior Angles Converse. **17.** *Sample answer:* The measure of the obtuse exterior angle formed by n and k is $90° + \frac{90}{2} = 135°$, so $k \parallel j$ by the Alternate Exterior Angles Converse. **19.** *Sample answer:* The measure of the obtuse angle formed by g and the left transversal is $(180 - x)°$. Since $(180 - x)° + x° = 180°$, $g \parallel h$ by the Consecutive Interior Angles Converse. **21.** $p \parallel q$ by the Corresponding Angles Converse; $q \parallel r$ by the Consecutive Interior Angles Converse. Then, because $p \parallel q$ and $q \parallel r$, $p \parallel r$. **23.** a and b are each perpendicular to d, so $a \parallel b$ by Theorem 3.12; c and d are each perpendicular to a, so $c \parallel d$ by Theorem 3.12.

25. *Sample answer:*



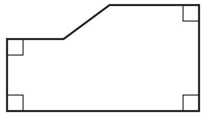
27. *Sample answer:*



29. *Sample answer:* The two angles that are congruent are corresponding angles, so the two lines are parallel by the Corresponding Angles Converse. **31.** *Sample answer:* Each edge is parallel to the previous edge, so all the strips are parallel by Theorem 3.11. **33.** always **35.** never **37.** 50° **39. a.** *Sample answer:* Hold the straightedge next to each red line and see if the red lines are straight. **b.** *Sample answer:* Measure the angles formed by the red lines and the top horizontal line, and see if corresponding angles are congruent.

3.5 MIXED REVIEW (p. 163) **43.** $2\sqrt{58}$, or about 15.23 **45.** $2\sqrt{34}$, or about 11.66 **47.** $5\sqrt{17}$, or about 20.62 **49.** Converse: If an angle is acute, then its measure is 42°. Counterexample: a 41° angle (or any acute angle whose measure is not 42°)

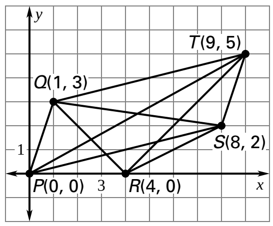
51. Converse: If a polygon contains four right angles, then it is a rectangle. Counterexample:



QUIZ 2 (p. 164) **1.** yes; Consecutive Interior Angles Converse **2.** $a \parallel b$ **3.** $a \parallel b$ **4.** $a \parallel b$, $c \parallel d$ **5.** *Sample answer:* First, it is given that $\angle ABC$ is supplementary to $\angle DEF$. Next, note that $\angle ABC$ and $\angle CBE$ are a linear pair; therefore, by the Linear Pair Postulate, $\angle ABC$ and $\angle CBE$ are supplementary. By the Congruent Supplements Theorem, $\angle CBE \cong \angle DEF$. Finally, the left and right edges of the chimney are parallel by the Corresponding Angles Converse.

3.6 PRACTICE (pp. 168–171) **5.** –2 **7.** parallel; both have slope $\frac{1}{3}$. **9.** parallel; both have slope $\frac{1}{2}$. **11.** $\frac{3}{2}$ **13.** $\frac{1}{2}$ **15.** –1 **17.** –2, –2; parallel **19.** 3, 4; not parallel **21.** $\frac{5}{6}, \frac{5}{7}$; not parallel **23.** about 7.2 feet; *Sample answer:* Using x for the height, a proportion is $\frac{3}{5} = \frac{x}{12}$. Then, $5x = 36$ and $x = 7.2$. **25.** slope of $\overleftrightarrow{AB}$: $\frac{1}{2}$; slope of $\overleftrightarrow{CD}$: $\frac{1}{2}$; slope of $\overleftrightarrow{EF}$: $\frac{3}{4}$; $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ **27.** $y = 3x + 2$ **29.** $y = -\frac{2}{9}x$ **31.** $y = -3$ **33.** $y = -6x + 3$ **35.** $y = -\frac{4}{3}x + 3$ **37.** $y = -x + 6$ **39.** $y = -4$ **41.** $x = 6$ **43.** $y = \frac{5}{4}x - \frac{13}{4}$ **45.** *Sample answer:* $y = \frac{1}{3}x$

47.



49. 5%; no **51.** 9%; yes **53.** $y = x$; 45°

3.6 MIXED REVIEW (p. 171) **59.** $\frac{1}{20}$ **61.** $-\frac{1}{11}$ **63.** $\frac{7}{3}$ **65.** –2 **67.** –9 **69.** $-11\frac{2}{3}$ **71.** yes; Alternate Exterior Angles Converse **73.** no

3.7 PRACTICE (pp. 175–177) **3.** yes; *Sample answer:* The slope of $\overleftrightarrow{AC}$ is –2, and the slope of $\overleftrightarrow{BD}$ is $\frac{1}{2}$, and $(-2)\left(\frac{1}{2}\right) = -1$. **5.** perpendicular **7.** yes **9.** yes **11.** no **13.** $-\frac{1}{2}$ **15.** $\frac{1}{3}$ **17.** $-\frac{3}{2}$ **19.** 3 **21.** slope of $\overleftrightarrow{AC}$: 3; slope of $\overleftrightarrow{BD}$: $-\frac{1}{3}$; perpendicular **23.** slope of $\overleftrightarrow{AC}$: $\frac{1}{3}$; slope of $\overleftrightarrow{BD}$: $-\frac{5}{2}$; not perpendicular **25.** perpendicular **27.** perpendicular **29.** perpendicular **31.** not perpendicular **33.** slope of $\overleftrightarrow{AB}$: –1; slope of $\overleftrightarrow{PQ}$: $\frac{6}{7}$; slope of $\overleftrightarrow{WV}$: –1; $\overleftrightarrow{AB} \parallel \overleftrightarrow{WV}$ **35.** slope of $\overleftrightarrow{AZ}$: $\frac{2}{3}$; slope of $\overleftrightarrow{CD}$: $-\frac{4}{3}$; slope of $\overleftrightarrow{RS}$: $\frac{3}{4}$; $\overleftrightarrow{CD} \perp \overleftrightarrow{RS}$

37. *Sample answer:* The slopes are 2 and $-\frac{1}{2}$, and the product of the two slopes is -1. **39.** $y = -\frac{3}{5}x + 4$ **41.** $y = \frac{3}{4}x - \frac{7}{4}$ **43.** $y = -7x + 39$ **45.** $y = \frac{5}{2}x - \frac{35}{2}$ **47.** parallel **49.** perpendicular

3.7 Mixed Review (p. 178)

55. 142° **57.** 35° **59.** $\angle 6$ **61.** $\angle 6$

Quiz 3 (p. 178)

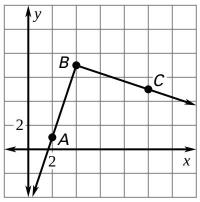
1. $\frac{3}{2}$ **2.** $-\frac{8}{3}$ **3.** $y = 3x + 2$ **4.** $y = \frac{1}{2}x - 5$ **5.** yes **6.** no **7.** 1

Chapter 3 Review (pp. 180–182)

1. alternate exterior **3.** $\overleftrightarrow{BF}$, $\overleftrightarrow{CG}$, or $\overleftrightarrow{AE}$ **5.** Possible answers: $\overleftrightarrow{CG}$, $\overleftrightarrow{AB}$, $\overleftrightarrow{AC}$, $\overleftrightarrow{AE}$, $\overleftrightarrow{EG}$, $\overleftrightarrow{GH}$ **7.** $m\angle 2 = 105°$; $m\angle 3 = 105°$; $m\angle 4 = 75°$; $m\angle 5 = 75°$; $m\angle 6 = 105°$ **9.** 22; Alternate Interior Angles Postulate, $(4x + 4)° = 92°$. So, $x = \frac{92° - 4°}{4} = 22$.
11. Since $m\angle 4 = 60°$ and $m\angle 7 = 120°$, they are supplementary because their measures add up to 180°. By the Consecutive Interior Angles Converse, $\ell \parallel m$. **13.** $j \parallel k$; Corresponding Angles Converse
15. $m \parallel n$; Consecutive Interior Angles Converse
17. Slope of $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ is $\frac{1}{2}$; yes.
19. Slope of $\overleftrightarrow{JK} = 3$; slope of $\overleftrightarrow{MN} = \frac{5}{2}$; no **21.** yes **23.** yes

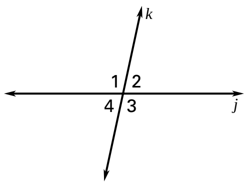
Cumulative Practice (pp. 186–187)

1. You add 2, then 3, then 4, and so on: 30. **3.** $\overleftrightarrow{DT}$ **5.** Exactly 1; through any three noncollinear points there is exactly one plane.
7. $(-13, 3)$ **9.**



; right **11.** $x = 6, y = 2$ **13.** $x = 16, y = 36$ **15.** 40 units^2

17. If an angle is a straight angle, then its measure is 180°. If an angle is not a straight angle, then its measure is not 180°. If an angle measure is 180°, then it is a straight angle. If an angle measure is not 180°, then it is not a straight angle.
19. Two lines can intersect to form acute and obtuse angles.
21. If the angles are same side interior angles of two parallel lines, they would be supplementary but not a linear pair.
23.



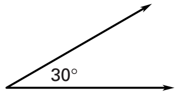
$\angle 1$ and $\angle 2$ are supplementary; $\angle 1$ and $\angle 4$ are supplementary; $\angle 2$ and $\angle 3$ are supplementary; $\angle 3$ and $\angle 4$ are supplementary; $\angle 1$ and $\angle 3$ are vertical angles; $\angle 2$ and $\angle 4$ are vertical angles.

25. Yes; by the Law of Detachment **27.** 55°
29. $\overleftrightarrow{DE} \parallel \overleftrightarrow{AC}$ by the Consecutive Interior Angles Converse.
31. slope of $\overleftrightarrow{AD} = -\frac{11}{23}$, slope of $\overleftrightarrow{BC} = -\frac{11}{23}$ **33.** $y = -\frac{3}{4}x + \frac{21}{4}$
35. a. 6 in. by 9 in. **b.** $\angle 1$ and $\angle 3$ are complementary.
c. $\angle 1$ and $\angle 2$ are supplementary.

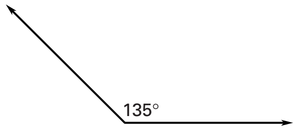
Chapter 4

Skill Review (p. 192)

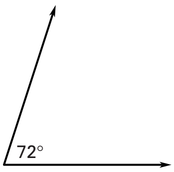
1. 30 **2.** 2 **3.** 3 **4.** 75 **5.** 60 **6.** 3
7.



8.



9.



10. Vertical Angles Theorem
11. Alternate Interior Angles Theorem
12. Corresponding Angles Postulate

4.1 Practice (pp. 198–200)

7. right scalene **9.** 77.5° **11.** E **13.** D **15.** C **17.** right isosceles **19.** right scalene **21.** acute scalene **23.** sometimes **25.** always **27.** (Ex. 17) legs: $\overline{DE}$, $\overline{DF}$, hypotenuse: $\overline{EF}$; (Ex. 19) legs: $\overline{RP}$, $\overline{RQ}$, hypotenuse: $\overline{PQ}$ **29.** $C(5, 5)$ **31.** 48° **33.** $m\angle 1 = 79°$, $m\angle 2 = 51°$, $m\angle 3 = 39°$ **35.** $m\angle R = 20°$, $m\angle S = 140°$, $m\angle T = 20°$; obtuse **37.** 70° **39.** 143° **41.** 120°, 24°
43. Yes; the total length needed is 3×33.5, or 100.5 cm.
45. $\overline{MN}$ and $\overline{LN}$; $\overline{ML}$
47.

Statements	Reasons
4. $m\angle A + m\angle B + m\angle ACB = 180°$	3. Linear Pair Postulate 5. Substitution property of equality 6. Subtraction property of equality

4.1 Mixed Review (p. 201)

53. true **55.** false **57.** yes; Alternate Interior Angles Converse **59.** yes; Corresponding Angles Converse **61.** $y = x + 3$ **63.** $y = \frac{2}{3}x - 7$ **65.** $y = -\frac{7}{2}x - 10$ **67.** $y = -\frac{3}{2}x + 15$

4.2 Practice (pp. 205–208)

5. 45° **7.** 30° **9.** $\overline{PR}$ **11.** $\overline{CA}$ **13.** $\overline{UV}$ **15.** B, C, D **17.** triangles FGH and JKH; $\angle FHG \cong \angle JHK$ by the Vertical Angles Theorem, so the triangles are congruent by the definition of congruence; $\triangle FGH$ and $\triangle JKH$. **19.** pentagons $VWXYZ$ and $MNJKL$; definition of congruence; $VWXYZ \cong MNJKL$ **21.** triangles LKR and NMQ and quadrilaterals $LKQS$ and $NMRS$; $\overline{LR}$ and $\overline{NQ}$ are congruent by the addition property of equality, the Segment Addition Postulate, and the definition of congruence and $\angle NQM$ and $\angle LRK$ are congruent by the Third Angles Theorem, so the triangles are congruent by the definition of congruence; $\angle LSQ \cong \angle NSR$ by the Vertical Angles Theorem and $\angle KQS \cong \angle MRS$ by the Congruent Supplements Theorem, so the quadrilaterals are congruent by the definition of congruence; $\triangle LKR \cong \triangle NMQ$, $LKQS \cong NMRS$.
25. $a = 13$, $b = 13$ **27.** 12 **29.** 65 **31.** 120°
33. The measure of each of the congruent angles in each small triangle is 30°. By the Angle Addition Postulate, the measure of each angle of $\triangle ABC$ is 60°.

35.

Statements	Reasons
7. $\angle C \cong \angle F$	1. Given
	2. A, D, B, E; Definition of congruent angles
	3. Triangle Sum Theorem
	4. Substitution property of equality or transitive property of equality
	5. Substitution property of equality
	6. Subtraction property of equality

37. $\triangle ABF$ and $\triangle EBF$; $\overline{BF} \cong \overline{BF}$ by the Reflexive Property of Congruence, and $\angle A$ and $\angle BEF$ are congruent by the Third Angles Theorem, so the triangles are congruent by the definition of congruence.

4.2 Mixed Review (p. 209) **41.** $4\sqrt{10}$ **43.** $\sqrt{26}$ **45.** $3\sqrt{13}$ **47.** $(-2, -2)$ **49.** $(1, 0)$ **51.** $(10, 3)$ **53.** 82° **55.** 28° **57.** $-\frac{5}{2}$ and -2; no

Quiz 1 (p. 210) **1.** acute isosceles **2.** acute isosceles **3.** obtuse scalene **4.** 7; $m\angle F = 77°$, $m\angle E = 55°$, $m\angle EDF = 48°$, $m\angle CDF = 132°$ **5.** $\triangle MNP \cong \triangle QPN$; $\angle M$ and $\angle Q$, $\angle MNP$ and $\angle QPN$, $\angle MPN$ and $\angle QNP$, $\overline{MN}$ and $\overline{QP}$, $\overline{NP}$ and $\overline{PN}$, $\overline{MP}$ and $\overline{QN}$ **6.** 107°

4.3 Practice (pp. 216–219) **3.** yes; SAS Congruence Postulate **5.** yes; SSS Congruence Postulate **7.** $\angle LKP$ **9.** $\angle KJL$ **11.** $\angle KPL$ **13.** yes; SAS Congruence Postulate **15.** yes; SAS Congruence Postulate **17.** yes; SSS Congruence Postulate **19.** $\angle ACB \cong \angle CED$

21.

Statements	Reasons
1. $\overline{NP} \cong \overline{QN} \cong \overline{RS} \cong \overline{TR}$, $\overline{PQ} \cong \overline{ST}$	1. Given
2. $\triangle NPQ \cong \triangle RST$	2. SSS Congruence Postulate

23. It is given that $\overline{SP} \cong \overline{TP}$ and that $\overrightarrow{PQ}$ bisects $\angle SPT$. Then, by the definition of angle bisector, $\angle SPQ \cong \angle TPQ$. $\overline{PQ} \cong \overline{PQ}$ by the Reflexive Property of Congruence, so $\triangle SPQ \cong \triangle TPQ$ by the SAS Congruence Postulate.

25.

Statements	Reasons
1. $\overline{AC} \cong \overline{BC}$; M is the midpoint of $\overline{AB}$.	1. Given
2. $\overline{AM} \cong \overline{BM}$	2. Definition of midpoint
3. $\overline{CM} \cong \overline{CM}$	3. Reflexive Property of Congruence
4. $\triangle ACM \cong \triangle BCM$	4. SSS Congruence Postulate

27. Since it is given that $\overline{PA} \cong \overline{PB} \cong \overline{PC}$ and $\overline{AB} \cong \overline{BC}$, $\triangle PAB \cong \triangle PBC$ by the SSS Congruence Postulate. **29.** The new triangle and the original triangle are congruent. **35.** $AB = DE = 3$, $BC = EF = \sqrt{13}$, and $AC = DF = \sqrt{10}$, so all three pairs of sides are congruent and $\triangle ABC \cong \triangle DEF$ by the SSS Congruence Postulate.

4.3 Mixed Review (p. 219) **39.** *Sample answer:* The measure of each of the angles formed by two adjacent "spokes" is about 60°.

41. $m\angle 2 = 57°$ (Vertical Angles Theorem)
$m\angle 1 = 180° - m\angle 2 = 123°$
(Consecutive Interior Angles Theorem)
43. $m\angle 1 = 90°$ (Corresponding Angles Postulate)
$m\angle 2 = 90°$ (Alternate Interior Angles Theorem or Vertical Angles Theorem)
45. slope of $\overleftrightarrow{EF} = -2$, slope of $\overleftrightarrow{GH} = -2$, $\overleftrightarrow{EF} \parallel \overleftrightarrow{GH}$

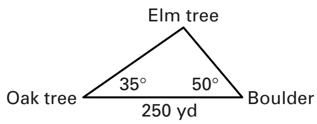
4.4 Practice (pp. 223–226) **5.** $\overline{AB} \cong \overline{DE}$ **7.** By the Right Angle Congruence Theorem, $\angle B \cong \angle D$. Since $\overline{AD} \parallel \overline{BC}$, $\angle CAD \cong \angle ACB$ by the Alternate Interior Angles Theorem. By the Reflexive Property of Congruence, $\overline{AC} \cong \overline{AC}$, so $\triangle ACD \cong \triangle CAB$ by the AAS Congruence Theorem. Then, all three pairs of corresponding sides are congruent; that is, they have the same length. So, $AB + BC + CA = CD + DA + AC$ and the two courses are the same length. **9.** Yes; SAS Congruence Postulate; two pairs of corresponding sides and the corresponding included angles are congruent. **11.** No; two pairs of corresponding sides are congruent and corresponding nonincluded angles $\angle EGF$ and $\angle JGH$ are congruent by the Vertical Angles Theorem; that is insufficient to prove triangle congruence. **13.** Yes; SSS Congruence Postulate; $\overline{XY} \cong \overline{XY}$ by the Reflexive Property of Congruence, so all three pairs of corresponding sides are congruent. **15.** $\angle P \cong \angle S$ **17.** $\overline{QR} \cong \overline{TU}$

19.

Statements	Reasons
1. $\overline{FH} \parallel \overline{LK}$, $\overline{GF} \cong \overline{GL}$	1. Given
2. $\angle F \cong \angle L$, $\angle H \cong \angle K$	2. Alternate Interior Angles Theorem
3. $\triangle FGH \cong \triangle LGK$	3. AAS Congruence Theorem

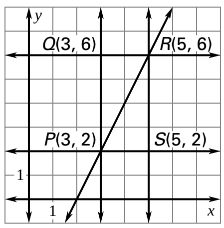
21. It is given that $\overline{VX} \cong \overline{XY}$, $\overline{XW} \cong \overline{YZ}$, and that $\overline{XW} \parallel \overline{YZ}$. Then, $\angle VXW \cong \angle Y$ by the Corresponding Angles Postulate and $\triangle VXW \cong \triangle XYZ$ by the SAS Congruence Postulate. **23.** Yes; two sides of the triangle are north-south and east-west lines, which are perpendicular, so the measures of two angles and the length of a nonincluded side are known and only one such triangle is possible.

25.



Yes; the measures of two angles and the length of the included side are known and only one such triangle is possible.

27.



$\angle PQR \cong \angle RSP$ since they are both right angles, and since $\overline{QR} \parallel \overline{PS}$, $\angle PRQ \cong \angle RPS$ by the Alternate Interior Angles Theorem. $QR = SP = 2$, so $\overline{QR} \cong \overline{SP}$. Then, two pairs of corresponding angles and a pair of included sides are congruent, so $\triangle PQR \cong \triangle RSP$ by the ASA Congruence Postulate.

4.4 MIXED REVIEW (p. 227) **33.** (12, –13) **35.** $m\angle DBC = 42°$, $m\angle ABC = 84°$ **37.** $m\angle ABD = 75°$, $m\angle ABC = 150°$

QUIZ 2 (p. 227) **1.** Yes; SAS Congruence Postulate; $\overline{BD} \cong \overline{BD}$ by the Reflexive Property of Congruence, so two pairs of corresponding sides and the corresponding included angles are congruent. **2.** Yes; SSS Congruence Postulate; $\overline{SQ} \cong \overline{SQ}$ by the Reflexive Property of Congruence, so three pairs of corresponding sides are congruent. **3.** No; two pairs of corresponding sides and one pair of corresponding nonincluded angles are congruent; that is insufficient to prove triangle congruence. **4.** Yes; ASA Congruence Postulate; $\overline{MK} \cong \overline{MK}$ by the Reflexive Property of Congruence, so two pairs of corresponding angles and the corresponding included sides are congruent. **5.** No; $\overline{ZB} \cong \overline{ZB}$ by the Reflexive Property of Congruence, so two pairs of corresponding sides are congruent; that is insufficient to prove triangle congruence. **6.** Yes; AAS Congruence Theorem; $\angle STR \cong \angle VTU$ by the Vertical Angles Theorem, so two pairs of corresponding angles and corresponding nonincluded sides are congruent.

7.

Statements	Reasons
1. M is the midpoint of $\overline{NL}$, $\overline{NL} \perp \overline{NQ}$, $\overline{NL} \perp \overline{MP}$, $\overline{QM} \parallel \overline{PL}$.	1. Given
2. $\angle N$ and $\angle PML$ are right angles.	2. If two lines are perpendicular, they form four right angles.
3. $\angle N \cong \angle PML$	3. Right Angle Congruence Theorem
4. $\overline{NM} \cong \overline{ML}$	4. Definition of midpoint
5. $\angle QMN \cong \angle PLM$	5. Corresponding Angles Postulate
6. $\triangle NQM \cong \triangle MPL$	6. ASA Congruence Postulate

4.5 PRACTICE (pp. 232–235)

3. *Sample answer:* A, G, C, F, E, B, D

Statements	Reasons
1. $\overline{QS} \perp \overline{RP}$	1. Given
2. $\angle PTS$ and $\angle RTS$ are right angles.	2. If two lines are perpendicular, then they form four right angles.
3. $\angle PTS \cong \angle RTS$	3. Right Angle Congruence Theorem
4. $\overline{TS} \cong \overline{TS}$	4. Reflexive Property of Congruence
5. $\overline{PT} \cong \overline{RT}$	5. Given
6. $\triangle PTS \cong \triangle RTS$	6. SAS Congruence Postulate
7. $\overline{PS} \cong \overline{RS}$	7. Corresp. parts of $\cong$ $\triangle$s are $\cong$.

5. You can use the method in the answer to Ex. 4 to show that $\triangle QUR \cong \triangle PUQ$, so by the Transitive Property of Congruent Triangles, $\triangle NUP \cong \triangle QUR$. (You could instead use the Transitive Property of Congruence to show that $\overline{UN} \cong \overline{UP} \cong \overline{UQ} \cong \overline{UR}$.)

7. $\triangle NUP$ and $\triangle PUQ$ are congruent by Ex. 4 above. Since corresponding parts of congruent triangles are congruent, $\angle UNP \cong \angle UPQ$. **9.** SSS Congruence Postulate; if $\triangle STV \cong \triangle UVT$, then $\angle STV \cong \angle UVT$ because corresponding parts of congruent triangles are congruent.

11.

Statements	Reasons
1. $\triangle AGD \cong \triangle FHC$	1. Given
2. $\overline{GD} \cong \overline{HC}$	2. Corresp. parts of $\cong$ $\triangle$s are $\cong$.

13.

Statements	Reasons
1. $\triangle EDA \cong \triangle BCF$	1. Given
2. $\overline{AE} \cong \overline{FB}$	2. Corresp. parts of $\cong$ $\triangle$s are $\cong$.

15.

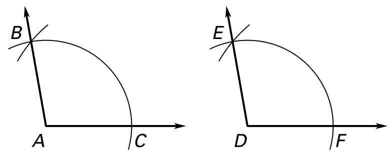
Statements	Reasons
3. $\overline{CF} \cong \overline{CF}$	1. Given
6. $\angle AFB \cong \angle EFD$	2. Given
	4. AAS Congruence Theorem
	5. Corresp. parts of $\cong$ $\triangle$s are $\cong$.
	7. ASA Congruence Postulate

17.

Statements	Reasons
1. $\overline{UR} \parallel \overline{ST}$, $\angle R$ and $\angle T$ are right angles.	1. Given
2. $\angle R \cong \angle T$	2. Right Angle Congruence Theorem
3. $\angle RUS \cong \angle TSU$	3. Alternate Interior Angles Theorem
4. $\overline{US} \cong \overline{US}$	4. Reflexive Property of Congruence
5. $\triangle RSU \cong \triangle TUS$	5. AAS Congruence Theorem
6. $\angle RSU \cong \angle TUS$	6. Corresp. parts of $\cong$ $\triangle$s are $\cong$.

19. It is given that $\overline{AB} \cong \overline{AC}$ and $\overline{BD} \cong \overline{CD}$. By the Reflexive Property of Congruence, $\overline{AD} \cong \overline{AD}$. So, $\triangle ACD \cong \triangle ABD$ by the SSS Congruence Postulate. Then, since corresponding parts of congruent triangles are congruent, $\angle CAD \cong \angle BAD$. Then, by definition, $\overrightarrow{AD}$ bisects $\angle A$.

21.



$\overline{AB} \cong \overline{AC} \cong \overline{DE} \cong \overline{DF}$, $\overline{BC} \cong \overline{EF}$ (Given) → $\triangle ABC \cong \triangle DEF$ (SSS Congruence Post.) → $\angle A \cong \angle D$ (Corresp. parts of $\cong$ $\triangle$s are $\cong$.)

4.5 MIXED REVIEW (p. 235) **25.** 170 m; 1650 m^2 **27.** 75.36 cm; 452.16 cm^2

29. $x + 11 = 21$
$x = 10$ Subtraction property of equality

31. $8x + 13 = 3x + 38$
$5x + 13 = 38$ Subtraction property of equality
$5x = 25$ Subtraction property of equality
$x = 5$ Division property of equality

SELECTED ANSWERS

33. $6(2x - 1) + 15 = 69$

$6(2x - 1) = 54$	Subtraction property of equality
$2x - 1 = 9$	Division property of equality
$2x = 10$	Addition property of equality
$x = 5$	Division property of equality

35. right scalene; legs: $\overline{MN}$ and $\overline{MP}$, hypotenuse: $\overline{NP}$

4.6 PRACTICE (pp. 239–242) **5.** Yes; the hypotenuse and one leg of one right triangle are congruent to the hypotenuse and one leg of the other. **7.** No; it cannot be shown that $\triangle ABC$ is equilateral. **9.** $x = 70$, $y = 70$ **11.** Yes; the triangles can be proved congruent using the SSS Congruence Postulate. **13.** Yes; the triangles can be proved congruent using the ASA Congruence Postulate, the SSS Congruence Postulate, the SAS Congruence Postulate, or the AAS Congruence Theorem. **15.** Yes; the triangles can be proved congruent using the HL Congruence Theorem. **17.** 11 **19.** 7 **21.** $x = 52.5$, $y = 75$ **23.** $x = 30$, $y = 120$ **25.** $x = 60$, $y = 30$ **27.** GIVEN: $\overline{AB} \cong \overline{AC} \cong \overline{BC}$; PROVE: $\angle A \cong \angle B \cong \angle C$; Since $\overline{AB} \cong \overline{AC}$, $\angle B \cong \angle C$ by the Base Angles Theorem. Since $\overline{AB} \cong \overline{BC}$, $\angle A \cong \angle C$ by the Base Angles Theorem. Then, by the Transitive Property of Congruence, $\angle A \cong \angle B \cong \angle C$ and $\triangle ABC$ is equiangular. **29.** $\triangle ABD$ and $\triangle CBD$ are congruent equilateral triangles, so $\overline{AB} \cong \overline{CB}$ and $\triangle ABC$ is isosceles by definition. **31.** Since $\triangle ABD$ and $\triangle CBD$ are congruent equilateral triangles, $\overline{AB} \cong \overline{BC}$ and $\angle ABD \cong \angle CBD$. By the Base Angles Theorem, $\angle BAE \cong \angle BCE$. Then, $\triangle ABE \cong \triangle CBE$ by the AAS Congruence Theorem. Moreover, by the Linear Pair Postulate, $m\angle AEB + m\angle CEB = 180°$. But $\angle AEB$ and $\angle CEB$ are corresponding parts of congruent triangles, so they are congruent, that is, $m\angle AEB = m\angle CEB$. Then, by the Substitution Property, $2m\angle AEB = 180°$ and $m\angle AEB = 90°$. So, $\angle AEB$ and $\angle CEB$ are both right angles, and $\triangle AEB$ and $\triangle CEB$ are congruent right triangles.

33.

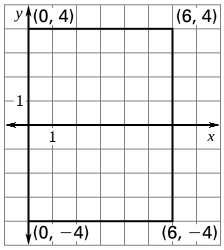
Statements	Reasons
1. D is the midpoint of $\overline{CE}$, $\angle BCD$ and $\angle FED$ are rt. $\angle$s.	1. Given
2. $\angle BCD \cong \angle FED$	2. Right Angle Congruence Theorem
3. $\overline{CD} \cong \overline{ED}$	3. Definition of midpoint
4. $\overline{BD} \cong \overline{FD}$	4. Given
5. $\triangle BCD \cong \triangle FED$	5. HL Congruence Theorem

35. Each of the triangles is isosceles and every pair of adjacent triangles have a common side, so the legs of all the triangles are congruent by the Transitive Property of Congruence. The common vertex angles are congruent, so any two of the triangles are congruent by the SAS Congruence Postulate. **37.** equilateral **39.** It is given that $\angle CDB \cong \angle ADB$ and that $\overline{DB} \perp \overline{AC}$. Since perpendicular lines form right angles, $\angle ABD$ and $\angle CBD$ are right angles. By the Right Angle Congruence Theorem, $\angle ABD \cong \angle CBD$. By the Reflexive Property of Congruence, $\overline{DB} \cong \overline{DB}$, so $\triangle ABD \cong \triangle CBD$ by the ASA Congruence Postulate. **41.** No; the measure of $\angle ADB$ will decrease, as will the measure of $\angle CDB$ and the amount of reflection will remain the same.

4.6 MIXED REVIEW (p. 242)

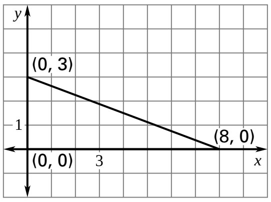
45. congruent **47.** not congruent **49.** (4, 4) **51.** $\left(1\frac{1}{2}, 4\frac{1}{2}\right)$ **53.** $\left(-1\frac{1}{2}, -12\frac{1}{2}\right)$ **55.** $y = -x$ **57.** $y = -\frac{3}{2}x - \frac{1}{2}$

4.7 PRACTICE (pp. 246–249) **3.** (4, 0), (4, 7), (–4, 7), (–4, 0) **5.** Use the Distance Formula to show that $\overline{AB} \cong \overline{AC}$. **7.** *Sample figure:*

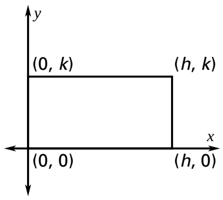


9, 11. Good placements should include vertices for which at least one coordinate is 0.

9. *Sample figure:*



11. *Sample figure:*



13. 58.31 **15.** $\sqrt{41}$ **17.** $3\sqrt{2}$ **19.** (45, 35) **21.** Show that, since $\overline{HJ}$ and $\overline{OF}$ both have slope 0, they are parallel, so that alternate interior angles $\angle H$ and $\angle F$ are congruent. $\overline{HG} \cong \overline{FG}$ by the definition of midpoint. Then use the Distance Formula to show that $\overline{HJ} \cong \overline{OF}$ so that $\triangle GHJ \cong \triangle GFO$ by the SAS Congruence Postulate. **23.** $F(2h, 0)$, $E(2h, h)$; $h\sqrt{5}$ **25.** $O(0, 0)$, $R(k, k)$, $S(k, 2k)$, $T(2k, 2k)$, $U(k, 0)$; $2k\sqrt{2}$ **27.** Since $OC = \sqrt{h^2 + k^2}$ and $EC = \sqrt{h^2 + k^2}$, $\overline{OC} \cong \overline{EC}$, and since $BC = k$ and $DC = k$, $\overline{BC} \cong \overline{DC}$. Then, since vertical angles $\angle OCB$ and $\angle ECD$ are congruent, $\triangle OBC \cong \triangle EDC$ by the SAS Congruence Postulate. **29.** isosceles; no; no **31.** The triangle in Exercise 5 has vertices which can be used to describe $\triangle ABC$. Point A is on the y-axis and points B and C are on the x-axis, equidistant from the origin. The proof shows that any such triangle is isosceles.

4.7 MIXED REVIEW (p. 250) **35.** 5 **37.** true **39.** true **41.** If two triangles are congruent, then the corresponding angles of the triangles are congruent; true. **43.** If two triangles are not congruent, then the corresponding angles of the triangles are not congruent; false.

QUIZ 3 (p. 250)

1.

Statements	Reasons
1. $\overline{DF} \cong \overline{DG}$, $\overline{ED} \cong \overline{HD}$	1. Given
2. $\angle EDF \cong \angle HDG$	2. Vertical Angles Theorem
3. $\triangle EDF \cong \triangle HDG$	3. SAS Congruence Postulate
4. $\angle EFD \cong \angle HGD$	4. Corresp. parts of ≅ ⚠ are ≅.

2.

Statements	Reasons
1. $\overline{ST} \cong \overline{UT} \cong \overline{VU}$, $\overline{SU} \parallel \overline{TV}$	1. Given
2. $\angle S \cong \angle SUT$, $\angle UTV \cong \angle V$	2. Base Angles Theorem
3. $\angle SUT \cong \angle UTV$	3. Alternate Interior Angles Theorem
4. $\angle S \cong \angle SUT \cong \angle UTV \cong \angle V$	4. Transitive Property of Congruence
5. $\triangle STU \cong \triangle TUV$	5. AAS Congruence Theorem

3. Use the Distance Formula to show that OP, PM, NM, and ON are all equal, so that $\overline{OP} \cong \overline{PM} \cong \overline{NM} \cong \overline{ON}$. Since $\overline{OM} \cong \overline{OM}$ by the Reflexive Property of Congruence, $\triangle OPM \cong \triangle ONM$ by the SSS Congruence Postulate and both triangles are isosceles by definition.

CHAPTER 4 REVIEW (pp. 252–254)

1. isosceles right **3.** obtuse isosceles **5.** 53° **7.** $\angle A$ and $\angle X$, $\angle B$ and $\angle Y$, $\angle C$ and $\angle Z$, $\overline{AB}$ and $\overline{XY}$, $\overline{BC}$ and $\overline{YZ}$, $\overline{AC}$ and $\overline{XZ}$ **9.** Yes; ASA Congruence Postulate; two pairs of corresponding angles are congruent and the corresponding included sides are congruent. **11.** Yes; AAS Congruence Theorem; because $\overline{HF} \parallel \overline{JE}$, $\angle HFG \cong \angle E$ (Corresponding Angles Postulate), so two pairs of corresponding angles are congruent and two nonincluded sides are congruent. **13.** $\overline{PQ}$ **15.** 54 **17.** 110

ALGEBRA REVIEW (pp. 258–259)

1. $\sqrt{73}$ **2.** $\sqrt{170}$ **3.** 4 **4.** 5 **5.** $\sqrt{137}$ **6.** $\sqrt{65}$ **7.** $2x + 12y$ **8.** $-m + 2q$ **9.** $-5p - 9t$ **10.** $27x - 25y$ **11.** $9x^2y - 5xy^2$ **12.** $-2x^2 + 3xy$ **13.** 6 **14.** 6 **15.** –10 **16.** –5 **17.** 0 **18.** 0 **19.** 10 **20.** no solution **21.** 2 **22.** $x < -5$ **23.** $c < 28$ **24.** $m < 26$ **25.** $x < 9$ **26.** $z > -8$ **27.** $x \geq 3$ **28.** $x < -11$ **29.** $m \geq 1$ **30.** $b > \frac{3}{5}$ **31.** $x < \frac{3}{10}$ **32.** $z \leq 1$ **33.** $t \leq -\frac{14}{5}$ **34.** $r > -6$ **35.** $x \geq -1$ **36.** $x \leq -7$ **37.** $x = 7$ or -17 **38.** $x = 12$ or -8 **39.** $x = 2$ or 8 **40.** $x = 7$ or -5 **41.** $x = 14$ or -20 **42.** $x = -1$ or $\frac{9}{5}$ **43.** $x = 7$ or -4 **44.** $x = \frac{12}{7}$ or -4 **45.** $x = -2$ or $\frac{9}{2}$ **46.** $x = -\frac{4}{3}$ or -4 **47.** $x \geq 10$ or $x \leq -36$ **48.** $x > 14$ or $x < -2$ **49.** $-6 \leq x \leq 10$ **50.** $x \leq 8$ or $x \geq 22$ **51.** $12 < x < 20$ **52.** $-\frac{2}{3} < x < 2$ **53.** $-3 \leq x \leq 7$ **54.** $-\frac{5}{3} \leq x \leq 3$ **55.** $x \leq -2$ or $x \geq 4$ **56.** $x < -8$ or $x > 5$ **57.** $-6 < x < 2$ **58.** $x < -2$ or $x > 5$ **59.** $x \leq -6$ or $x \geq 2$ **60.** $-1 < x < \frac{23}{5}$ **61.** $x < -2$ or $x > \frac{20}{11}$ **62.** no solution **63.** $x < -\frac{8}{3}$ or $x > 4$ **64.** $-3 \leq x \leq \frac{1}{3}$ **65.** all real numbers **66.** $-2 \leq x \leq 0$

CHAPTER 5

SKILL REVIEW (p. 262)

3. (–1, 2) **4.** 5 **5.** 2 **6.** $-\frac{1}{2}$

5.1 PRACTICE (pp. 267–271)

3. $\overline{AD} \cong \overline{BD}$ **5.** $\overline{AC} \cong \overline{BC}$; C is on the ⊥ bisector of $\overline{AB}$. **7.** The distance from M to $\overrightarrow{PL}$ is equal to the distance from M to $\overrightarrow{PN}$. **9.** No; the diagram does not show that $CA = CB$. **11.** No; since P is not equidistant from the sides of $\angle A$, P is not on the bisector of $\angle A$. **13.** No; the diagram does not show that the segments with equal length are perpendicular segments. **15.** D is 1.5 in. from each side of $\angle A$. **17.** 17 **19.** 2 **21.** B **23.** C **25.** D **27.** $\overline{PA} \cong \overline{AB}$ and $\overline{CA} \cong \overline{CB}$ by construction. By the Reflexive Prop. of Cong., $\overline{CP} \cong \overline{CP}$. Then, $\triangle CPA \cong \triangle CPB$ by the SSS Cong. Post. Corresp. angles $\angle CPA$ and $\angle CPB$ are ≅. Then, $\overleftrightarrow{CP} \perp \overleftrightarrow{AB}$. (If 2 lines form a linear pair of ≅ ⚠, then the lines are ⊥.)

29.

Statements	Reasons
1. Draw a line through C ⊥ to $\overline{AB}$ intersecting $\overline{AB}$ at P.	1. Through a point not on a line there is exactly one line ⊥ to a given line.
2. $\angle CPA$ and $\angle CPB$ are right ⚠.	2. Def. of ⊥ lines
3. $\triangle CPA$ and $\triangle CPB$ are right ⚠.	3. Def. of right △
4. $CA = CB$, or $\overline{CA} \cong \overline{CB}$	4. Given; def. of cong.
5. $\overline{CP} \cong \overline{CP}$	5. Reflexive Prop. of Cong.
6. $\triangle CPA \cong \triangle CPB$	6. HL Cong. Thm.
7. $\overline{PA} \cong \overline{PB}$	7. Corresp. parts of ≅ ⚠ are ≅.
8. $\overleftrightarrow{CP}$ is the ⊥ bisector of $\overline{AB}$ and C is on the ⊥ bisector of $\overline{AB}$.	8. Def. of ⊥ bisector

31. The post is the ⊥ bisector of the segment between the ends of the wires. **33.** ℓ is the ⊥ bisector of $\overline{AB}$. **35.** $m\angle APB$ increases; more difficult; the goalie has a greater area to defend because the distances from the goalie to the sides of $\angle APB$ (the shooting angle) increase.

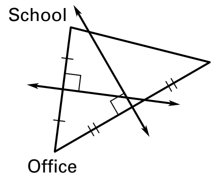
5.1 MIXED REVIEW (p. 271)

41. 6 cm **43.** about 113.04 cm^2 **45.** $-\frac{4}{5}$ **47.** $\frac{8}{7}$ **49.** 0 **51.** 34

5.2 PRACTICE (pp. 275–278)

3. 7 **5.** outside **7.** on **9.** The segments are ≅; Thm. 5.6. **11.** always **13.** sometimes **15.** 20 **17.** 25 **19.** The ∠ bisectors of a △ intersect in a point that is equidistant from the sides of the △, but MQ and MN are not necessarily distances to the sides; M is equidistant from $\overline{JK}$, $\overline{KL}$, and $\overline{JL}$.

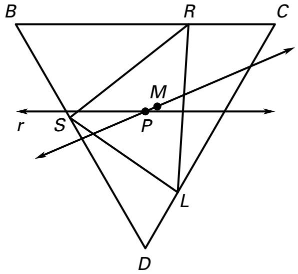
21.



25. about $2\frac{1}{2}$ feet

5.2 Mixed Review (p. 278) **33.** 77 square units **35.** $y = \frac{1}{2}x + \frac{5}{2}$ **37.** $y = -\frac{11}{10}x - \frac{56}{5}$ **39.** no

5.3 Practice (pp. 282–284) **3.** median **5.** angle bisector **7.** ⊥ bisector, ∠ bisector, median, altitude **9.** 12 **11.** 48 **15.** yes **17.** (5, 0) **19.** (5, 2) **21.** (4, 4) **23.** $\frac{JP}{JM} = \frac{2\sqrt{5}}{3\sqrt{5}} = \frac{2}{3}$, so $JP = \frac{2}{3}JM$.
29. Measure GH. Because $GH = 0$, G and H must be the same point; therefore, the lines containing the three altitudes intersect at one point.
30–32.



33. about 20°

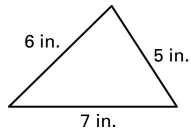
5.3 Mixed Review (p. 284) **39.** $y = -x + 8$ **41.** $y = 3x - 21$ **43.** $\angle E \cong \angle H$ **45.** $5\sqrt{10}$

Quiz 1 (p. 285) **1.** 16 **2.** 12 **3.** 10 **4.** 10; the ⊥ bisectors intersect at a point equidistant from the vertices of the △. **5.** at G, the intersection of the medians of $\triangle ABC$, 8 in. from C on $\overline{CF}$

5.4 Practice (pp. 290–293) **3.** $\overline{DF}$ **5.** 21.2 **7.** 16 **9.** 30.6 **11.** about 54 yd **13.** $\overline{MN}$ **15.** 14 **17.** 31 **19.** $\angle BLN$, $\angle A$, and $\angle NMC$ are ≅ by the Corresp. Angles Post., as are $\angle BNL$, $\angle C$, and $\angle LMA$. By the Alternate Interior Angles Thm., $\angle LNM \cong \angle NMC$ and $\angle NLM \cong \angle LMA$, so by the Transitive Prop. of Cong., $\angle BLN$, $\angle A$, $\angle NMC$, and $\angle LNM$ are ≅, as are $\angle BNL$, $\angle C$, $\angle LMA$, and $\angle NLM$. Then, $\angle B$, $\angle ALM$, $\angle LMN$, and $\angle MNC$ are all ≅ by the Third Angles Thm. and the Transitive Prop. of Cong.
21. $D\left(2\frac{1}{2}, 0\right)$, $E\left(7\frac{1}{2}, 2\right)$, $F(5, 4)$ **23.** $(c, 0)$
25. $DF = \sqrt{(a-c)^2 + (b-0)^2} = \sqrt{(a-c)^2 + b^2}$ and $CB = \sqrt{(2a-2c)^2 + (2b-0)^2} = 2\sqrt{(a-c)^2 + b^2}$, so $DF = \frac{1}{2}CB$; $EF = \sqrt{(a+c-c)^2 + (b-0)^2} = \sqrt{a^2 + b^2}$ and $CA = \sqrt{(2a-0)^2 + (2b-0)^2} = 2\sqrt{a^2 + b^2}$, so $EF = \frac{1}{2}CA$. **27.** (3, –1), (11, 3), (7, 9) **29.** 31 **31.** $\frac{1}{2}$; $1\frac{1}{4}$; $2\frac{3}{8}$
33. $\overline{DE}$ is a midsegment of $\triangle ABC$, so D is the midpoint of $\overline{AB}$ and $\overline{AD} \cong \overline{DB}$. $\overline{DE}$ is also a midsegment of $\triangle ABC$, so by the Midsegment Thm., $\overline{DE} \parallel \overline{BC}$ and $DE = \frac{1}{2}BC$. But F is the midpoint of $\overline{BC}$, so $BF = \frac{1}{2}BC$. Then by the transitive prop. of equality and the def. of cong., $\overline{DE} \cong \overline{BF}$. Corresp. angles $\angle ADE$ and $\angle ABC$ are ≅, so $\triangle ADE \cong \triangle DBF$ by the SAS Cong. Post.
35. No, no, yes, no; if you imagine "sliding" a segment parallel to $\overline{RS}$ up the triangle, then its length decreases as the segment slides upward (as can be shown with a coordinate argument). So, $MN < PQ < RS$, or $12 < PQ < 24$.

5.4 Mixed Review (p. 293)
39. $x - 3 = 11$
$x = 14$ (Addition prop. of equality)
41. $8x - 1 = 2x + 17$
$8x = 2x + 18$ (Addition prop. of equality)
$6x = 18$ (Subtraction prop. of equality)
$x = 3$ (Division prop. of equality)
43. $2(4x - 1) = 14$
$4x - 1 = 7$ (Division prop. of equality)
$4x = 8$ (Addition prop. of equality)
$x = 2$ (Division prop. of equality)
45. $-2(x + 1) + 3 = 23$
$-2(x + 1) = 20$ (Subtraction prop. of equality)
$x + 1 = -10$ (Division prop. of equality)
$x = -11$ (Subtraction prop. of equality)
47. 23 **49.** 18 **51.** incenter **53.** 6

5.5 Practice (pp. 298–301) **3.** $\angle D$, $\angle F$ **5.** greater than 66 mi and less than 264 mi **7.** $\overline{RT}$, $\overline{SR}$ and $\overline{ST}$ ($\overline{SR} \cong \overline{ST}$) **9.** $\angle C$, $\angle B$ **11.** $\angle H$, $\angle F$ **13.** $x > y$, $x > z$ **15.** $\overline{DF}$, $\overline{DE}$, $\overline{EF}$ **17.** $\angle L$, $\angle K$, $\angle M$ **19.** $\angle T$, $\angle S$, $\angle R$ **21, 23.** Sample answers are given.
21.



23. 4 in., 5 in., 9 in.; 4 in., 4 in., 10 in.; 3 in., 6 in., 9 in. **25.** $x < 7$
27. The sides and angles could not be positioned as they are labeled; for example, the longest side is not opposite the largest angle. **29.** raised **31.** Yes; when the boom is lowered and $AB > 100$ (and so $AB > BC$), then $\angle ACB$ will be larger than $\angle BAC$.
33. $\overline{MJ} \perp \overline{JN}$, so $\triangle MJN$ is a right △. The largest ∠ in a right △ is the right ∠, so $m\angle MJN > m\angle MNJ$, so $MN > MJ$. (If one ∠ of a △ is larger than another ∠, then the side opp. the larger ∠ is longer than the side opp. the smaller ∠.)

5.5 Mixed Review (p. 301) **39, 41.** Sample answers are given. **39.** proof of Theorem 4.1, page 196 **41.** Example 1, page 136 **43.** ∠9 **45.** ∠2; ∠10 **47.** (–7, 3), (–5, –3), (1, 7) **49.** (0, 0), (6, –4), (0, –8)

5.6 Practice (pp. 305–307) **3.** > **5.** < **7.** < **9.** > **11.** = **13.** > **15.** > **17.** B; $AD = AD$, $AB = DC$, and $m\angle 3 < m\angle 5$, so by the Hinge Thm., $AC > BD$. **19.** $x > 1$ **21.** Given that $RS + ST \neq 12$ in. and $ST = 5$ in., assume that $RS = 7$ in.
23. Given $\triangle ABC$ with $m\angle A + m\angle B = 90°$, assume $m\angle C \neq 90°$. (That is, assume that either $m\angle C < 90°$ or $m\angle C > 90°$.)
25. Case 1: Assume that $EF < DF$. If one side of a △ is longer than another side, then the ∠ opp. the longer side is larger than the ∠ opp. the shorter side, so $m\angle D < m\angle E$. But this contradicts the given information that $m\angle D > m\angle E$.

Case 2: Assume that $EF = DF$. By the Converse of the Base Angles Thm., $m\angle E = m\angle D$. But this contradicts the given information that $m\angle D > m\angle E$. Since both cases produce a contradiction, the assumption that EF is not greater than DF must be incorrect and $EF > DF$.
27. Assume that $RS > RT$. Then $m\angle T > m\angle S$. But $\triangle RUS \cong \triangle RUT$ by the ASA Congruence Postulate, so $\angle S \cong \angle T$, or $m\angle T = m\angle S$. This is a contradiction, so $RS \le RT$. We get a similar contradiction if we assume $RT > RS$; therefore, $RS = RT$, and $\triangle RST$ is isosceles by definition.
29. The paths are described by two △s in which two sides of one △ are ≅ to two sides of another △, but the included ∠ in your friend's △ is larger than the included ∠ in yours, so the side representing the distance from the airport is longer in your friend's △.

5.6 MIXED REVIEW (p. 308) **33.** isosceles, equiangular, equilateral **35.** isosceles **37.** isosceles **39.** 51° **41.** 84°

QUIZ 2 (p. 308) **1.** $\overline{CE}$ **2.** 16 **3.** 21 **4.** $\overline{LQ}$, $\overline{LM}$, $\overline{MQ}$
5. $\overline{QM}$, $\overline{PM}$, $\overline{QP}$ **6.** $\overline{MP}$, $\overline{NP}$, $\overline{MN}$ **7.** $\overline{DE}$
8. the second group

CHAPTER 5 REVIEW (pp. 310–312) **1.** If a point is on the ⊥ bisector of a segment, then it is equidistant from the endpoints of the segment. **3.** Q is on the bisector of $\angle RST$. **5.** 6 **7.** ⊥ bisectors; circumcenter **9.** altitudes; orthocenter
11. (0, 0) **13.** Let L be the midpoint of $\overline{HJ}$, M the midpoint of $\overline{JK}$, and N the midpoint of $\overline{HK}$; slope of $\overline{LM} = 0$ = slope of $\overline{HK}$, so $\overline{LM} \parallel \overline{HK}$; slope of $\overline{LN} = -1$ = slope of $\overline{JK}$, so $\overline{LN} \parallel \overline{JK}$; slope of $\overline{MN} = 1$ = slope of $\overline{HJ}$, so $\overline{MN} \parallel \overline{HJ}$.
15. 31 **17.** $m\angle D$, $m\angle E$, $m\angle F$; EF, DF, DE **19.** $m\angle L$, $m\angle K$, $m\angle M$; KM, LM, KL **21.** < **23.** = **25.** Assume that there is a $\triangle ABC$ with 2 right ∠s, say $m\angle A = 90°$ and $m\angle B = 90°$. Then, $m\angle A + m\angle B = 180°$ and, since $m\angle C > 0°$, $m\angle A + m\angle B + m\angle C > 180°$. This contradicts the △ Sum Theorem. Then the assumption that there is such a $\triangle ABC$ must be incorrect and no △ has 2 right ∠s.

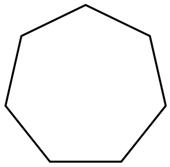
CHAPTER 6

SKILL REVIEW (p. 320) **1.** If two ∥ lines are cut by a transversal, consecutive interior angles are supplementary. **2.** If two ∥ lines are cut by a transversal, alternate interior angles are congruent. **3.** AAS Cong. Theorem
4. SSS Cong. Postulate **5.** 13, $-\frac{12}{5}$; $\left(-\frac{1}{2}, -2\right)$

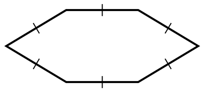
6.1 PRACTICE (pp. 325–328) **5.** Not a polygon; one side is not a segment. **7.** equilateral **9.** regular **11.** 67°
13. not a polygon **15.** not a polygon **17.** not a polygon
19. heptagon; concave **21.** octagon **23.** $\overline{MP}$, $\overline{MQ}$, $\overline{MR}$, $\overline{MS}$, $\overline{MT}$ **25.** equilateral **27.** quadrilateral; regular
29. triangle; regular

31–33. Sample figures are given.

31.



33.



35. Yes; *Sample answer:* A polygon that is concave must include an ∠ with measure greater than 180°. By the Triangle Sum Theorem, every △ must be convex. **37.** 75°
39. 125° **41.** 67 **43.** 44 **45.** 4 **47.** three; *Sample answers:* triangle (a polygon with three sides), trilateral (having three sides), tricycle (a vehicle with three wheels), trio (a group of three) **49.** octagon; concave, equilateral **51.** 17-gon; concave; none of these

6.1 MIXED REVIEW (p. 328) **55.** 63 **57.** 6 **59.** 5
61. (1, 13), (5, –1), (–9, –15) **63.** (2, 15), (–4, –9), (10, –1)

6.2 PRACTICE (pp. 333–337) **5.** $\overline{KN}$; diags. of a ▱ bisect each other. **7.** $\angle LMJ$; opp. ∠s of a ▱ are ≅. **9.** $\overline{JM}$; opp. sides of a ▱ are ≅. **11.** $\angle KMJ$; if 2 ∥ lines are cut by a transversal, then alt. int. ∠s are ≅. **13.** 7; since the diags. of a ▱ bisect each other, $LP = NP = 7$. **15.** 8.2°; since the diags. of a ▱ bisect each other, $QP = MP = 8.2$. **17.** 80°; since consec. ∠s of a ▱ are supplementary, $m\angle NQL = 180° - m\angle QLM = 80°$.
19. 29°; opp. sides of a ▱ are ∥, so $m\angle LMQ \cong m\angle MQN$ since they are alt. int. ∠s. **21.** 11; since opp. sides of a ▱ are ≅, $BA = CD = 11$. **23.** 60°; since consec. ∠s of a ▱ are supplementary, $m\angle CDA = 180° - m\angle BAD = 60°$.
25. 120°; since opp. ∠s of a ▱ are ≅, $m\angle BCD = m\angle BAD = 120°$. **27.** $a = 79$, $b = 101$ **29.** $p = 5$, $q = 9$ **31.** $k = 7$, $m = 8$ **33.** $u = 4$, $v = 18$ **35.** $b = 90$, $c = 80$, $d = 100$
37. $r = 30$, $s = 40$, $t = 25$

39.

Statements	Reasons
1. $JKLM$ is a ▱.	2. Opp. ∠s of a ▱ are ≅.
3. 360°	4. Substitution prop. of equality
5. $m\angle J$; $m\angle K$	6. Division
	7. Def. of supplementary ∠s

41. $(a + c, b)$ **43.** $\left(\frac{a+c}{2}, \frac{b}{2}\right)$ **45.** ∠3 and ∠7 are supplementary by the Linear Pair Postulate, so $m\angle 3 + m\angle 7 = 180°$. Opp. ∠s of a ▱ are ≅, so $\angle 6 \cong \angle 7$, or $m\angle 6 = m\angle 7$. Then by the substitution prop. of equality, $m\angle 3 + m\angle 6 = 180°$ and ∠3 and ∠6 are supplementary.
47. ∠4 **49.** Corresp. ∠s Postulate (If 2 ∥ lines are cut by a transv., then corresp. ∠s are ≅.) **51.** 60° **53.** AD increases.

55.

Statements	Reasons
1. $ABCD$ and $CEFD$ are ▱s.	1. Given
2. $\overline{AB} \cong \overline{CD}$; $\overline{CD} \cong \overline{EF}$	2. Opp. sides of a ▱ are ≅.
3. $\overline{AB} \cong \overline{EF}$	3. Transitive Prop. of Cong.

SELECTED ANSWERS

57.

Statements	Reasons
1. *WXYZ* is a ▱.	1. Given
2. $\overline{WZ} \cong \overline{XY}$	2. Opp. sides of a ▱ are ≅.
3. $\overline{WM} \cong \overline{YM}$; $\overline{ZM} \cong \overline{XM}$	3. The diags. of a ▱ bisect each other.
4. $\triangle WMZ \cong \triangle YMX$	4. SSS Cong. Postulate

6.2 MIXED REVIEW (p. 337) **65.** $4\sqrt{5}$ **67.** $5\sqrt{2}$ **69.** $-\frac{1}{2}$
71. Yes; in a plane, 2 lines ⊥ to the same line are ∥.
73. $\overline{EF}$, $\overline{DF}$; $m\angle D = 180° - (90° + 55°) = 35°$, so ∠*D* is the smallest ∠ of △*DEF* and ∠*E* is the largest. If 1 ∠ of a △ is larger than another ∠, then the side opp. the larger ∠ is longer than the side opp. the smaller ∠.

6.3 PRACTICE (pp. 342–344) **3.** Yes; if an ∠ of a quad. is supplementary to both of its consec. ∠s, then the quad. is a ▱. **5.** Show that since alt. int. ∠s *BCA* and *DAC* are ≅, $\overline{BC} \parallel \overline{AD}$. Then, since one pair of opp. sides of *ABCD* is both ∥ and ≅, *ABCD* is a ▱. **7.** Use the Corresponding Angles Converse to show that $\overline{BC} \parallel \overline{AD}$ and the Alternate Interior Angles Converse to show that $\overline{AB} \parallel \overline{DC}$. Then, *ABCD* is a ▱ by the def. of a ▱. **9.** Yes; if opp. sides of a quad. are ≅, then it is a ▱. **11.** No; according to the Vertical Angles Theorem, the given information is true for the diags. of any quad. **13.** No; the fact that two opp. sides and one diag. are ≅ is insufficient to prove that the quad. is a ▱. **15.** *Sample answer:* Since corresp. parts of ≅ △s are ≅, both pairs of opp. sides of *ABCD* are ≅, so *ABCD* is a ▱.
17. 70 **19.** 90 **21.** $AB = CD = \sqrt{17}$, so $\overline{AB} \cong \overline{CD}$. $AD = BC = 2\sqrt{17}$, so $\overline{AD} \cong \overline{BC}$. Since opp. sides of *ABCD* are ≅, *ABCD* is a ▱. **23.** Slope of $\overline{AB}$ = slope of $\overline{CD} = -\frac{1}{4}$ and slope of $\overline{AD}$ = slope of $\overline{BC} = -4$, so $\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{BC}$. Then, *ABCD* is a ▱ by the def. of a ▱.
25. *Sample answer:* Slope of $\overline{JK}$ = slope of $\overline{LM} = \frac{1}{5}$ and slope of $\overline{JM}$ = slope of $\overline{KL} = -2$, so $\overline{JK} \parallel \overline{LM}$ and $\overline{JM} \parallel \overline{KL}$. Then, *JKLM* is a ▱ by the def. of a ▱.
27. Since opp. sides of *ABCD* are ≅, *ABCD* is a ▱, so opp. sides $\overline{AB}$ and $\overline{CD}$ are ∥. **29.** The diags. of the figure that is drawn were drawn to bisect each other. Therefore, the figure is a ▱. **31.** *Sample answer:* Design the mount so that $\overline{AD} \cong \overline{BC}$ and $\overline{AB} \cong \overline{DC}$, making *ABCD* a ▱. Then, as long as the support containing $\overline{AD}$ is vertical, $\overline{BC}$ will be vertical, because opp. sides of a ▱ are ∥. **33.** Since ∠*P* is supplementary to ∠*Q*, $\overline{QR} \parallel \overline{PS}$ by the Consecutive Interior Angles Converse. Similarly, $\overline{QP} \parallel \overline{RS}$ by the same theorem. Then, *PQRS* is a ▱ by the def. of a ▱.

35. $(-b, -c)$; the diags. of a ▱ bisect each other, so (0, 0) is the midpoint of $\overline{QN}$. Let $Q = (x, y)$. By the Midpoint Formula, $(0, 0) = \left(\frac{x+b}{2}, \frac{y+c}{2}\right)$, so $x = -b$ and $y = -c$.

6.3 MIXED REVIEW (p. 345) **39.** If $x^2 + 2 = 2$, then $x = 0$. If $x = 0$, then $x^2 + 2 = 2$. **41.** If each pair of opp. sides of a quad. are ∥, then the quad. is a ▱. If a quad. is a ▱, then each pair of opp. sides are ∥. **43.** A point is on the bisector of an ∠ if and only if the point is equidistant from the two sides of the ∠. **45.** 60 **47.** 35

QUIZ 1 (p. 346) **1.** convex, equilateral, equiangular, regular
2. 35; the sum of the measures of the interior ∠s of a quad. is 360°, so $2x + 2x + 110 + 110 = 360$, $4x = 140$, and $x = 35$.
3. *ABCG* and *CDEF* are ▱, so ∠*A* ≅ ∠*BCG* and ∠*DCF* ≅ ∠*E*. (Opp. ∠s of a ▱ are ≅.) ∠*BCG* ≅ ∠*DCF* by the Vert. ∠s Thm. Then, ∠*A* ≅ ∠*E* by the Transitive Prop. of Cong. **4.** *Sample answers:* Use slopes to show that both pairs of opp. sides are ∥, use the Distance Formula to show that both pairs of opp. sides are ≅, use slope and the Distance Formula to show that one pair of opp. sides are both ∥ and ≅, use the Midpoint Formula to show that the diags. bisect each other.

6.4 PRACTICE (pp. 351–354) **3.** always **5.** sometimes
7. C, D **9.** B, D **11.** 45 **13.** Sometimes; if rectangle *ABCD* is also a rhombus (a square), then $\overline{AB} \cong \overline{BC}$.
15. Sometimes; if rectangle *ABCD* is also a rhombus (a square), then the diags. of *ABCD* are ⊥. **17.** square
19. ▱, rectangle, rhombus, square **21.** rhombus, square
23. $\overline{PQ} \parallel \overline{RS}$, $\overline{PS} \parallel \overline{QR}$, $\overline{PQ} \cong \overline{QR} \cong \overline{RS} \cong \overline{PS}$, ∠*P* ≅ ∠*R*, ∠*Q* ≅ ∠*S*, $\overline{PR}$ and $\overline{QS}$ bisect each other, $\overline{PR} \perp \overline{QS}$, $\overline{PR}$ bisects ∠*SPQ* and ∠*SRQ*, $\overline{QS}$ bisects ∠*PSR* and ∠*PQR*.
25. rectangle **27.** Always; opp. ∠s of a ▱ are ≅.
29. Always; each diag. of a rhombus bisects a pair of opp. ∠s.
31. Sometimes; if a rhombus is also a rectangle (a square), then its diagonals are ≅. **33.** 18 **35.** 50 **37.** 1 **39.** $2\sqrt{2}$
41. 45° **43.** 10 **45.** Assume temporarily that $\overline{MN} \parallel \overline{PQ}$, ∠1 ≇ ∠2, and that $\overline{MQ} \parallel \overline{NP}$. By the def. of a ▱, *MNPQ* is a ▱. This contradicts the given information that ∠1 ≇ ∠2. It follows that $\overline{MQ}$ is not ∥ to $\overline{NP}$. **47.** If a ▱ is a rectangle, then its diags. are ≅; if the diags. of a ▱ are ≅, then the ▱ is a rectangle; $\overline{JL} \cong \overline{KM}$.
49. If a quad. is a rectangle, then it has 4 right ∠s (def. of rectangle); if a quad. has 4 right ∠s, then it is a rectangle. (Both pairs of opp. ∠s are ≅, so the quad. is a ▱. Since all 4 ∠s are ≅ and the sum of the measures of the int. ∠s of a quad. is 360°, the measure of each ∠ is 90°, and the quad. is a rectangle.)

51.

Statements	Reasons
1. *PQRT* is a rhombus.	1. Given
2. $\overline{PQ} \cong \overline{QR} \cong \overline{RT} \cong \overline{PT}$	2. A quad. is a rhombus if and only if it has 4 ≅ sides.
3. $\overline{PR} \cong \overline{PR}$, $\overline{QT} \cong \overline{QT}$	3. Reflexive Prop. of Cong.
4. $\triangle PRQ \cong \triangle PRT$; $\triangle PTQ \cong \triangle RTQ$	4. SSS Cong. Postulate
5. $\angle TPR \cong \angle QPR$, $\angle TRP \cong \angle QRP$, $\angle PTQ \cong \angle RTQ$, $\angle PQT \cong \angle RQT$	5. Corresp. parts of ≅ ⚠s are ≅.
6. $\overline{PR}$ bisects $\angle TPQ$ and $\angle QRT$, $\overline{QT}$ bisects $\angle PTR$ and $\angle RQP$.	6. Def. of ∠ bisector

53. *Sample answer:* Draw $\overline{AB}$ and a line *j* (not ⊥ to $\overline{AB}$) intersecting $\overline{AB}$ at *B*. Construct $\overline{BC}$ on *j* so that $\overline{BC} \cong \overline{AB}$. Construct two arcs with radius *AB* and centers *A* and *C*, intersecting at *D*. Draw $\overline{AD}$ and $\overline{CD}$. Since all 4 sides of *ABCD* are ≅, *ABCD* is a rhombus. Since $\overline{AB}$ and $\overline{BC}$ are not ⊥, *ABCD* is not a rectangle, and thus not a square. **55.** Rectangle; $PR = QS = \sqrt{41}$; since the diags. of *PQRS* are ≅, *PQRS* is a rectangle. **57.** Rectangle; $PR = QS = \sqrt{58}$; since the diags. of *PQRS* are ≅, *PQRS* is a rectangle. **59.** (b, a); $\overline{KM} \cong \overline{ON}$, so $KM = b$ and $\overline{MN} \cong \overline{KO}$, so $MN = a$. **61.** *Sample answer:* Since cross braces $\overline{AD}$ and $\overline{BC}$ bisect each other, *ABDC* is a ▱. Since cross braces $\overline{AD}$ and $\overline{BC}$ also have the same length, *ABDC* is a rectangle. Since a rectangle has 4 right ⚠s, $m\angle BAC = m\angle ABD = 90°$. Then, $m\angle BAC = m\angle BAE$ and $m\angle ABD = m\angle ABF$, so $m\angle BAE = m\angle ABF = 90°$ by substitution. So tabletop $\overline{AB}$ is perpendicular to legs $\overline{AE}$ and $\overline{BF}$ by the def. of perpendicular. **63.** Rhombus; $\overline{AE} \cong \overline{CE} \cong \overline{AF} \cong \overline{CF}$; *AECF* remains a rhombus. **65.** Each diag. of a rhombus bisects a pair of opp. ⚠s. (Theorem 6.12)

6.4 Mixed Review (p. 355)

73. yes **75.** no **77.** yes **79.** $\frac{1}{2}$ **81.** 9 **83.** Assume temporarily that *ABCD* is a quad. with 4 acute ⚠s, that is, $m\angle A < 90°$, $m\angle B < 90°$, $m\angle C < 90°$, and $m\angle D < 90°$. Then $m\angle A + m\angle B + m\angle C + m\angle D < 360°$. This contradicts the Interior Angles of a Quadrilateral Theorem. Then no quad. has 4 acute ⚠s.

6.5 Practice (pp. 359–362)

3. isosceles trapezoid **5.** trapezoid **7.** 9 **9.** 9.5 **11.** legs **13.** diags. **15.** base ⚠s **17.** $m\angle J = 102°$, $m\angle L = 48°$ **19.** 8 **21.** 12 **23.** 10 **25.** Yes; *X* is equidistant from the vertices of the dodecagon, so $\overline{XA} \cong \overline{XB}$ and $\angle XAB \cong \angle XBA$ by the Base Angles Theorem. Since trapezoid *ABPQ* has a pair of ≅ base ⚠s, *ABPQ* is isosceles. **27.** $m\angle A = m\angle B = 75°$, $m\angle P = m\angle Q = 105°$ **29.** $EF = GF \approx 6.40$, $HE = HG \approx 8.60$ **31.** 95° **33.** 90°

37. *ABCD* is a trapezoid; slope of $\overline{BC}$ = slope of $\overline{AD} = 0$, so $\overline{BC} \parallel \overline{AD}$; slope of $\overline{AB} = 2$ and slope of $\overline{CD} = -\frac{4}{3}$, so $\overline{AB}$ is not ∥ to $\overline{CD}$. *ABCD* is not isosceles; $AB = 2\sqrt{5}$ and $CD = 5$. **39.** 16 in. **41.** *TQRS* is an isosceles trapezoid, so $\angle QTS \cong \angle RST$ because base ⚠s of an isosceles trapezoid are ≅. $\overline{TS} \cong \overline{TS}$ by the Reflexive Prop. of Cong. and $\overline{QT} \cong \overline{RS}$, so $\triangle QTS \cong \triangle RST$ by the SAS Cong. Postulate. Then $\overline{TR} \cong \overline{SQ}$ because corresp. parts of ≅ ⚠s are ≅. **43.** If $AC \neq BC$, then *ACBD* is a kite; $AC = AD$ and $BC = BD$, so the quad. has two pairs of ≅ sides, but opp. sides are not ≅. (If $AC = BC$, then *ACBD* is a rhombus.); *ABCD* remains a kite in all three cases. **45.** If a quad. is a kite, then exactly 1 pair of opp. ⚠s are ≅. **47.** Draw $\overline{BD}$. (Through any 2 points, there is exactly 1 line.) Since $\overline{AB} \cong \overline{CB}$ and $\overline{AD} \cong \overline{CD}$, $\triangle BCD \cong \triangle BAD$ by the SSS Cong. Postulate. Then corresp. ⚠s *A* and *C* are ≅. Assume temporarily that $\angle B \cong \angle D$. Then both pairs of opp. ⚠s of *ABCD* are ≅, so *ABCD* is a ▱ and opp. sides are ≅. This contradicts the definition of a kite. It follows that $\angle B \ncong \angle D$.

49. Yes; *ABCD* has one pair of ∥ sides and the diagonals are ≅. *ABCD* is not a ▱ because opp. ⚠s are not ≅.

6.5 Mixed Review (p. 363)

55. If a quad. is a kite, then its diags. are ⊥. **57.** 5.6 **59.** 7 **61.** 80° **63.** Yes; *Sample answer:* slope of $\overline{AB}$ = slope of $\overline{CD} = 0$, so $\overline{AB} \parallel \overline{CD}$ and $AB = CD = 7$. Then one pair of opp. sides are both ≅ and ∥, so *ABCD* is a ▱.

Quiz 2 (p. 363)

1. *Sample answer:* Opposite sides of *EBFJ* are ≅ so *EBFJ* is a ▱. Opposite ⚠s of a ▱ are ≅, so $\angle BEJ \cong \angle BFJ$. By the Cong. Supplements Theorem, $\angle HEJ \cong \angle KFJ$. Since $\overline{HE} \cong \overline{JE} \cong \overline{JF} \cong \overline{KF}$, $\triangle HEJ \cong \triangle JFK$ by the SAS Cong. Postulate and, since corresp. sides of ≅ ⚠s are ≅, $\overline{HJ} \cong \overline{JK}$. **2.** rectangle **3.** kite **4.** square **5.** trapezoid

6.

Statements	Reasons
1. $\overline{AB} \parallel \overline{DC}$, $\angle D \cong \angle C$	1. Given
2. Draw $\overline{AE} \parallel \overline{BC}$.	2. Parallel Postulate
3. *ABCE* is a ▱.	3. Def. of a ▱
4. $\overline{AE} \cong \overline{BC}$	4. Opp. sides of a ▱ are ≅.
5. $\angle AED \cong \angle C$	5. Corresp. Angles Postulate
6. $\angle AED \cong \angle D$	6. Transitive Prop. of Cong.
7. $\overline{AD} \cong \overline{AE}$	7. Converse of the Base Angles Theorem
8. $\overline{AD} \cong \overline{BC}$	8. Transitive Prop. of Cong.

6.6 Practice (pp. 367–369)

	Property	▱	Rect.	Rhom.	Sq.	Kite	Trap.
3.	Exactly 1 pr. of opp. sides ∥.						X
5.	Diags. are ≅.		X		X		

SELECTED ANSWERS

7. ▱, rectangle, rhombus, square

	Property	▱	Rect.	Rhom.	Sq.	Kite	Trap.
9.	Exactly 1 pr. of opp. sides are ≅.						
11.	Both pairs of opp. ∠s are ≅.	X	X	X	X		
13.	All ∠s are ≅.		X		X		

15. isosceles trapezoid **17.** square **19.** ▱, rectangle, rhombus, square, kite **21.** rhombus, square **23.** rectangle, square **25.** Show that the quad. has 2 pairs of consec. ≅ sides, but opp. sides are not ≅ (def. of kite).
27. Show that the quad. has 4 right ∠s; show that the quad. is a ▱ and that its diags. are ≅.
29. Show that exactly 2 sides are ∥ and that the nonparallel sides are ≅ (def. of trapezoid); show that the quad. is a trapezoid and that one pair of base ∠s are ≅; show that the quad. is a trapezoid and that its diags. are ≅. **31.** $\overline{BE}$ and $\overline{DE}$ **33.** $\overline{AE}$ and $\overline{BE}$ or $\overline{DE}$ (and so on), $\overline{AC}$ and $\overline{BD}$ **35.** any two consecutive sides of *ABCD* **37.** Isosceles trapezoid; $\overline{PQ} \parallel \overline{RS}$, and $\overline{PS}$ and $\overline{QR}$ are ≅ but not ∥. **39.** ▱; *Sample answer:* $\overline{PQ} \parallel \overline{RS}$ and $\overline{PS} \parallel \overline{QR}$. **41.** Rhombus: *Sample answer:* $\overline{PQ} \cong \overline{QR} \cong \overline{RS} \cong \overline{PS}$. **43.** isosceles trapezoid
45. ▱; if the diags. of a quad. bisect each other, the quad. is a ▱. Since the diags. are not ⊥, the ▱ is not a rhombus and since the diags. are not ≅, the ▱ is not a rectangle.
47. Kite; $\overline{AC} \perp \overline{BD}$ and $\overline{AC}$ bisects $\overline{BD}$, so ≅ △s can be used to show that $\overline{AB} \cong \overline{AD}$ and then that $\overline{CB} \cong \overline{CD}$. $\overline{BD}$ does not bisect $\overline{AC}$, so *ABCD* is not a ▱. Then opp. sides are not ≅ and *ABCD* is a kite. **49.** Draw a line through *C* ∥ to $\overline{DF}$ and a line through *E* ∥ to $\overline{CD}$. Label the intersection *F*. *CDEF* is a ▱ by the def. of a ▱. ∠*DCF* and ∠*DEF* are right ∠s because consec. ∠s of a ▱ are supplementary. Then ∠*CFE* is also a right ∠ and *CDEF* is a rectangle. The diags. of a ▱ bisect each other, so $DM = \frac{1}{2}DF$ and $CM = \frac{1}{2}CE$. The diags. of a rectangle are ≅, so $DF = CE$, $\frac{1}{2}DF = \frac{1}{2}CE$, and $DM = CM$. By the def. of cong., $\overline{DM} \cong \overline{CM}$.

6.6 Mixed Review (p. 370)

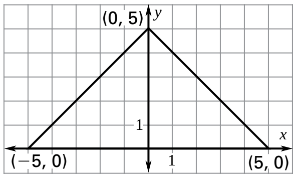
55. 16 sq. units **57.** 15 sq. units **59.** 30 sq. units **61.** 1.75 **63.** 7 **65.** 5

6.7 Practice (pp. 376–379)

3. A **5.** C **7.** D **9.** 25 sq. units **11.** 40 sq. units **13.** 36 sq. units **15.** 49 sq. units **17.** 120 sq. units **19.** 10 sq. units **21.** 361 sq. units **23.** 240 sq. units **25.** 70 sq. units **27.** 12 ft **29.** $b = \frac{2A}{h}$ **31.** $b_1 = \frac{2A}{h} - b_2$ **33.** 4 sq. units **35.** 3 ft^2 **37.** 552 $in.^2$
39. No; such a ▱ has base 6 ft and height 4 ft; two such ▱s that have ∠s with different measures are not ≅.
41. 24 sq. units **43.** 192 sq. units **45.** about 480 carnations **47.** about 432 chrysanthemums **49.** about 6023 shakes **51.** blue: 96 sq. units; yellow: 96 sq. units **53.** Square; square; *Sample answer:* In quad. *EBFJ*, ∠*E*, ∠*J*, and ∠*F* are right ∠s by the Linear Pair Postulate and ∠*B* is a right ∠ by the Interior Angles of a Quadrilateral Theorem. Then *EBFJ* is a rectangle by the Rectangle Corollary. $\overline{EJ} \cong \overline{FJ}$ because they are corresp. parts of ≅ ▱s. Then, by the def. of a ▱ and the Transitive Prop. of Cong., *EBFJ* is a rhombus and, therefore, a square. Similarly, *HJGD* is a square.
55. $b + h$; $(b + h)^2$ **57.** $(b + h)^2 = b^2 + h^2 + 2A$; $A = bh$
59. Show that the area of $AEGH = \frac{1}{2}h(b_1 + b_2)$. Then, since *EBCF* and *GHDF* are ≅, Area of *ABCD* = Area of *AEFD* + area of *EBCF* = area of *AEFD* + area of *GHDF* = area of $AEGH = \frac{1}{2}h(b_1 + b_2)$.

6.7 Mixed Review (p. 380)

63. obtuse; about 140° **65.** acute; about 15°
67. *Sample answer:*



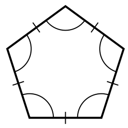
69. 1

Quiz 3 (p. 380)

1. Kite; $\overline{ON} \cong \overline{OP}$ and $\overline{MN} \cong \overline{MP}$, but opp. sides are not ≅. **2.** Trapezoid; $\overline{QR} \parallel \overline{TS}$, but $\overline{QT}$ and $\overline{RS}$ are not ∥. **3.** ▱; *Sample answer:* $\overline{ZY} \cong \overline{WX}$ and $\overline{ZY} \parallel \overline{WX}$.
4. 5 in. **5.** 12 in. **6.** 8 in. **7.** 52.11 cm^2

Chapter 6 Review (pp. 382–384)

1. *Sample answer:*



3. 115 **5.** 13 **7.** 65°, 115°
9. No; you are not given information about opp. sides. **11.** Yes; you can prove △s *PQT* and *SRT* are ≅ and opp. sides are ≅. **13.** rhombus, square
15. rhombus, square **17.** $m\angle ABC = 112°$, $m\angle ADC = m\angle BCD = 68°$ **19.** Square; *Sample answer:* $PQ = QR = RS = PS = \sqrt{34}$, so *PQRS* is a rhombus; $QS = PR = 2\sqrt{17}$, so the diags. of *PQRS* are ≅ and *PQRS* is a rectangle. A quad. that is both a rhombus and a rectangle is a square.
21. Rhombus; $PQ = QR = RS = PS = 2\sqrt{5}$
23. $29\frac{3}{4}$ $in.^2$ **25.** 12 sq. units

Cumulative Practice (pp. 388–389)

1. 0.040404…, 0.181818…, 0.353535…, 0.898989…
3. 135°; 45° **5.** *Sample answer:* △*QPR* ≅ △*QPS* and △*QPR* ≅ △*TPS*; show that ∠1 ≅ ∠2, $\overline{QP} \cong \overline{QP}$, and $m\angle QPS = m\angle QPR$, so the △s are ≅ by the ASA Cong. Postulate. Then show that $\overline{PR} \cong \overline{PS}$, ∠2 ≅ ∠*T*, and ∠*QRP* ≅ ∠*TSP*, so △*QPR* ≅ △*TPS* by the AAS Cong. Theorem. **7.** *P* is equidistant from $\overrightarrow{QS}$ and $\overrightarrow{QR}$ by the Angle Bisector Theorem. **9.** 53°, 95°, 32°; obtuse
11. no **13.** yes; HL Congruence Theorem

15. $AB = AC = \sqrt{89}$ **17.** $y = -\frac{8}{5}x + \frac{97}{10}$ **19.** $\left(\frac{17}{3}, 1\right)$

21. If 2 ⦞ are supplementary, then they form a linear pair; false; *Sample answer:* two consec. ⦞ of a ▱ are supplementary, but they do not form a linear pair.
23. $m\angle X > m\angle Z$; the ∠ opp. the longer side is larger than the ∠ opp. the shorter side. **25.** rhombus **27.** Yes; *Sample answer:* The diags. share a common midpoint, (4.5, 6), which means they bisect each other. Thus, *PQRS* is a ▱ .
29. a. square, rhombus, kite **b.** square, rectangle, isosceles trapezoid **31.** $AC = DF$, $m\angle ACB = 65° = \angle DFE$, and $m\angle ABC = 90° = \angle DEF$, so $\triangle ABC \cong \triangle DEF$ by the AAS Cong. Theorem. **33.** 69° **35.** 438.75 in.^{2}

ALGEBRA REVIEW (pp. 390–391) **1.** $\frac{4}{5}$ **2.** $\frac{7}{4}$ **3.** $\frac{25}{27}$ **4.** $\frac{11}{4}$
5. $\frac{103}{45}$ **6.** $\frac{11}{9}$ **7.** $\frac{4}{1}$ **8.** $\frac{5}{4}$ **9.** $\frac{1}{1}$ **10.** 3 **11.** –3 **12.** 6 **13.** –4
14. $\frac{13}{4}$ **15.** $\frac{7}{6}$ **16.** –1 **17.** 2 **18.** $\frac{7}{9}$ **19.** $\frac{27}{2}$ **20.** –2 **21.** 8
22. 4 **23.** 9 **24.** 200 **25.** 12 **26.** $\frac{24}{5}$ **27.** $\frac{42}{17}$ **28.** $\frac{5}{9}$ **29.** $\frac{3}{2}$
30. 30 **31.** 4 **32.** 5 **33.** $\frac{95}{9}$ **34.** 5 **35.** –4 **36.** 9 **37.** –29
38. $-\frac{43}{2}$ **39.** $\frac{2}{3}$ **40.** –3 **41.** $-\frac{2}{3}$ **42.** ±6

CHAPTER 7

SKILL REVIEW (p. 394) **1.** congruent **2.** not congruent **3.** congruent **4.** 10 **5.** 35° **6.** 55° **7.** 90° **8.** $\overline{QR}$
9. about 7

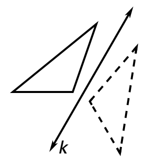
7.1 PRACTICE (pp. 399–402) **5.** translation **7.** rotation
9. $\overline{VW}$ **11.** $\triangle WXY$ **13.** rotation about the origin; a turn about the origin **15.** ∠*A* and ∠*J*, ∠*B* and ∠*K*, ∠*C* and ∠*L*, ∠*D* and ∠*M*, or ∠*E* and ∠*N*
17. *Sample answer:* $JK = \sqrt{(-3-(-1))^2 + (2-1)^2} = \sqrt{5}$; $AB = \sqrt{(2-1)^2 + (3-1)^2} = \sqrt{5}$ **19.** false **21.** reflection in the line $x = 1$; a flip over the line $x = 1$; $A'(6, 2)$, $B'(3, 4)$, $C'(3, -1)$, $D'(6, -1)$ **23.** Yes; the preimage and image appear to be ≅. **25.** No; the preimage and image are not ≅.
27. *LKJ* **29.** *PRQ* **31.** *RQP* **33.** $AB = XY = 3\sqrt{2}$, $BC = YZ = \sqrt{10}$, $AC = XZ = 4$ **35.** $w = 35$, $x = 4\frac{1}{3}$, $y = 3$
37. translation **39.** rotation **41.** reflection; reflection; rotation (or two reflections) **43.** *Sample answer:* Flip the plan vertically to lay the upper left corner, then horizontally to lay the lower left corner, then vertically again to lay the lower right corner.

7.1 MIXED REVIEW (p. 402) **47.** 13 **49.** $\sqrt{89}$ **51.** polygon
53. not a polygon; one side not a segment **55.** not a polygon; two of the sides intersect only one other side.

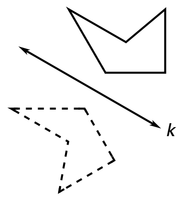
57. (1) Since slope of $\overline{PQ}$ = slope of $\overline{SR} = \frac{2}{7}$ and slope of $\overline{PS}$ = slope of $\overline{QR} = -8$, both pairs of opposite sides are ∥ and *PQRS* is a parallelogram. (2) Since $PQ = SR = \sqrt{53}$ and $PS = QR = \sqrt{65}$, both pairs of opposite sides are ≅ and *PQRS* is a parallelogram.

7.2 PRACTICE (pp. 407–410) **3.** not a reflection **5.** reflection
7. ∠*DAB* **9.** *D* **11.** $\overline{DC}$ **13.** 4

15.

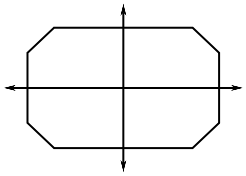


17.



19. True; *M* is 3 units to the right of the line $x = 3$, so its image is 3 units to the left of the line.

21. True; *U* is 4 units to the right of the line $x = 1$, so its image is 4 units to the left of the line.
23. $\overline{CD}$ **25.** $\overline{EF}$ **27.** (3, –8) **29.** (–7, –2)
31.



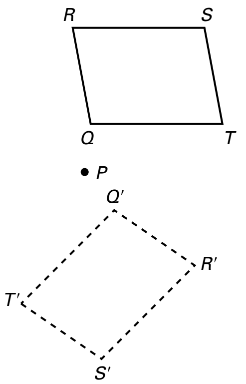
33. Draw $\overline{PP'}$ and $\overline{QQ'}$ intersecting line *m* at points *S* and *T*. By the def. of reflection, $\overline{P'S} \cong \overline{PS}$ and $\overline{RS} \perp \overline{PP'}$, and $\overline{Q'T} \cong \overline{QT}$ and $\overline{RT} \perp \overline{QQ'}$. It follows that $\triangle P'SR \cong \triangle PSR$ and $\triangle Q'TR \cong \triangle QTR$ by the SAS Congruence Postulate. Since corresp. parts of ≅ ⟁ are ≅, $\overline{P'R} \cong \overline{PR}$ and $\overline{Q'R} \cong \overline{QR}$. So, $P'R = PR$ and $Q'R = QR$. Since $P'Q' = P'R + Q'R$ and $PQ = PR + QR$ by the Segment Addition Postulate, we get by substitution $PQ = P'Q'$, or $\overline{PQ} \cong \overline{P'Q'}$.
35. *Q* is on line *m*, so $Q = Q'$. By the def. of reflection, $\overline{PQ} \cong \overline{P'Q}\,(\overline{P'Q'})$. **37.** (6, 0) **39.** (3, 0) **41.** Each structure is a reflection of the other. **43.** Triangles 2 and 3 are reflections of triangle 1; triangle 4 is rotation of triangle 1. **45.** 90° **47.** The distance between each vertex of the preimage and line *m* is equal to the distance between the corresponding vertex of the image and line *m*. **49.** $u = 6$, $v = 5\frac{4}{5}$, $w = 5$

7.2 MIXED REVIEW (p. 410) **57.** ∠*P* **59.** $\overline{BC}$ **61.** 101°
63. $10 < c < 24$ **65.** $21 < c < 45$ **67.** $25.7 < c < 56.7$
69. $m\angle A = m\angle B = 119°$, $m\angle C = 61°$ **71.** $m\angle A = 106°$, $m\angle C = 61°$

7.3 PRACTICE (pp. 416–419) **7.** *P* **9.** *R* **11.** yes; a rotation of 180° clockwise or counterclockwise about its center
13. $\overline{CD}$ **15.** $\overline{GE}$ **17.** $\triangle MAB$ **19.** $\triangle CPA$ **21.** By the def. of a rotation, $\overline{QP} \cong \overline{Q'P}$. Since *P* and *R* are the same point, as are *R* and *R'*, $\overline{QR} \cong \overline{Q'R'}$.

SELECTED ANSWERS

23.



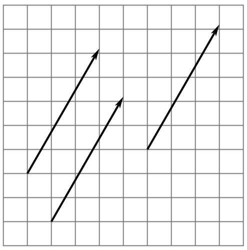
25. $J'(1, 2)$, $K'(4, 1)$, $L'(4, -3)$, $M'(1, -3)$ **27.** $D'(4, 1)$, $E'(0, 2)$, $F'(2, 5)$ **29.** $X'(2, 3)$, $O'(0, 0)$, $Z'(-3, 4)$; the coordinates of the image of the point (x, y) after a 180° clockwise rotation about the origin are $(-x, -y)$. **31.** 30° **33.** 81° **35.** $q = 30$, $r = 5$, $s = 11$, $t = 1$, $u = 2$

37. The wheel hub can be mapped onto itself by a clockwise or counterclockwise rotation of $51\frac{3}{7}°$, $102\frac{6}{7}°$, or $154\frac{2}{7}°$ about its center. **39.** Yes; the image can be mapped onto itself by a clockwise or counterclockwise rotation of 180° about its center. **41.** the center of the square, that is, the intersection of the diagonals

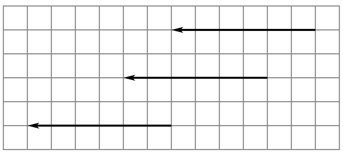
7.3 Mixed Review (p. 419) **45.** 82° **47.** 82° **49.** 98° **51.** any obtuse triangle **53.** any acute triangle

Quiz 1 (p. 420) **1.** *RSTQ* **2.** Reflection in line *m*; the figure is flipped over line *m*. **3.** Yes; the transformation preserves lengths. **4.** (2, –3) **5.** (2, –4) **6.** (–4, 0) **7.** (–8.2, –3) **8.** rotations by multiples of 120° clockwise or counterclockwise about the center of the knot where the rope starts to unravel

7.4 Practice (pp. 425–428) **3.** $(x, y) \to (x + 6, y - 2)$ **5.** $(x, y) \to (x - 7, y + 1)$ **7.** 8; 3 **9.** 5; –2 **11.** *Sample figure:*

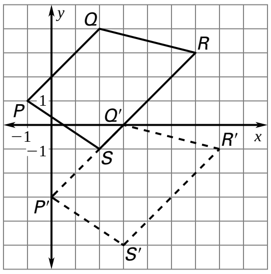


13. *Sample figure:*

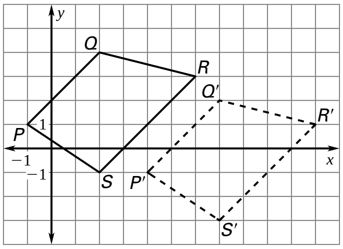


15. $(x, y) \to (x - 3, y - 4)$; $\langle -3, -4 \rangle$ **17.** $\overrightarrow{HJ}$; $\langle 4, 2 \rangle$ **19.** $\overrightarrow{MN}$; $\langle 5, 0 \rangle$ **21.** *k* and *m* **23.** 2.8 in. **25.** (17, –4) **27.** (–14, 8) **29.** (12.5, –4.5)

31.

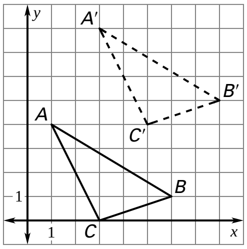


33.

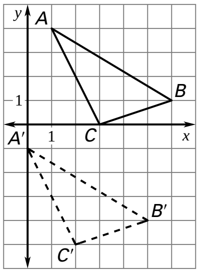


35. true **37.** true

39.



41.

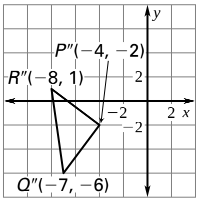


43. We are given $P(a, b)$ and $Q(c, d)$. Suppose P' has coordinates $(a + r, b + s)$. Then $PP' = \sqrt{r^2 + s^2}$ and the slope of $\overline{PP'} = \frac{s}{r}$. If $PP' = QQ'$ and $\overline{PP'} \parallel \overline{QQ'}$ as given, then $QQ' = \sqrt{r^2 + s^2}$ and the slope of $\overline{QQ'} = \frac{s}{r}$. So, the coordinates of Q' are $(c + r, d + s)$. By the Distance Formula, $PQ = \sqrt{(a - c)^2 + (b - d)^2}$ and $P'Q' = \sqrt{[(a + r) - (c + r)]^2 + [(b + s) - (d + s)]^2} = \sqrt{(a - c)^2 + (b - d)^2}$. Thus, by the substitution prop. of equality, $PQ = P'Q'$. **45.** D **47.** B **49.** no **51.** Samples might include photographs of floor tiles or of fabric patterns. **53.** $\langle 6, 4 \rangle$, $\langle 4, 6 \rangle$ **55.** $\langle 18, 12 \rangle$

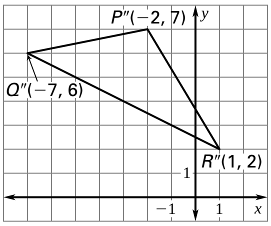
7.4 Mixed Review (p. 428) **63.** –5 **65.** –6 **67.** $\frac{3}{4}$ **69.** 12 **71.** true **73.** false

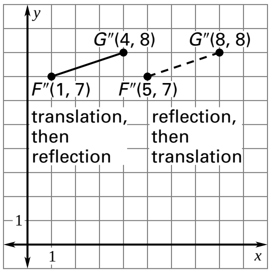
7.5 Practice (pp. 433–436) **5.** $\overline{A'B'}$ **7.** the *y*-axis **9.** A **11.** B **13.** (1, –10) **15.** (2, –6)

17.



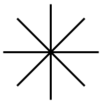
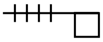
19.



21. 

; The order does affect the final image. **23.** reflection in the line $y = 2$, followed by reflection in the line $x = -2$ **25.** 90° counterclockwise rotation about the point (0, 1), followed by the translation $(x, y) \rightarrow (x + 2, y + 3)$
27. A, B, C **31.** After each part was painted, the stencil was moved through a glide reflection (reflection in a horizontal line through its center and translation to the right) to paint the next part. **33.** 1, 4, 5, 6 **35.** The pattern can be created by horizontal translation, 180° rotation, vertical line reflection, or horizontal glide reflection. **37.** The pattern can be created by translation or 180° rotation.

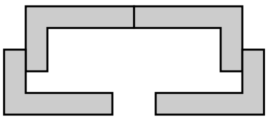
7.5 Mixed Review (p. 436)

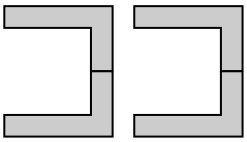
41.  **43.** 

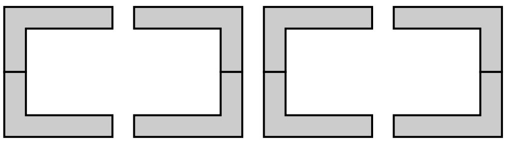
45, 47. Sample explanations are given.
45. Square; $PQ = QR = RS = PS = \sqrt{17}$, so *PQRS* is a rhombus. Also, since $PR = QS = \sqrt{34}$, the diagonals of *PQRS* are ≅, so *PQRS* is a rectangle. Then, by the Square Corollary, *PQRS* is a square. **47.** Rhombus; $PQ = QR = RS = PS = \sqrt{13}$, so *PQRS* is a rhombus. Since $PR = 6$ and $SQ = 4$, the diagonals are not congruent, so *PQRS* is not a rectangle or a square. **49.** $A'(-6, 9)$, $B'(-6, 3)$, $C'(-2, 8)$ **51.** $A'(-3, 7)$, $B'(-3, 1)$, $C'(1, 6)$ **53.** $A'(-9, 9.5)$, $B'(-9, 3.5)$, $C'(-5, 8.5)$

7.6 Practice (pp. 440–443)

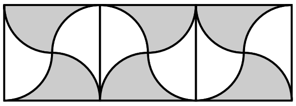
3. translation, vertical line reflection **5.** translation, rotation, vertical line reflection, horizontal glide reflection **7.** translation (T), 180° rotation (R), horizontal glide reflection (G), vertical line reflection (V), horizontal line reflection (H) **9.** D **11.** B **13.** translation, 180° rotation **15.** translation, 180° rotation, horizontal line reflection, vertical line reflection, horizontal glide reflection **17.** yes; reflection in the *x*-axis **19.** 180° rotation about the point (8, 0) **21.** TRHVG **23.** T
27, 29, 31. Sample patterns are given.

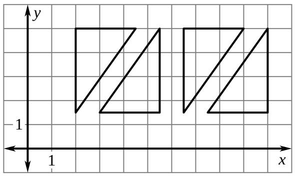
27. 

29. 

31. 

33. TRHVG **35.** There are three bands of frieze patterns visible. **39.** just under 3 in.

41. *Sample pattern:* 

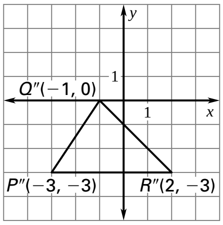
47. *Sample pattern:* 

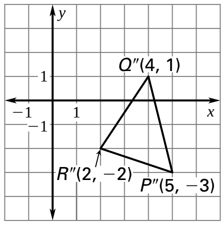
7.6 Mixed Review (p. 444)

55. $\frac{13}{8}$ **57.** $\frac{16}{19}$ **59.** 1 **61.** $w = 8$, $y = 2$ **63.** 288 sq. units

Quiz 2 (p. 444)

1. $A'(0, 5)$, $B'(5, 6)$, $C'(2, 4)$ **2.** $A'(-4, 6)$, $B'(1, 7)$, $C'(-2, 5)$ **3.** $A'(-3, -2)$, $B'(2, -1)$, $C'(-1, -3)$ **4.** $A'(4, 4)$, $B'(9, 5)$, $C'(6, 3)$

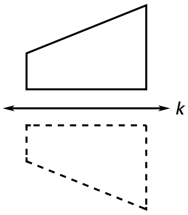
5. 

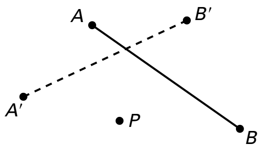
6. 

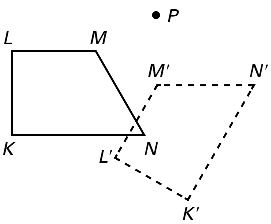
7. yes; TR

Chapter 7 Review (pp. 446–448)

1. Yes; the figure and its image appear to be congruent. **3.** Yes; the figure and its image appear to be congruent.

5. 

7. 

9. 

11. A **13.** B **15.** reflection in the *x*-axis followed by 90° counterclockwise rotation about the origin **17.** TRHVG

Chapter 8

Skill Review (p. 456)

1. 32 units **2.** 31 units **3.** 91 units **4.** $\frac{1}{2}$ **5.** $\frac{3}{7}$ **6.** $\frac{11}{4}$

8.1 Practice (pp. 461–464)

5. 4 : 5 **7.** $\frac{48}{5}$ **9.** 6 **11.** $\frac{6}{1}$ **13.** $\frac{2}{3}$ **15.** $\frac{7.5\text{ cm}}{10\text{ cm}}; \frac{3}{4}$ **17.** $\frac{36\text{ in.}}{12\text{ in.}}$ or $\frac{3\text{ ft}}{1\text{ ft}}; \frac{3}{1}$ **19.** $\frac{350\text{ g}}{1000\text{ g}}; \frac{7}{20}$ **21.** $\frac{18\text{ ft}}{10\text{ ft}}; \frac{9}{5}$ **23.** $\frac{400\text{ m}}{500\text{ m}}; \frac{4}{5}$ **25.** $\frac{2}{3}$ **27.** $\frac{11}{9}$ **29.** 30 ft, 12 ft **31.** 15°, 60°, 105° **33.** $\frac{20}{7}$ **35.** $\frac{35}{2}$ **37.** $\frac{7}{3}$ **39.** 12 **41.** 15 **43.** $-\frac{48}{5}$ **45.** 16 **47.** 21 **49.** Venus: 126 lb; Mars: 53 lb; Jupiter: 330 lb; Pluto 10 lb **51.** 1440 in. **53.** about 1.0 in.

55. 6 **57.** $RQ = 12$, $PQ = 13$, $SU = 15$, $ST = 39$ **59.** 12 : 1 **61.** 144 : 1 **63.** $EF = 20$, $DF = 24$

8.1 MIXED REVIEW (p. 464) **69.** 95° **71.** 95° **73.** $\left(-1\frac{1}{2}, 3\right)$ and (1, 3) **75.** $\left(-\frac{1}{2}, 3\frac{1}{2}\right)$ and $\left(1\frac{1}{2}, 1\right)$

8.2 PRACTICE (pp. 468–470) **5.** 6 **7.** 11.4 ft **9.** $\frac{x}{y}$ **11.** $\frac{y+12}{12}$ **13.** true **15.** true **17.** 9 **19.** 14 **21.** $4\sqrt{10}$ **23.** 11.25 **25.** $6\frac{2}{3}$ **27.** $6\frac{6}{7}$ **29.** about 25 ft **31.** 198 hits **33.** 11

37. Let $\frac{a}{b} = \frac{c}{d}$ and show that $\frac{a+b}{b} = \frac{c+d}{d}$.

$\frac{a}{b} = \frac{c}{d}$ (Given)

$\frac{a}{b} + 1 = \frac{c}{d} + 1$ (Addition prop. of equality)

$\frac{a}{b} + \frac{b}{b} = \frac{c}{d} + \frac{d}{d}$ (Inverse prop. of multiplication)

$\frac{a+b}{b} = \frac{c+d}{d}$ (Addition of fractions)

39. 24 ft **41.** about $\frac{3}{8}$ in.; about $2\frac{1}{2}$ mi

8.2 MIXED REVIEW (p. 471) **47.** 12 m^2 **49.** 26 cm^2 **51.** $m\angle C = 115°$, $m\angle A = m\angle D = 65°$ **53.** $m\angle A = m\angle B = 100°$, $m\angle C = 80°$ **55.** $m\angle B = 41°$, $m\angle C = m\angle D = 139°$ **57.** A regular pentagon has 5 lines of symmetry (one from each vertex to the midpoint of the opposite side) and rotational symmetries of 72° and 144°, clockwise and counterclockwise about the center of the pentagon.

8.3 PRACTICE (pp. 475–478) **5.** 5 : 3 **7.** 110° **9.** $\angle J \cong \angle W$, $\angle K \cong \angle X$, $\angle L \cong \angle Y$, $\angle M \cong \angle Z$; $\frac{JK}{WX} = \frac{KL}{XY} = \frac{LM}{YZ} = \frac{JM}{WZ}$ **11.** Yes; both figures are rectangles, so all 4 ∠s are ≅ and $\frac{AB}{FG} = \frac{BC}{GH} = \frac{CD}{HE} = \frac{AD}{FE} = \frac{7}{4}$. **13.** No; $m\angle B = 90°$ and $m\angle Q = 88°$, so corresp. ∠s are not ≅. **15.** yes; *Sample answers: ABCD ~ EFGH, ABCD ~ FEHG* **17.** yes; $\triangle XYZ \sim \triangle CAB$ **19.** 4 : 5 **21.** 20, 12.5, 20 **23.** $\frac{4}{5}$ **25.** 2 **27.** 10 **29.** no **31.** sometimes **33.** sometimes **35.** always **37.** always **39.** 11, 9 **41.** $39\frac{3}{7}$, $23\frac{1}{7}$ **43.** analog TV: 21.6 in. by 16.2 in., digital TV: about 23.5 in. by 13.2 in. **45.** $ABCD \sim EFGH$ with scale factor $1 : k$, so $\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{AD}{EH} = \frac{1}{k}$. Then, $EF = k \cdot AB$, $FG = k \cdot BC$, $GH = k \cdot CD$, and $EH = k \cdot AD$, so $\frac{\text{perimeter of } ABCD}{\text{perimeter of } EFGH} = \frac{AB + BC + CD + AD}{EF + FG + GH + EH} = \frac{AB + BC + CD + AD}{k \cdot AB + k \cdot BC + k \cdot CD + k \cdot AD} = \frac{AB + BC + CD + AD}{k(AB + BC + CD + AD)} = \frac{1}{k} = \frac{AB}{EF}$. **47.** 11.2 in.

8.3 MIXED REVIEW (p. 479) **53.** 1 **55.** $-\frac{1}{7}$ **57.** $-\frac{7}{6}$ **59.** 49 **61.** 9 **63.** 38 **65.** $\frac{32}{13}$ **67.** 21

QUIZ 1 (p. 479) **1.** 10 **2.** 28 **3.** $\frac{24}{7}$ **4.** 21 **5.** $\sqrt{55} \approx 7.42$ **6.** $\sqrt{70} \approx 8.37$ **7.** 3; 1 : 2; $\frac{1}{2}$ **8.** 30; 3 : 2; $\frac{3}{2}$ **9.** None are exactly similar, but the 5 × 7 and wallet sizes are very nearly similar. $\left(\frac{5}{2.25} \approx 2.22, \frac{7}{3.25} \approx 2.15\right)$ **10.** $3\frac{1}{8}$ in.

8.4 PRACTICE (pp. 483–486) **5.** yes **7.** 10, 6 **9.** $\angle J$ and $\angle F$, $\angle K$ and $\angle G$, $\angle L$ and $\angle H$, $\frac{JK}{FG} = \frac{KL}{GH} = \frac{JL}{FH}$ **11.** $\angle L$ and $\angle Q$, $\angle M$ and $\angle P$, $\angle N$ and $\angle N$, $\frac{LM}{QP} = \frac{MN}{PN} = \frac{LN}{QN}$ **13.** LM; MN; NL **15.** 15; x **17.** 24 **19.** yes; $\triangle PQR \sim \triangle WPV$ **21.** yes; $\triangle XYZ \sim \triangle GFH$ **23.** yes; $\triangle JMN \sim \triangle JLK$ **25.** yes; $\triangle VWX \sim \triangle VYZ$ **27.** $-\frac{2}{5}$ **29.** (10, 0) **31.** (30, 0) **33.** CDE **35.** 15; x **37.** 20 **39.** 14 **41.** 27 **43.** 100 **45.** 12 **47.** 25

49.

Statements	Reasons
1. $\angle ECD$ and $\angle EAB$ are right ∠s.	1. Given
2. $\overline{AB} \perp \overline{AE}$, $\overline{CD} \perp \overline{AE}$	2. Def. of ⊥ lines
3. $\overline{AB} \parallel \overline{CD}$	3. In a plane, 2 lines ⊥ to the same line are ∥.
4. $\angle EDC \cong \angle B$	4. If 2 ∥ lines are cut by a transversal, corresp. ∠s are ≅.
5. $\triangle ABE \sim \triangle CDE$	5. AA Similarity Post.

51. False; all ∠s of any 2 equilateral △s are ≅, so the △s are ~ by the AA Similarity Post. (Note, also, that if one △ has sides of length x and the other has sides of length y, then the ratio of any two side lengths is $\frac{x}{y}$. Then, all corresp. side lengths are in proportion, so the def. of ~ △s can also be used to show that any 2 equilateral △s are ~.) **53.** 1.5 m **55.** $\overline{PQ} \perp \overline{QT}$ and $\overline{SR} \perp \overline{QT}$, so $\angle Q$ and $\angle SRT$ are right ∠s. Since all right ∠s are ≅, $\angle Q \cong \angle SRT$. $\overline{PR} \parallel \overline{ST}$ so corresp. ∠s PRQ and STR are ≅. Then, $\triangle PQR \sim \triangle SRT$ by the AA Similarity Post., so $\frac{PQ}{QR} = \frac{SR}{RT}$. That is, $\frac{PQ}{780} = \frac{4}{6.5}$ and $PQ = 480$ ft.

8.4 MIXED REVIEW (p. 487) **61.** $5\sqrt{82}$ **63.** 46 **65.** 12 **67.** 8 **69.** $\frac{36}{11}$ **71.** −16, 16

8.5 PRACTICE (pp. 492–494) **5.** $\frac{1}{6}$; yes; SSS Similarity Thm. **7.** $\triangle DEF \sim \triangle GHJ$; 2:5 **9.** yes; $\triangle JKL \sim \triangle XYZ$ (or $\triangle XZY$); SSS Similarity Thm. **11.** no **13.** yes; $\triangle PQR \sim \triangle DEF$; SSS or SAS Similarity Thm. **15.** SSS Similarity Thm. **17.** SAS Similarity Thm. **19.** 53° **21.** 82° **23.** 15 **25.** $4\sqrt{2}$ **27.** $\triangle ABC \sim \triangle BDC$; 18 **29.** 140 ft **31.** Locate G on $\overline{AB}$ so that $GB = DE$ and draw $\overline{GH}$ through $G \parallel$ to $\overline{AC}$. Corresp. ∡ A and BGH are ≅ as are corresp. ∡ C and BHG, so $\triangle ABC \sim \triangle GBH$. Then $\frac{AB}{GB} = \frac{AC}{GH}$. But $\frac{AB}{DE} = \frac{AC}{DF}$ and $GB = DE$, so $\frac{AC}{GH} = \frac{AC}{DF}$ and $GH = DF$. By the SAS Cong. Post., $\triangle BGH \cong \triangle EDF$. Corresp. ∡ F and BHG are ≅, so $\angle F \cong \angle C$ by the Transitive Prop. of Cong. $\triangle ABC \sim \triangle DEF$ by the AA Similarity Post. **33.** 18 ft **35.** Julia and the flagpole are both perpendicular to the ground and the two ⧍ formed (one by Julia's head, feet, and the tip of the shadow, and the other by the top and bottom of the flag pole and the tip of the shadow) have a shared angle. Then, the ⧍ are ~ by the AA Similarity Post.

8.5 MIXED REVIEW (p. 495) **39.** $m\angle ABD = m\angle DBC = 38.5°$ **41.** $m\angle ABD = 64°$, $m\angle ABC = 128°$ **43.** $\angle 10$ **45.** $\angle 5$ **47.** (2, 7) **49.** (–5, 1)

QUIZ 2 (p. 496) **1.** yes; $m\angle B = m\angle E = 81°$, $m\angle ANB = 46°$, $m\angle A = 53°$ **2.** yes; $m\angle VSU = m\angle P = 47°$, $m\angle U = 101°$, $m\angle V = 32°$ **3.** no; $m\angle J = m\angle H = 42°$, $m\angle A = 43°$, $m\angle P = 94°$ **4.** no **5.** yes **6.** yes **7.** 10 mi

8.6 PRACTICE (pp. 502–505) **7.** CE **9.** GE
11. Yes; $\overline{QS}$ divides two sides of $\triangle PRT$ proportionally.
13. No; $\overline{QS}$ does not divide $\overline{TR}$ and $\overline{PR}$ proportionally.
15. Yes; △ Proportionality Converse.
17. yes; Corresponding Angles Converse
19. no **21.** 3 **23.** 6 **25.** 14 **27.** 29.4
29. A: 47.8 m, B: 40.2 m, C: 34.0 m
31.

Statements	Reasons
1. $\overline{DE} \parallel \overline{AC}$	1. Given
2. $\angle BDE \cong \angle A$, $\angle BED \cong \angle C$	2. If 2 ∥ lines are cut by a transversal, corresp. ∡ are ≅.
3. $\triangle DBE \sim \triangle ABC$	3. AA Similarity Post.
4. $\frac{BA}{BD} = \frac{BC}{BE}$	4. Def. of ~ ⧍
5. $\frac{BD + DA}{BD} = \frac{BE + EC}{BE}$	5. Segment Addition Post.
6. $\frac{BD}{BD} + \frac{DA}{BD} = \frac{BE}{BE} + \frac{EC}{BE}$	6. Addition of fractions
7. $1 + \frac{DA}{BD} = 1 + \frac{EC}{BE}$	7. Inverse prop. of multiplication
8. $\frac{DA}{BD} = \frac{EC}{BE}$	8. Subtraction prop. of equality

33. Draw a ∥ to $\overline{XW}$ through Z (∥ Post.) and extend $\overline{XY}$ to intersect the ∥ at A. ($\overline{XY}$ is not ∥ to $\overline{AZ}$ because it would also have to be ∥ to $\overline{XW}$.) Then, $\frac{YW}{WZ} = \frac{XY}{XA}$. Also, corresp. ∡ YXW and A are ≅, as are alternate interior ∡ WXZ and AZX. Since $\angle YXW \cong \angle WXZ$, $\angle A \cong \angle AZX$ by the Transitive Prop. of Cong. By the Converse of the Base Angles Thm., $\overline{XA} \cong \overline{XZ}$ or $XA = XZ$. Then, by the substitution prop. of equality, $\frac{YW}{WZ} = \frac{XY}{XZ}$. **35.** $MT = 8.4$, $LN = 8$, $SN = 8$, $PR = 27$, $UR = 21$ **37.** about 1040 ft

8.6 MIXED REVIEW (p. 505) **41.** $\sqrt{337}$ **43.** $7\sqrt{2}$ **45.** $\sqrt{305}$ **47.** 15 units **49.** $6\sqrt{2}$ units **51.** reflection **53.** rotation

8.7 PRACTICE (pp. 509–512) **5.** larger; enlargement **7.** Yes; *Sample answer:* a preimage and its image after a dilation are ~. **9.** Enlargement; the dilation has center C and scale factor $\frac{8}{3}$. **11.** Reduction; the dilation has center C and scale factor $\frac{2}{5}$; $x = y = 20$, $z = 25$. **13.** $P'(6, 10)$, $Q'(8, 0)$, $R'(2, 2)$ **15.** $S'(–20, 8)$, $T'(–12, 16)$, $U'(–4, 4)$, $V'(–12, –4)$ **21.** $x = 7.2$, $y = 6.3$; 3:4 **23.** enlargement; $k = 4$; 9, 28 **25.** about 9.2 cm **27.** 7:1 **29.** 4.8 in. **31.** 1.7 in.

8.7 MIXED REVIEW (p. 513) **39.** $b = 14$ **41.** $a = 7$ **43.** Yes; *Sample answer:* $\angle C \cong \angle L$ and $\frac{CA}{LJ} = \frac{CB}{LK}$, so the ⧍ are ~ by the SAS Similarity Thm.

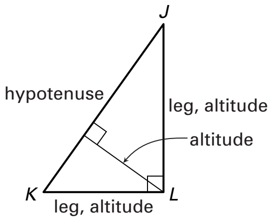
QUIZ 3 (p. 513) **1.** BD **2.** CE **3.** AF **4.** FA **5.** The dilation is an enlargement with center C and scale factor 2. **6.** The dilation is a reduction with center C and scale factor $\frac{1}{3}$. **7.** reduction, larger **8.** $\frac{9}{4}$

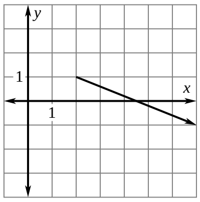
CHAPTER 8 REVIEW (pp. 516–518) **1.** $\frac{21}{2}$ **3.** 4 **5.** 39 in. **7.** $\frac{5}{3}$ **9.** $\frac{3}{5}$ **11.** no **13.** no **15.** 22 **17.** $16\frac{16}{59}$

ALGEBRA REVIEW (pp. 522–523) **1.** 11 **2.** $2\sqrt{13}$ **3.** $3\sqrt{5}$ **4.** $6\sqrt{2}$ **5.** $2\sqrt{10}$ **6.** $3\sqrt{3}$ **7.** $4\sqrt{5}$ **8.** $5\sqrt{2}$ **9.** $9\sqrt{3}$ **10.** $12\sqrt{2}$ **11.** $8\sqrt{5}$ **12.** 15 **13.** $6\sqrt{3}$ **14.** $2\sqrt{2}$ **15.** $8 - 2\sqrt{7}$ **16.** $4\sqrt{11}$ **17.** $\sqrt{5}$ **18.** $21\sqrt{2}$ **19.** $-16\sqrt{3}$ **20.** $5\sqrt{7}$ **21.** $4\sqrt{5}$ **22.** $13\sqrt{2}$ **23.** $21\sqrt{10}$ **24.** 330 **25.** 24 **26.** 36 **27.** $6\sqrt{14}$ **28.** 8 **29.** 112 **30.** 40 **31.** 180 **32.** 32 **33.** 192 **34.** 12 **35.** 125 **36.** 1100 **37.** $\frac{4\sqrt{3}}{3}$ **38.** $\frac{5\sqrt{7}}{7}$ **39.** $\sqrt{2}$ **40.** $\frac{2\sqrt{15}}{5}$ **41.** 1 **42.** $\sqrt{2}$ **43.** $\frac{4\sqrt{6}}{3}$ **44.** $\frac{\sqrt{2}}{2}$ **45.** $\frac{2\sqrt{3}}{3}$ **46.** $\frac{3}{2}$ **47.** $\frac{9\sqrt{13}}{26}$ **48.** $\frac{\sqrt{2}}{2}$ **49.** $\frac{3\sqrt{5}}{5}$ **50.** $\frac{4\sqrt{10}}{5}$ **51.** $\frac{\sqrt{15}}{5}$ **52.** $\frac{\sqrt{6}}{3}$ **53.** ±3 **54.** ±25 **55.** ±17 **56.** $\pm\sqrt{10}$ **57.** ±4 **58.** $\pm\sqrt{13}$ **59.** ±6 **60.** ±8 **61.** ±7 **62.** $\pm\sqrt{10}$ **63.** ±3 **64.** $\pm\sqrt{5}$ **65.** ±2 **66.** $\pm\sqrt{2}$ **67.** ±1 **68.** $\pm\sqrt{7}$ **69.** $\pm\sqrt{6}$ **70.** ±5 **71.** ±4 **72.** ±24 **73.** ±13

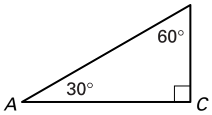
CHAPTER 9

SKILL REVIEW (p. 526) **1.** 90°; right
2. *Sample answer:* **3.** *Sample answer:* **4.** 4.5



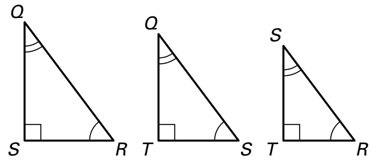


5.



Sample answer: $m\angle A = 30°$ and $m\angle B = 60°$, so $\triangle ABC \sim \triangle JKL$ by the AA Similarity Post.

9.1 PRACTICE (pp. 531–534) **5.** *JK* **7.** *KM* **9.** *LK*
11.



13. 20; $33\frac{1}{3}$ **15.** 3; $\sqrt{15}$
17. $\triangle QRS \sim \triangle QST \sim \triangle SRT$; *RQ* **19.** $\triangle ABC \sim \triangle ACD \sim \triangle CBD$; 9 **21.** $\triangle JKL \sim \triangle JLM \sim \triangle LKM$; $\frac{1024}{15} \approx 68.3$
23. $\triangle ABC \sim \triangle ACD \sim \triangle CBD$; 4 **25.** $3\sqrt{3}$ **27.** $10\frac{4}{7}$
29. $x = 42\frac{2}{3}$, $y = 40$, $z = 53\frac{1}{3}$ **31.** about 76 cm; $\triangle ABC$ and $\triangle ADC$ are congruent right triangles by the SSS Congruence Post., so $\overline{AC}$ is a perpendicular bisector of $\overline{BD}$. By Geometric Mean Theorem 9.3, the altitude from *D* to hypotenuse $\overline{AC}$ divides $\overline{AC}$ into segments of lengths 23.67 cm and 61.13 cm. By Geometric Mean Theorem 9.2, the length of the altitude to the hypotenuse of each right triangle is about 38 cm long, so the crossbar $\overline{BD}$ should be about 2 • 38, or 76 cm long.
33. $\triangle ABC \sim \triangle ACD \sim \triangle CBD$; area of $\triangle ABC = \frac{1}{2}(2)(1.5) = 1.5\ m^2$; $AD = 1.6$ and $DC = 1.2$, so the area of $\triangle ACD = \frac{1}{2}(1.6)(1.2) = 0.96\ m^2$, and the area of $\triangle CBD = 1.5 - 0.96 = 0.54\ m^2$. **35.** From Ex. 34, $\triangle CBD \sim \triangle ACD$. Corresponding side lengths are in proportion, so $\frac{BD}{CD} = \frac{CD}{AD}$.
37. The values of the ratios will vary, but will not be equal. The theorem says that these ratios are equal.
39. The ratios are equal when the triangle is a right triangle but are not equal when the triangle is not a right triangle.

9.1 MIXED REVIEW (p. 534) **45.** 8, –8 **47.** If the measure of one of the angles of a triangle is greater that 90°, then the triangle is obtuse; true. **49.** 36 $in.^2$ **51.** 62.5 m^2

9.2 PRACTICE (pp. 538–541) **3.** $\sqrt{5}$; no **5.** $4\sqrt{3}$; no
7. 97; yes **9.** 80; yes **11.** $4\sqrt{2}$; no **13.** $8\sqrt{3}$; no
15. $14\sqrt{2}$; no **17.** $2\sqrt{13}$ **19.** $t = 20$ **21.** $s = 24$ **23.** $s = 12$
25. 35.7 cm^2 **27.** 25.2 cm^2 **29.** 104 cm^2 **31.** about 41.9 ft; the distance from home plate to second base is about 91.9 ft, so the distance from the pitcher's plate to second base is about 91.9 – 50, or about 41.9 ft. **33.** 94 in., or 7 ft 10 in.
35. 48 in. **37.** The area of the large square is $(a + b)^2$. Also, the area of the large square is the sum of the areas of the four congruent right triangles plus the area of the small square, or $4\left(\frac{1}{2} \cdot a \cdot b\right) + c^2$. Thus, $(a + b)^2 = 4\left(\frac{1}{2} \cdot a \cdot b\right) + c^2$, and so $a^2 + 2ab + b^2 = 2ab + c^2$. Subtracting 2*ab* from each side gives $a^2 + b^2 = c^2$.

9.2 MIXED REVIEW (p. 541) **43.** 9 **45.** 8 **47.** –1225
49. 147 **51.** no **53.** no **55.** *Sample answer:* slope of $\overline{PQ} = -\frac{11}{2}$ = slope of $\overline{RS}$; slope of $\overline{QR} = \frac{5}{4}$ = slope of $\overline{PS}$. Both pairs of opposite sides are parallel, so *PQRS* is a ▱ by the definition of a ▱.

9.3 PRACTICE (pp. 545–548) **3.** C **5.** D **7.** The crossbars are not perpendicular: $45^2 > 22^2 + 38^2$, so the smaller triangles formed by the crossbars are obtuse. **9.** yes
11. yes **13.** no **15.** yes; right **17.** no **19.** yes; right
21. yes; acute **23.** yes; right **25.** yes; obtuse **27.** Square; the diagonals bisect each other, so the quad. is a ▱; the diagonals are ≅, so the ▱ is a rectangle. $1^2 + 1^2 = \left(\sqrt{2}\right)^2$, so the diagonals intersect at rt. ∠s to form ⊥ lines; thus, the ▱ is also a rhombus. A quad. that is both a rectangle and a rhombus must be a square. **29.** $\frac{3}{4}$; $-\frac{4}{3}$; since $\left(\frac{3}{4}\right)\left(-\frac{4}{3}\right) = -1$, $\overline{AC} \perp \overline{BC}$, so $\angle ACB$ is a rt. ∠. Therefore, $\triangle ABC$ is a rt. △ by the definition of rt. △. **31.** *Sample answer:* I prefer to use slopes, because I have two computations rather than three, and computing slopes doesn't involve square roots.
33. acute **35.** Since $\left(\sqrt{10}\right)^2 + 2^2 < 4^2$, $\triangle ABC$ is obtuse and $\angle C$ is obtuse. By the Triangle Sum Thm., $m\angle A + m\angle ABC + m\angle C = 180°$. $\angle C$ is obtuse, so $m\angle C > 90°$. It follows that $m\angle ABC < 90°$. Vertical angles are ≅, so $m\angle ABC = m\angle 1$. By substitution, $m\angle 1 < 90°$. By the definition of an acute ∠, ∠1 is acute. **37.** A, C, and D
39. $120^2 + 119^2 = 169^2$, $4800^2 + 4601^2 = 6649^2$, and $(13{,}500)^2 + (12{,}709)^2 = (18{,}541)^2$.
41. Reasons

1. Pythagorean Thm.
2. Given
3. Substitution prop. of equality
5. Converse of the Hinge Thm.
6. Given, def. of right angle, def. of acute angle, and substitution prop. of equality
7. Def. of acute triangle ($\angle C$ is the largest angle of $\triangle ABC$.)

43. Draw rt. $\triangle PQR$ with side lengths a, b, and hypotenuse x. $x^2 = a^2 + b^2$ by the Pythagorean Thm. It is given that $c^2 = a^2 + b^2$, so by the substitution prop. of equality, $x^2 = c^2$. By a prop. of square roots, $x = c$. $\triangle PQR \cong \triangle LMN$ by the SSS Congruence Post. Corresp. parts of $\cong$ △ are $\cong$, so $m\angle R = 90° = m\angle N$. By def., $\angle N$ is a rt. $\angle$, and so $\triangle LNM$ is a right triangle.

9.3 Mixed Review (p. 549) **47.** $2\sqrt{11}$ **49.** $2\sqrt{21}$ **51.** $\frac{3\sqrt{11}}{11}$ **53.** $2\sqrt{2}$ **55.** an enlargement with center C and scale factor $\frac{7}{4}$ **57.** $x = 9$, $y = 11$

Quiz 1 (p. 549) **1.** $\triangle ABC \sim \triangle ADB \sim \triangle BDC$ **2.** $\overline{BD}$ **3.** 25 **4.** 12 **5.** $2\sqrt{10}$ **6.** $6\sqrt{5}$ **7.** $12\sqrt{2}$ **8.** no; $219^2 \neq 168^2 + 140^2$

9.4 Practice (pp. 554–556) **9.** $4\sqrt{2}$ **11.** $h = k = \frac{9\sqrt{2}}{2}$ **13.** $a = 12\sqrt{3}$, $b = 24$ **15.** $c = d = 4\sqrt{2}$ **17.** $q = 16\sqrt{2}$, $r = 16$ **19.** $f = \frac{8\sqrt{3}}{3}$, $h = \frac{16\sqrt{3}}{3}$ **21.** 4.3 cm **23.** 18.4 in. **25.** 31.2 ft^2 **27.** $24\sqrt{3} \approx 41.6$ ft^2 **29.** about 2 cm **31.** $r = \sqrt{2}$; $s = \sqrt{3}$; $t = 2$; $u = \sqrt{5}$; $v = \sqrt{6}$; $w = \sqrt{7}$; I used the Pythagorean Theorem in each right triangle in turn, working from left to right. **33.** the right triangle with legs of lengths 1 and $s = \sqrt{3}$, and hypotenuse $t = 2$ **35.** Let $DF = x$. Then $EF = x$. By the Pythagorean Theorem, $x^2 + x^2 = (DE)^2$; $2x^2 = (DE)^2$; $DE = \sqrt{2x^2} = \sqrt{2} \cdot x$ by a property of square roots. Thus, the hypotenuse is $\sqrt{2}$ times as long as a leg.

9.4 Mixed Review (p. 557) **43.** $Q'(-1, 2)$ **45.** $A'(-4, -5)$ **47.** AA Similarity Post. **49.** SSS Similarity Thm.

9.5 Practice (pp. 562–565) **3.** $\frac{4}{5} = 0.8$ **5.** $\frac{4}{3} \approx 1.3333$ **7.** $\frac{4}{5} = 0.8$ **9.** about 17 ft **11.** $\sin A = 0.8$; $\cos A = 0.6$; $\tan A \approx 1.3333$; $\sin B = 0.6$; $\cos B = 0.8$; $\tan B = 0.75$ **13.** $\sin D = 0.28$; $\cos D = 0.96$; $\tan D \approx 0.2917$; $\sin F = 0.96$; $\cos F = 0.28$; $\tan F \approx 3.4286$ **15.** $\sin J = 0.8575$; $\cos J = 0.5145$; $\tan J = 1.6667$; $\sin K = 0.5145$; $\cos K = 0.8575$; $\tan K = 0.6$ **17.** 0.9744 **19.** 0.4540 **21.** 0.0349 **23.** 0.8090 **25.** 0.4540 **27.** 2.2460 **29.** $s \approx 31.3$; $t \approx 13.3$ **31.** $t \approx 7.3$; $u \approx 3.4$ **33.** $x \approx 16.0$; $y \approx 14.9$ **35.** 41.6 m^2 **37.** about 13.4 m **39.** 482 ft; about 1409 ft **41.** about 16.4 in. **45.** Procedures may vary. One method is to reason that since the tangent ratio is equal to the ratio of the lengths of the legs, the tangent is equal to 1 when the legs are equal in length, that is, when the triangle is a 45°-45°-90° triangle. Tan $A > 1$ when $m\angle A > 45°$, and tan $A < 1$ when $m\angle A < 45°$, since increasing the measure of $\angle A$ increases the length of the opposite leg and decreasing the measure of $\angle A$ decreases the length of the opposite leg.

47. Reasons

1. Given
2. Pythagorean Thm.
3. Division prop. of equality
5. Substitution prop. of equality

49. $(\sin 45°)^2 + (\cos 45°)^2 = \left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} + \frac{2}{4} = 1$ ✓

51. $(\sin 13°)^2 + (\cos 13°)^2 \approx (0.2250)^2 + (0.9744)^2 \approx 1$ ✓

9.5 Mixed Review (p. 566) **57.** $\triangle MNP \sim \triangle MQN \sim \triangle NQP$; $QP \approx 3.3$; $NP \approx 7.8$ **59.** $5\sqrt{69}$; no

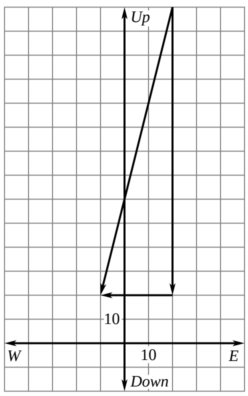
Quiz 2 (p. 566) **1.** 3.5 m **2.** 5.7 in. **3.** 3.9 in.^2 **4.** $x \approx 15.6$; $y \approx 11.9$ **5.** $x \approx 8.5$; $y \approx 15.9$ **6.** $x \approx 9.3$; $y \approx 22.1$ **7.** about 4887 ft

9.6 Practice (pp. 570–572) **5.** 79.5° **7.** 84.3° **9.** $d = 60$, $m\angle D = 33.4°$, $m\angle E = 56.6°$ **11.** 73 **13.** 41.1° **15.** 45° **17.** 20.5° **19.** 50.2° **21.** 6.3° **23.** side lengths: 7, 7, and 9.9; angle measures: 90°, 45°, and 45° **25.** side lengths: 4.5, 8, and 9.2; angle measures: 90°, 29.6°, and 60.4° **27.** side lengths: 6, 11.0, and 12.5; angle measures: 90°, 28.7°, and 61.3° **29.** $s = 4.1$, $t = 11.3$, $m\angle T = 70°$ **31.** $a = 7.4$, $c = 8.9$, $m\angle B = 34°$ **33.** $\ell = 5.9$, $m = 7.2$, $m\angle L = 56°$ **35.** 62.4° **37.** 0.4626 **39.** about 239.4 in., or about 19 ft 11 in.; about 4.1°

9.6 Mixed Review (p. 572) **47.** $\langle 3, 2\rangle$ **49.** $\langle -1, -3\rangle$ **51.** $\langle 1, -2\rangle$ **53.** 25 **55.** 12.6 **57.** 14 **59.** no **61.** yes; right **63.** yes; right

9.7 Practice (pp. 576–579) **5.** $\langle 4, 5\rangle$; 6.4 **7.** $\langle 2, -5\rangle$; 5.4 **9.** $\langle 0, 3\rangle$ **11.** $\langle -3, 6\rangle$; 6.7 **13.** $\langle 2, 7\rangle$; 7.3 **15.** $\langle 10, 4\rangle$; 10.8 **17.** $\langle -6, -4\rangle$; 7.2 **19.** $\langle 1, -4\rangle$; 4.1 **21.** about 61 mi/h; about 9° north of east **23.** about 57 mi/h; 45° north of west **25.** $\overrightarrow{EF}$, $\overrightarrow{CD}$, and $\overrightarrow{AB}$ **27.** $\overrightarrow{EF}$ and $\overrightarrow{CD}$ **29.** yes; no **31.** $\vec{u} = \langle 4, 1\rangle$; $\vec{v} = \langle 2, 4\rangle$; $\vec{u} + \vec{v} = \langle 6, 5\rangle$ **33.** $\vec{u} = \langle 2, -4\rangle$; $\vec{v} = \langle 3, 6\rangle$; $\vec{u} + \vec{v} = \langle 5, 2\rangle$ **35.** $\langle 4, 11\rangle$ **37.** $\langle 10, 10\rangle$ **39.** $\langle 4, -4\rangle$ **41.** $\vec{u} = \langle 0, -120\rangle$; $\vec{v} = \langle 40, 0\rangle$ **43.** about 126 mi/h; the speed at which the skydiver is falling, taking into account the breeze

45.

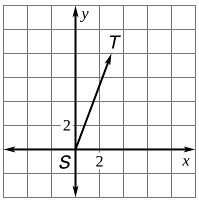


; The new velocity is $s = \langle -30, -120\rangle$. **47.** When $k > 0$, the magnitude of $\vec{v}$ is k times the magnitude of $\vec{u}$ and the directions are the same. When $k < 0$, the magnitude of $\vec{v}$ is $|k|$ times the magnitude of $\vec{u}$ and the direction of $\vec{v}$ is opposite the direction of $\vec{u}$. Justifications may vary.

SELECTED ANSWERS

9.7 MIXED REVIEW (p. 580) **53.** Since $\angle D$ and $\angle E$ are rt. $\triangle$s and all rt. $\triangle$s are $\cong$, $\angle D \cong \angle E$. Since $\triangle ABC$ is equilateral, $\overline{AB} \cong \overline{BC}$. $\overline{DE} \parallel \overline{AC}$, so $\angle DBA \cong \angle BAC$ and $\angle EBC \cong \angle BCA$ by the Alternate Interior Angles Thm. An equilateral triangle is also equiangular, so $m\angle BAC = m\angle BCA = 60°$. By the def. of $\cong$ $\triangle$s and the substitution prop. of equality, $\angle DBA \cong \angle EBC$. $\triangle ADB \cong \triangle CEB$ by the AAS Congruence Thm. Corresponding parts of $\cong$ $\triangle$ are $\cong$, so $\overline{DB} \cong \overline{EB}$. By the def. of midpoint, B is the midpoint of $\overline{DE}$. **55.** $x = 120$, $y = 30$ **57.** $x^2 + 2x + 1$ **59.** $x^2 + 22x + 121$

QUIZ 3 (p. 580) **1.** $a = 41.7$, $b = 19.4$, $m\angle A = 65°$ **2.** $y = 12$, $z = 17.0$, $m\angle Y = 45°$ **3.** $m = 13.4$, $q = 20.9$, $m\angle N = 50°$ **4.** $p = 7.7$, $q = 2.1$, $m\angle Q = 15°$ **5.** $f = 4.7$, $m\angle F = 37.9°$, $m\angle G = 52.1°$ **6.** $\ell = 12.0$, $m\angle K = 14.0°$, $m\angle L = 76.0°$ **7.** $\langle -5, -1 \rangle$; 5.1 **8.** $\langle 6, -5 \rangle$; 7.8 **9.** $\langle 3, 5 \rangle$; 5.8 **10.** $\langle -7, -11 \rangle$; 13.0 **11.**



; about 69° north of east **12.** $\langle 4, 2 \rangle$ **13.** $\langle 2, 4 \rangle$ **14.** $\langle -2, -8 \rangle$ **15.** $\langle 2, 1 \rangle$ **16.** $\langle 6, 13 \rangle$ **17.** $\langle 0, 3 \rangle$

CHAPTER 9 REVIEW (pp. 582–584) **1.** $x = 4$, $y = 3\sqrt{5}$ **3.** $x = 48$, $y = 21$, $z = 9\sqrt{7}$ **5.** $s = 4\sqrt{5}$; no **7.** $t = 2\sqrt{13}$; no **9.** yes; right **11.** yes; acute **13.** $12\sqrt{2} \approx 17.0$ in.; 18 in.^{2} **15.** $9\sqrt{3}$ cm; $81\sqrt{3} \approx 140.3$ cm^2 **17.** $\sin P \approx 0.9459$; $\cos P \approx 0.3243$; $\tan P \approx 2.9167$; $\sin N \approx 0.3243$; $\cos N \approx 0.9459$; $\tan N \approx 0.3429$ **19.** $x = 8.9$, $m\angle X = 48.2°$, $m\angle Z = 41.8°$ **21.** $s = 17$, $m\angle R = 28.1°$, $m\angle T = 61.9°$ **23.** $\langle 12, -5 \rangle$; 13 **25.** $\langle 14, 9 \rangle$; about 16.6; about 32.7° north of east

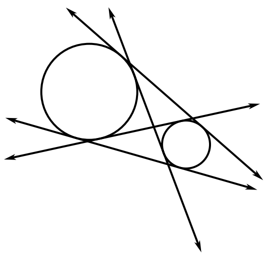
CUMULATIVE PRACTICE (pp. 588–589) **1.** No; if two planes intersect, then their intersection is a line. The three points must be collinear, so they cannot be the vertices of a triangle. **3.** never **5.** Paragraph proof: $\overline{BD}$ is the median from point B, $\overline{AD} \cong \overline{CD}$, $\overline{BD} \cong \overline{BD}$, and it is given that $\overline{AB} \cong \overline{CB}$. Thus, $\triangle ABD \cong \triangle CBD$ by the SSS Congruence Post. Also, $\angle ABD \cong \angle CBD$ since corresponding parts of $\cong$ $\triangle$ are $\cong$. By the def. of an angle bisector, $\overline{BD}$ bisects $\angle ABC$. **7.** yes; clockwise and counterclockwise rotational symmetry of 120° **9.** $x = 24$, $y = 113$ **11.** $y = \frac{3}{4}x + \frac{7}{2}$ **13.** $A'(-1, -2)$, $B'(3, -5)$, $C'(5, 6)$ **15.** $A'(-3, 6)$, $B'(-7, 9)$, $C'(-9, -2)$ **17.** $3\frac{3}{7}$ **19.** No; in $ABCD$, the ratio of the length to width is 8 : 6, or 4 : 3. In $APQD$, the ratio of the length to width is 6 : 4, or 3 : 2. Since these ratios are not equal, the rectangles are not similar.
21. Yes; the ratios $\frac{6}{9}$, $\frac{8}{12}$, and $\frac{12}{18}$ all equal $\frac{2}{3}$, so the triangles are similar by the SSS Similarity Theorem.

23. The image with scale factor $\frac{1}{3}$ has endpoints $\left(2, -\frac{4}{3}\right)$ and (4, 3); its slope is $\frac{\frac{13}{3}}{2} = \frac{13}{6}$. The image with scale factor $\frac{1}{2}$ has endpoints (3, –2) and (6, 4.5); its slope is $\frac{13}{6}$. The two image segments are parallel. **25.** 4 **27.** acute **29.** Let $\angle A$ be the smaller acute angle; $\sin A = \frac{8}{17}$, $\cos A = \frac{15}{17}$, and $\tan A = \frac{8}{15}$. **31.** $\langle 2, 16 \rangle$; about 16.1; about 83° north of east **33.** 20 gal **35.** 189.4 mi

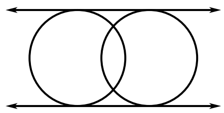
CHAPTER 10

SKILL REVIEW (p. 594) **1.** $2\frac{1}{2}$ **2.** 48 **3.** 23.4 **4.** $-\sqrt{6}$, $\sqrt{6}$ **5.** –16, 4 **6.** (8, 10) **7.** $JL = \sqrt{145}$, $m\angle J \approx 48.4°$, $m\angle L \approx 41.6°$ **8. a.** 15 **b.** $\left(3, -4\frac{1}{2}\right)$ **c.** $y = -\frac{3}{4}x - \frac{9}{4}$ **d.** the segment with endpoints $A'(-7, 0)$ and $B'(5, -9)$

10.1 PRACTICE (pp. 599–602) **5.** No; $5^2 + 5^2 \neq 7^2$, so by the the Converse of the Pythagorean Thm., $\triangle ABD$ is not a right $\triangle$, so $\overline{BD}$ is not $\perp$ to $\overline{AB}$. If $\overleftrightarrow{BD}$ were tangent to $\odot C$, $\angle B$ would be a right angle. Thus, $\overleftrightarrow{BD}$ is not tangent to $\odot C$. **7.** 2 **9.** 7.5 cm **11.** 1.5 ft **13.** 52 in. **15.** 17.4 in. **17.** C and G; the diameter of $\odot G$ is 45, so the radius is $\frac{45}{2} = 22.5$, which is the radius of $\odot C$. **19.** E **21.** D **23.** C **25.** G **27.** internal **29.** 2 internal, 2 external;



31. 2 external;



33. (6, 2), 2 **35.** the lines with equations $y = 0$, $y = 4$, and $x = 4$ **37.** No; $5^2 + 15^2 \neq 17^2$, so by the Converse of the Pythagorean Thm., $\triangle ABC$ is not a right $\triangle$, so $\overline{AB}$ is not $\perp$ to $\overline{AC}$. Then, $\overleftrightarrow{AB}$ is not tangent to $\odot C$. **39.** Yes; $BD = 10 + 10 = 20$ and $20^2 + 21^2 = 29^2$, so by the Converse of the Pythagorean Thm., $\triangle ABD$ is a right $\triangle$, and $\overline{AB} \perp \overline{BD}$. Then, $\overleftrightarrow{AB}$ is tangent to $\odot C$. **41.** 53 ft **43.** any two of $\overline{GD}$, $\overline{HC}$, $\overline{FA}$, and $\overline{EB}$ **45.** $\overleftrightarrow{JK}$ **47.** –1, 1 **49.** $\overleftrightarrow{PS}$ is tangent to $\odot X$ at P, $\overleftrightarrow{PS}$ is tangent to $\odot Y$ at S, $\overleftrightarrow{RT}$ is tangent to $\odot X$ at T, and $\overleftrightarrow{RT}$ is tangent to $\odot Y$ at R. Then, $\overline{PQ} \cong \overline{TQ}$ and $\overline{QS} \cong \overline{QR}$. (2 tangent segments with the same ext. endpoint are $\cong$.) By the def. of cong., $PQ = TQ$ and $QS = QR$, so $PQ + QS = TQ + QR$ by the addition prop. of equality. Then, by the Segment Addition Post. and the Substitution Prop., $PS = RT$ or $\overline{PS} \cong \overline{RT}$. **51.** $QR < QP$

53. *Sample answer:* Assume that ℓ is not tangent to P, that is, there is another point X on ℓ that is also on $\odot Q$. X is on $\odot Q$, so $QX = QP$. But the $\perp$ segment from Q to ℓ is the shortest such segment, so $QX > QP$. QX cannot be both equal to and greater than QP. The assumption that such a point X exists must be false. Then, ℓ is tangent to P.
55. Square; $\overline{BD}$ and $\overline{AD}$ are tangent to $\odot C$ at A and B, respectively, so $\angle A$ and $\angle B$ are right ⦣s. Then, by the Interior Angles of a Quadrilateral Thm., $\angle D$ is also a right $\angle$. Then, $CABD$ is a rectangle. Opp. sides of a ▱ are ≅, so $\overline{CA} \cong \overline{BD}$ and $\overline{AD} \cong \overline{CB}$. But $\overline{CA}$ and $\overline{CB}$ are radii, so $\overline{CA} \cong \overline{CB}$ and by the Transitive Prop. of Cong., all 4 sides of $CABD$ are ≅. $CABD$ is both a rectangle and a rhombus, so it is a square by the Square Corollary.

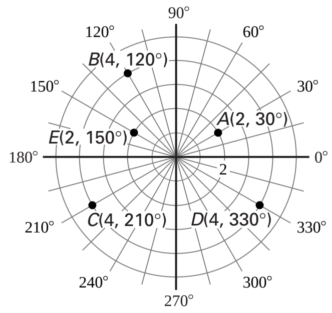
10.1 Mixed Review (p. 602)

59. *Sample answer:* Since slope of $\overline{PS} = \frac{3}{8}$ = slope of $\overline{QR}$, $\overline{PS} \parallel \overline{QR}$. Since slope of $\overline{PQ} = -3$ = slope of $\overline{SR}$, $\overline{PQ} \parallel \overline{SR}$. Then, $PQRS$ is a ▱ by def. **61.** $6\frac{3}{5}$ **63.** 28 **65.** $2\frac{2}{5}$ **67.** 9 **69.** $m\angle A \approx 23.2°$, $m\angle C \approx 66.8°$, $AC \approx 15.2$ **71.** $BC \approx 11.5$, $m\angle A \approx 55.2°$, $m\angle B \approx 34.8°$

10.2 Practice (pp. 607–611)

3. 60° **5.** 180° **7.** 220°
9. $\overline{BC}$ is a diameter; a chord that is the $\perp$ bisector of another chord is a diameter. **11.** $\overset{\frown}{AC} \cong \overset{\frown}{BC}$ and $\overset{\frown}{AD} \cong \overset{\frown}{BD}$; a diameter $\perp$ to a chord bisects the chord and its arc.
13. minor arc **15.** minor arc **17.** semicircle **19.** major arc **21.** 55° **23.** 305° **25.** 180° **27.** 65° **29.** 65° **31.** 120° **33.** 145° **35.** $\overset{\frown}{AC} \cong \overset{\frown}{KL}$ and $\overset{\frown}{ABC} \cong \overset{\frown}{KML}$; $\odot D$ and $\odot N$ are ≅ (both have radius 4). By the Arc Add. Post., $m\overset{\frown}{AC} = m\overset{\frown}{AE} + m\overset{\frown}{EC} = 70° + 75° = 145°$. $m\overset{\frown}{KL} = 145°$ and since $\odot D \cong \odot N$, $\overset{\frown}{AC} \cong \overset{\frown}{KL}$; $m\overset{\frown}{ABC} = 360° - m\overset{\frown}{AC} = 360° - 145° = 215°$. $m\overset{\frown}{KML} = m\overset{\frown}{KM} + m\overset{\frown}{ML} = 130° + 85° = 215°$ by the Arc Add. Post. Since $\odot D \cong \odot N$, $\overset{\frown}{ABC} \cong \overset{\frown}{KML}$. **37.** 36; 144°
39. $\overset{\frown}{AB} \cong \overset{\frown}{CB}$; 2 arcs are ≅ if and only if their corresp. chords are ≅. **41.** $\overline{AB} \cong \overline{AC}$; in a ⊙, 2 chords are ≅ if and only if they are equidistant from the center. **43.** 40°; a diameter that is $\perp$ to a chord bisects the chord and its arc.
45. 15; in a ⊙, 2 chords are ≅ if and only if they are equidistant from the center. **47.** 40°; Vertical Angles Thm., def. of minor arc **49.** 15° **51.** 3:00 A.M. **53.** This follows from the definition of the measure of a minor arc. (The measure of a minor arc is the measure of its central $\angle$.) If 2 minor arcs in the same ⊙ or ≅ ⊙s are ≅, then their central ⦣ are ≅. Conversely, if 2 central ⦣ of the same ⊙ or ≅ ⊙s are ≅, then the measures of the associated arcs are ≅.
55. Yes; construct the $\perp$s from the center of the ⊙ to each chord. Use a compass to compare the lengths of the segments. **57.** Since $\overset{\frown}{AB} \cong \overset{\frown}{DC}$, $\angle APB \cong \angle CPD$ by the def. of ≅ arcs. $\overline{PA}$, $\overline{PB}$, $\overline{PC}$, and $\overline{PD}$ are all radii of $\odot P$, so $\overline{PA} \cong \overline{PB} \cong \overline{PC} \cong \overline{PD}$. Then $\triangle APB \cong \triangle CPD$ by the SAS Cong. Post., so corresp. sides $\overline{AB}$ and $\overline{DC}$ are ≅.

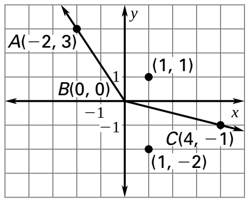
59. Draw radii $\overline{LG}$ and $\overline{LH}$. $\overline{LG} \cong \overline{LH}$, $\overline{LJ} \cong \overline{LJ}$, and since $\overline{EF} \perp \overline{GH}$, $\triangle LGJ \cong \triangle LHJ$ by the HL Cong. Thm. Then, corresp. sides $\overline{GJ}$ and $\overline{JH}$ are ≅, as are corresp. ⦣ GLJ and HLJ. By the def. of ≅ arcs, $\overset{\frown}{GE} \cong \overset{\frown}{EH}$. **61.** Draw radii $\overline{PB}$ and $\overline{PC}$. $\overline{PB} \cong \overline{PC}$ and $\overline{PE} \cong \overline{PF}$. Also, since $\overline{PE} \perp \overline{AB}$ and $\overline{PF} \perp \overline{CD}$, $\triangle PEB$ and $\triangle PFC$ are right ⚠s and are ≅ by the HL Cong. Thm. Corresp. sides $\overline{BE}$ and $\overline{CF}$ are ≅, so $BE = CF$ and, by the multiplication prop. of equality, $2BE = 2CE$. By Thm. 10.5, $\overline{PE}$ bisects $\overline{AB}$ and $\overline{PF}$ bisects $\overline{CD}$, so $AB = 2BE$ and $CD = 2CF$. Then, by the Substitution Prop., $AB = CD$ or $\overline{AB} \cong \overline{CD}$.
63.



65. 90° **67.** 210°

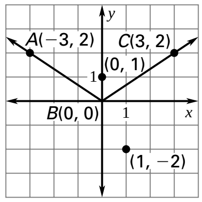
10.2 Mixed Review (p. 611)

71, 73. Coordinates of sample points are given.
71.



; interior: (1, 1), exterior: (1, –2)

73.



; interior: (0, 1), exterior: (1, –2)

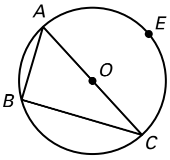
75. Square; $PQ = QR = RS = PS = 3\sqrt{2}$, so $PQRS$ is a rhombus by the Rhombus Corollary; $PR = QS = 6$, so $PQRS$ is a rectangle. (A ▱ is a rectangle if and only if its diagonals are ≅.) Then, $PQRS$ is a square by the Square Corollary. **77.** 16 **79.** 18

10.3 Practice (pp. 616–619)

3. 40° **5.** 210° **7.** $y = 150$, $z = 75$ **9.** 64° **11.** 228° **13.** 109° **15.** 47; inscribed ⦣ that intercept the same arc have the same measure. **17.** $x = 45$, $y = 40$; inscribed ⦣ that intercept the same arc have the same measure. **19.** $x = 80$, $y = 78$, $z = 160$ **21.** $x = 30$, $y = 20$; $m\angle A = m\angle B = m\angle C = 60°$ **23.** $x = 9$, $y = 6$; $m\angle A = 54°$, $m\angle B = 36°$, $m\angle C = 126°$, $m\angle D = 144°$
25. Yes; both pairs of opp. ⦣ are right ⦣ and, so, are supplementary. **27.** No; both pairs of opp. ⦣ of a kite may be, but are not always, supplementary. **29.** Yes; both pairs of opp. ⦣ of an isosceles trapezoid are supplementary.
31. diameter **33.** $\overline{AB}$; a line $\perp$ to a radius of a ⊙ at its endpoint is tangent to the ⊙. **35.** $\overline{QB}$; isosceles; base ⦣; $\angle A \cong \angle B$; Exterior Angle; $2x°$; $2x°$; 2; $\frac{1}{2}m\overset{\frown}{AC}$; $\frac{1}{2}m\overset{\frown}{AC}$

SELECTED ANSWERS

37. Draw the diameter containing $\overline{QB}$, intersecting the ⊙ at point D. By the proof in Ex. 35, $m\angle ABD = \frac{1}{2}m\overset{\frown}{AD}$ and $m\angle DBC = \frac{1}{2}m\overset{\frown}{DC}$. By the Arc Addition Post., $m\overset{\frown}{AD}$ = $m\overset{\frown}{AC} + m\overset{\frown}{CD}$, so $m\overset{\frown}{AC} = m\overset{\frown}{AD} - m\overset{\frown}{CD}$ by the subtraction prop. of equality. By the Angle Addition Post., $m\angle ABD = m\angle ABC + m\angle CBD$, so $m\angle ABC = m\angle ABD - m\angle CBD$ by the subtraction prop. of equality. Then, by repeated application of the Substitution Prop., $m\angle ABC = \frac{1}{2}m\overset{\frown}{AC}$.

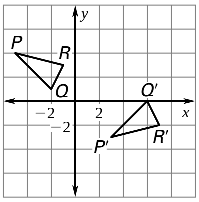


39. GIVEN: ⊙O with inscribed △ABC, $\overline{AC}$ is a diameter of circle ⊙O.
PROVE: △ABC is a right △.
Use the Arc Addition Postulate to show that $m\overset{\frown}{AEC} = m\overset{\frown}{ABC}$ and thus $m\overset{\frown}{ABC}$ = 180˚. Then use the Measure of an Incribed Angle Thm. to show $m\angle B = 90˚$, so that ∠B is a right ∠ and △ABC is a right △.
GIVEN: ⊙O with inscribed △ABC, ∠B is a right ∠.
PROVE: $\overline{AC}$ is a diameter of circle ⊙O.
Use the Measure of an Incribed Angle Thm. to show the inscribed right ∠ intercepts an arc with measure 2(90˚) = 180˚. Since $\overline{AC}$ intercepts an arc that is half of the measure of the circle, it must be a diameter. **41.** *Sample answer:* Use the carpenter's square to draw two diameters of the circle. (Position the vertex of the tool on the circle and mark the 2 points where the sides intersect the ⊙. Repeat, placing the vertex at a different point on the ⊙. The center is the point where the diameters intersect.)

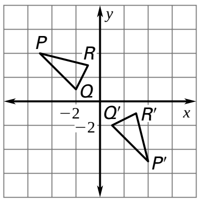
10.3 Mixed Review (p. 620)

49. $y = 2x - 9$ **51.** $y = \frac{4}{3}x + 7$ **53.** $y = -\frac{4}{5}x - 16$

55.



57.



59. $\frac{1}{2}$ **61.** $\frac{\sqrt{3}}{2}$

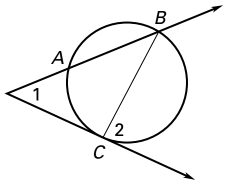
Quiz 1 (p. 620)

1. 90; a tangent line is ⊥ to the radius drawn to the point of tangency. **2.** 12; 2 tangent segs. with the same ext. endpoint are ≅. **3.** 47° **4.** 133° **5.** 227° **6.** 313° **7.** 180° **8.** 47° **9.** 85.2°

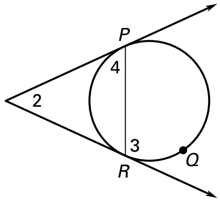
10.4 Practice (pp. 624–627)

3. 60° **5.** 90° **7.** 88° **9.** 280° **11.** 72° **13.** 110° **15.** 25.4 **17.** 112.5° **19.** 103° **21.** 26° **23.** 37° **25.** 55° **27.** 5 **29.** 60° **31.** 30° **33.** 30° **35.** 0.7° **37.** Diameter; 90°; a tangent line is ⊥ to the radius drawn to the point of tangency. **39.** The proof would be similar, using the Angle Addition and Arc Addition Postulates, but you would be subtracting $m\angle PBC$ and $m\overset{\frown}{PC}$ instead of adding.

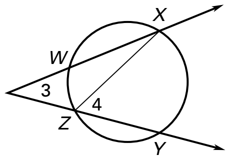
41.



Case 1: Draw $\overline{BC}$. Use the Exterior Angle Thm. to show that $m\angle 2 = m\angle 1 + m\angle ABC$, so that $m\angle 1 = m\angle 2 - m\angle ABC$. Then use Thm. 10.12 to show that $m\angle 2 = \frac{1}{2}m\overset{\frown}{BC}$ and the Measure of an Inscribed Angle Thm. to show that $m\angle ABC = \frac{1}{2}m\overset{\frown}{AC}$. Then, $m\angle 1 = \frac{1}{2}\left(m\overset{\frown}{BC} - m\overset{\frown}{AC}\right)$.



Case 2: Draw $\overline{PR}$. Use the Exterior Angle Thm. to show that $m\angle 3 = m\angle 2 + m\angle 4$, so that $m\angle 2 = m\angle 3 - m\angle 4$. Then use Thm. 10.12 to show that $m\angle 3 = \frac{1}{2}m\overset{\frown}{PQR}$ and $m\angle 4 = \frac{1}{2}m\overset{\frown}{PR}$. Then, $m\angle 2 = \frac{1}{2}\left(m\overset{\frown}{PQR} - m\overset{\frown}{PR}\right)$.



Case 3: Draw $\overline{XZ}$. Use the Exterior Angle Thm. to show that $m\angle 4 = m\angle 3 + m\angle WXZ$, so that $m\angle 3 = m\angle 4 - m\angle WXZ$. Then use the Measure of an Inscribed Angle Thm. to show that $m\angle 4 = \frac{1}{2}m\overset{\frown}{XY}$ and $m\angle WXZ = \frac{1}{2}m\overset{\frown}{WZ}$. Then, $m\angle 3 = \frac{1}{2}\left(m\overset{\frown}{XY} - m\overset{\frown}{WZ}\right)$.

10.4 Mixed Review (p. 627)

47. 6 **49.** 25 **51.** 2

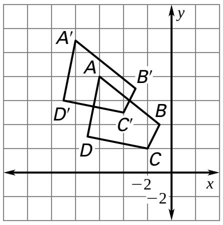
10.5 Practice (pp. 632–634)

3. 15; 18; 12 **5.** 16; $x + 8$; 4 **7.** 9; 6 **9.** The segment from you to the center of the aviary is a secant segment that shares an endpoint with the segment that is tangent to the aviary. Let x be the length of the internal secant segment (twice the radius of the aviary) and use Thm. 10.17. Since $40(40 + x) \approx 60^2$, the radius is about $\frac{50}{2}$, or 25 ft. **11.** 45; 27; 30 **13.** 13 **15.** 8.5 **17.** 6 **19.** $8\frac{2}{3}$ **21.** 4 **23.** $\frac{-9 + \sqrt{565}}{2} \approx 7.38$ **25.** $x = 42$, $y = 10$ **27.** $x = 7$, $y = \frac{-13 + 5\sqrt{17}}{2} \approx 3.81$ **29.** 4.875 ft; the diameter through A bisects the chord into two 4.5 ft segments. Use Thm. 10.15 to find the length of the part of the diameter containing A. Add this length to 3 and divide by 2 to get the radius. **31.** ∠B and ∠D intercept the same arc, so ∠B ≅ ∠D. ∠E ≅ ∠E by the Reflexive Prop. of Cong., so △BCE ~ △DAE by the AA Similarity Thm. Then, since lengths of corresp. sides of ~ ⚠ are proportional, $\frac{EA}{EC} = \frac{ED}{EB}$. By the Cross Product Prop., $EA \cdot EB = EC \cdot ED$.

10.5 Mixed Review (p. 635)

41. 10; (3, 0) **43.** 15; $\left(-\frac{11}{2}, 1\right)$ **45.** 14; (–2, –2) **47.** $y = -\frac{3}{2}x + 17$ **49.** $y = -\frac{1}{3}x - \frac{10}{3}$

51. $y = \frac{3}{7}x + \frac{81}{7}$ **53.**



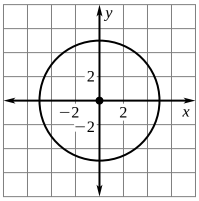
QUIZ 2 (p. 635)

1. 202 **2.** 139 **3.** 26 **4.** $6\frac{1}{4}$ **5.** 6 **6.** 5
7. Solve $20(2r + 20) = 49^2$ (Thm. 10.17) or solve $(r + 20)^2 = r^2 + 49^2$ (the Pythagorean Theorem); 50.025 ft.

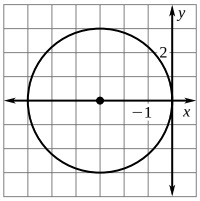
10.6 PRACTICE (pp. 638–640)

3. (0, 0), 2; $x^2 + y^2 = 4$
5. (–2, 2), 2; $(x + 2)^2 + (y – 2)^2 = 4$ **7.** (4, 3), 4 **9.** (0, 0), 2
11. (–5, –3), 1 **13.** (–3, 2), 2, $(x + 3)^2 + (y – 2)^2 = 4$
15. (3, 3), 1, $(x – 3)^2 + (y – 3)^2 = 1$ **17.** (2, 2), 4, $(x – 2)^2 + (y – 2)^2 = 16$ **19.** $x^2 + y^2 = 1$ **21.** $(x – 3)^2 + (y + 2)^2 = 4$ **23.** $x^2 + y^2 = 9$ **25.** $(x – 3)^2 + (y – 2)^2 = 4$

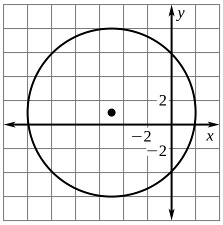
27.



29.

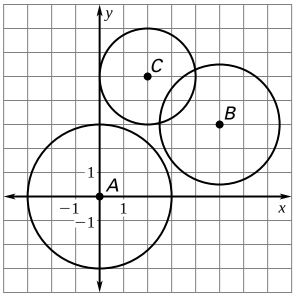


31.

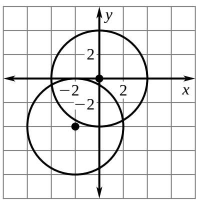


33. exterior **35.** on
37. interior **39.** exterior

41. A: $x^2 + y^2 = 9$,
B: $(x – 5)^2 + (y – 3)^2 = 6.25$,
C: $(x – 2)^2 + (y – 5)^2 = 4$;



43. $(x + 3)^2 + y^2 = 1$ **47.**



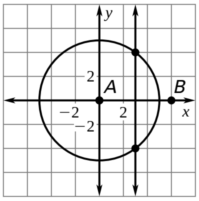
; $(x + 2)^2 + (y + 4)^2 = 16$

10.6 MIXED REVIEW (p. 640)

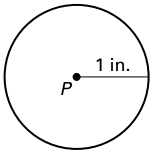
55. ▱, rectangle, rhombus, kite, isosceles trapezoid **57.** ⟨–6, 7⟩; 9.2 **59.** ⟨15, 1⟩; 15.0
61. No; P is not equidistant from the sides of $\angle A$.

10.7 PRACTICE (pp. 645–647)

3. B **5.** D **7.** the two points on the intersection of the ⊥ bisector of $\overline{AB}$ and ⊙A with radius 5;

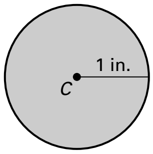


9.



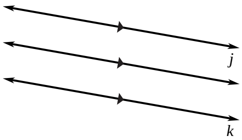
; ⊙P with radius 1 in.

11.



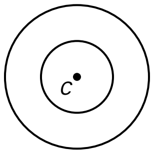
; ⊙C with radius 1 in. and the interior of ⊙C

13.



; a line ∥ to both j and k and halfway between them

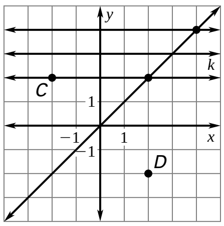
15.



; a ⊙ with center C and radius half that of the original ⊙

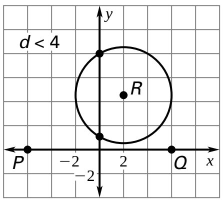
19. $x = 3$ **21.** $y = –x + 6$
23. $y = –2$, $y = 4$

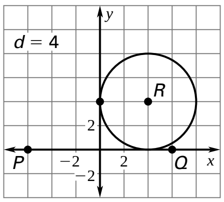
25.

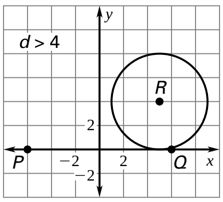


; 2 points, (2, 2) and (4, 4), the intersections of $y = x$ with $y = 2$ and $y = 4$

27.







; Let d be the distance from R to the ⊥ bisector of $\overline{PQ}$; the locus of points is 2 points if $d < 4$, 1 point if $d = 4$, and 0 points if $d > 4$.
29. (0, –6)

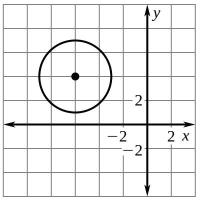
31. Let d be the distance from P to k. If $0 < d < 4$, then the locus is 2 points. If $d = 4$, then the locus is 1 point. If $d > 4$, then the locus is 0 points.

SELECTED ANSWERS

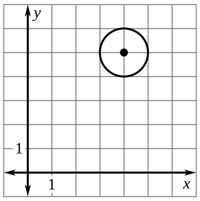
10.7 Mixed Review (p. 647)

37. 69 **39.** 17.5 **41.** 24

43.

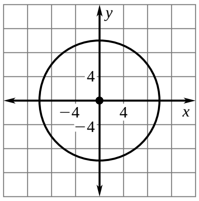


45.

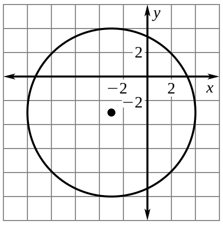


Quiz 3 (p. 648)

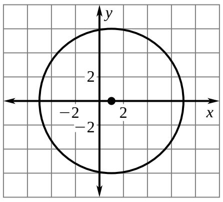
1.



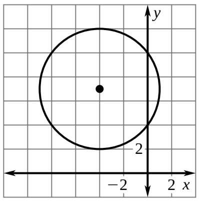
2.



3.

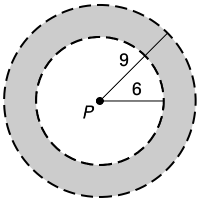


4.



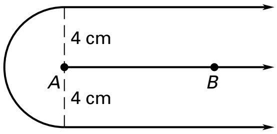
5. $(x-2)^2+(y+2)^2=74$

6.



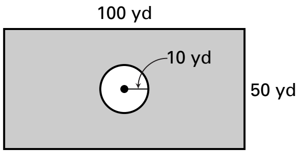
; the points that are in both the exterior of the ⊙ with center *P* and radius 6 units and the interior of the ⊙ with center *P* and radius 9 units

7.



; a set of points formed by 2 rays on opposite sides of $\overrightarrow{AB}$, each ∥ to $\overrightarrow{AB}$ and 4 cm from it, and a semicircle with center *A* and radius 4 cm

8.

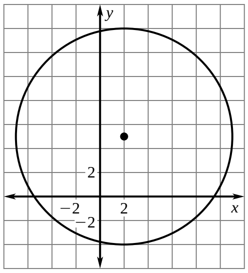


; the points that are on the field and on or outside the ⊙ whose center is the center of the field and whose radius is 10 yd

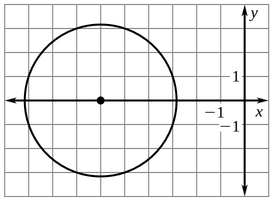
Chapter 10 Review (pp. 650–652)

1. $\overline{BN}$ **3.** $\overline{BN}$ or $\overline{BF}$ **5.** $\overline{QE}$ **7.** $\overleftrightarrow{BF}$ **9.** Yes; a tangent is ⊥ to the radius drawn to the point of tangency. **11.** 62° **13.** 239° **15.** 275° **17.** True; the sides of the △ opp. the inscribed ∠s are diameters, so the inscribed ∠s are right ∠s. **19.** True; *ABCD* is inscribed in a ⊙, so opp. ∠s are supplementary. **21.** 55 **23.** 94 **25.** 34.4

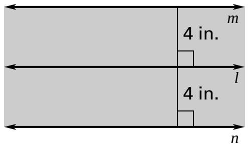
27. $(x-2)^2+(y-5)^2=81$;



29. $(x+6)^2+y^2=10$;



31.



; 2 lines, *m* and *n*, on opp. sides of ℓ, each ∥ to ℓ and 4 in. from ℓ, and all the points between *m* and *n*

Algebra Review (pp. 656–657)

1. $\frac{A}{\ell}$ **2.** $\frac{\sqrt[3]{6\pi^2V}}{2\pi}$ **3.** $\frac{2A}{b}$ **4.** $\frac{2A}{h}-b_2$ **5.** $\sqrt{\frac{A}{\pi}}$ or $\frac{\sqrt{A\pi}}{\pi}$ **6.** $\frac{C}{2\pi}$ **7.** $\sqrt[3]{V}$ **8.** $\frac{P-2w}{2}$ **9.** $\frac{V}{\ell w}$ **10.** $\frac{V}{\pi r^2}$ **11.** $\sqrt{\frac{S}{6}}$ or $\frac{\sqrt{6S}}{6}$ **12.** $\sqrt{c^2-a^2}$ **13.** $5+x$ **14.** $x^2+\sqrt{2}$ **15.** $2x-14$ **16.** $3x-6$ **17.** $x+2-9x$ **18.** $\frac{x}{2}+3x$ **19.** $5x-7=13$; 4 **20.** $2x-16=10$; 13 **21.** $2x+14x=48$; 3 **22.** $\frac{x}{2}=3(x+5)$; –6 **23.** 36 **24.** 51 miles **25.** 142 **26.** \$12.50 **27.** 25% **28.** 22% **29.** 400% **30.** about 15% **31.** 10 **32.** 25 meters **33.** \$2.08 **34.** about 17% **35.** $\frac{1}{2x}$ **36.** $2a^2$ **37.** x **38.** 3 **39.** $\frac{a+2}{a-8}$ **40.** $\frac{x+3}{6x-1}$ **41.** $\frac{7d-1}{3d+4}$ **42.** $\frac{y-6}{12-y}$ **43.** $\frac{9s-1}{s-3}$ **44.** $\frac{-5h+1}{h+1}$ **45.** $\frac{t-1}{t+1}$ **46.** $\frac{m-2}{m+2}$

Chapter 11

Skill Review (p. 660)

1. 48 in.^2 **2.** 44°; 123°, 101°, 136° **3. a.** $\frac{3}{2}$ **b.** $\frac{2}{3}$ **4.** 43.6°, 46.4°

11.1 Practice (pp. 665–668)

3. 95 **5.** 45 **7.** 1800° **9.** 2880° **11.** 5040° **13.** 17,640° **15.** 101 **17.** 108 **19.** 135 **21.** 140° **23.** 6 **25.** 16 **29.** 30° **31.** about 17.1° **33.** 6 **35.** 5 **37.** 75° **39.** The yellow hexagon is regular with interior angles measuring 120° each; the yellow pentagons each have two interior angles that measure 90° and three interior angles that measure 120°; the triangles are equilateral with all interior angles measuring 60°. **41.** ∠3 and ∠8 are a linear pair, so *m*∠3 = 140°; ∠2 and ∠7 are a linear pair, so *m*∠7 = 80°; *m*∠1 = 80° by the Polygon Interior Angles Thm.; ∠1 and ∠6 are a linear pair, so *m*∠6 = 100°; ∠4 and ∠9 are a linear pair, as are ∠5 and ∠10, so *m*∠9 = *m*∠10 = 70°. **43.** Draw all the diagonals of *ABCDE* that have *A* as one endpoint. The diagonals, $\overline{AC}$ and $\overline{AD}$, divide *ABCDE* into 3 △. By the Angle Addition Post., *m*∠*BAE* = *m*∠*BAC* + *m*∠*CAD* + *m*∠*DAE*.

Similarly, $m\angle BCD = m\angle BCA + m\angle ACD$ and $m\angle CDE = m\angle CDA + m\angle ADE$. Then, the sum of the measures of the interior ∠s of $ABCDE$ is equal to the sum of the measures of the ∠s of $\triangle ABC$, $\triangle ACD$, and $\triangle ADE$. By the △ Sum Thm., the sum of the measures of each △ is 180°, so the sum of the measures of the interior ∠s of $ABCDE$ is $3 \cdot 180° = (5-2) \cdot 180°$. **45.** Let A be a convex n-gon. Each interior ∠ and one of the exterior ∠s at that vertex form a linear pair, so the sum of their measures is 180°. Then, the sum of the measures of the interior ∠ and one exterior ∠ at each vertex is $n \cdot 180°$. By the Polygon Interior Angles Thm., the sum of the measures of the interior ∠s of A is $(n-2) \cdot 180°$. So, the sum of the measures of the exterior ∠s of A, one at each vertex, is $n \cdot 180° - (n-2) \cdot 180° = n \cdot 180° - n \cdot 180° + 360° = 360°$. **49.** $m\angle A = m\angle E = 90°$, $m\angle B = m\angle C = m\angle D = 120°$ **51.** Yes; if $\frac{(n-2) \cdot 180°}{n} = 150°$, then $n = 12$. A regular 12-gon (dodecagon) has interior ∠s with measure 150°. **53.** No; if $\frac{(n-2) \cdot 180°}{n} = 72°$, then $n = 3\frac{1}{3}$. It is not possible for a polygon to have $3\frac{1}{3}$ sides. **55.** $f(n)$ is the measure of each interior ∠ of a regular n-gon; as n gets larger and larger, $f(n)$ increases, becoming closer and closer to 180°. **57.** 10

11.1 Mixed Review (p. 668) **63.** 27.5 in.^{2} **65.** 37.5 sq. units **67.** no **69.** no **71.** 65° **73.** 245°

11.2 Practice (pp. 672–675) **7.** 45° **9.** $\frac{25\sqrt{3}}{4} \approx 10.8$ sq. units **11.** $\frac{245\sqrt{3}}{4} \approx 106.1$ sq. units **13.** 30° **15.** 2° **17.** $108\sqrt{3} \approx 187.1$ sq. units **19.** $30\sqrt{3} \approx 52.0$ units; $75\sqrt{3} \approx 129.9$ sq. units **21.** 150 tan 36° ≈ 109.0 units; 1125 tan 36° ≈ 817.36 sq. units **23.** 176 sin 22.5° ≈ 67.35 units; 968(sin 22.5°)(cos 22.5°) ≈ 342.24 sq. units **25.** $75\sqrt{3} \approx 129.9$ in.^{2} **27.** True; let θ be the central angle, n the number of sides, r the radius, and P the perimeter. As n grows bigger θ will become smaller, so the apothem, which is given by $r \cos \frac{\theta}{2}$ will get larger. The perimeter of the polygon, which is given by $n\left(2\sin \frac{\theta}{2}\right)$ will grow larger, too. Although the factor involving the sine will get smaller, the increase in n more than makes up for it. Consequently, the area, which is given by $\frac{1}{2}aP$ will increase. **29.** False; for example, the radius of a regular hexagon is equal to the side length. **31.** 32 tan 67.5° ≈ 77.3 **33.** Let s = the length of a side of the hexagon and of the equilateral triangle. The apothem of the hexagon is $\frac{1}{2}\sqrt{3}s$ and the perimeter of the hexagon is $6s$. The area of the hexagon, then, is $A = \frac{1}{2}aP = \frac{1}{2}\left(\frac{1}{2}\sqrt{3}s\right) \cdot 6s$, or $\frac{3}{2}\sqrt{3}s^2$. The area of an equilateral triangle with side length s is $A = \frac{1}{4}\sqrt{3}s^2$. Six of these equilateral triangles together (forming the hexagon), then, would have area $6 \cdot \frac{s^2\sqrt{3}}{4} = \frac{3s^2\sqrt{3}}{2}$. The two results are the same. **45.** $\frac{1}{4}\sqrt{3} \approx 0.43$ m **47.** 3 colors **49.** about 25 tiles

11.2 Mixed Review (p. 675) **55.** 3 **57.** –33 **59.** true **61.** false **63.** 7

11.3 Practice (pp. 679–681) **5.** 3 : 2, 9 : 4 **7.** 2 : 1, 4 : 1 **9.** 5 : 6, 25 : 36 **11.** sometimes **13.** always **15.** 7 : 10 **17.** Since $\overline{AB}$ is parallel to $\overline{DC}$, $\angle A \cong \angle C$ and $\angle B \cong \angle D$ by the Alternate Interior Angles Thm. So, $\triangle CDE \sim \triangle ABE$ by the AA Similarity Postulate; 98 square units. **19.** $3\sqrt{5} : 4$ **21.** $3\sqrt{10} : 5$ **23.** 1363 in.^{2} and 5452 in.^{2}; 1 : 4 **25.** 820 ft^2 **27.** about 1385.8 ft^2; about 565.8 ft^2

11.3 Mixed Review (p. 681) **35.** 145° **37.** 215° **39.** 80° **41.** 43°

Quiz 1 (p. 682) **1.** 3240° **2.** 14.4° **3.** $\frac{289\sqrt{3}}{4} \approx 125.1$ in.^{2} **4.** 729 tan 20° ≈ 265.3 cm^2 **5.** $\frac{4}{3}; \frac{16}{9}$ **6.** $\frac{13}{20}; \frac{169}{400}$ **7.** about \$2613

11.4 Practice (pp. 686–688) **3.** F **5.** C **7.** A **9.** False; the arcs must be arcs of the same ⊙ or of ≅ ⊙s. **11.** False; the arcs must be arcs of the same ⊙ or of ≅ ⊙s. **13.** about 81.0 cm **15.** 31.42 in. **17.** 25.13 m **19.** 5.09 yd **21.** 7.33 in.

23.

Radius	12	3	0.6	3.5	5.1	$3\sqrt{3}$
$m\overset{\frown}{AB}$	45°	30°	120°	192°	90°	about 107°
Length of $\overset{\frown}{AB}$	3π	0.5π	0.4π	about 3.73π	2.55π	3.09π

25. 36 **27.** $\frac{9971\pi}{1500} \approx 20.88$ **29.** $\frac{798}{25\pi} \approx 10.16$ **31.** $5\pi + 15 \approx 30.71$ **33.** 60, 9 **35.** $2\frac{1}{2}, \frac{19}{56}$ **37.** $4\pi\sqrt{7}$ **39.** A: 24.2 in., B: 24.9 in., C: 25.7 in. **41.** The sidewall width must be added twice to the rim diameter to get the tire diameter. **43.** about 9.8 laps **45.** about 47.62 in. **47.** about 37.70 ft

11.4 Mixed Review (p. 689) **53.** $10.89\pi \approx 34.21$ in.^{2} **55.** $176\pi \approx 552.92$ m^2 **57.** $2\frac{11}{12}$ **59.** 96° **61.** 258°

11.5 Practice (pp. 695–698) **3.** $81\pi \approx 254.47$ in.^{2} **5.** $36\pi \approx 113.10$ ft^2 **7.** $\frac{175\pi}{9} \approx 61.09$ m^2 **9.** $8\pi \approx 25.13$ in.^{2} **11.** $0.16\pi \approx 0.50$ cm^2 **13.** $100\pi \approx 314.16$ in.^{2} **15.** $\frac{49\pi}{18} \approx 8.55$ in.^{2} **17.** $\frac{529\pi}{75} \approx 22.16$ m^2 **19.** $100\pi \approx 314.16$ ft^2 **21.** 13.00 in. **23.** $540\pi \approx 1696.46$ m^2 **25.** $16\pi - 80 \cos 36° \sin 36° \approx 12.22$ ft^2 **27.** $324 - 81\pi \approx 69.53$ in.^{2} **29.** 2.4, 4.7, 7.1, 9.4, 11.8, 14.1 **31.** Yes; it appears that the points lie along a line. You can also write a linear equation, $y = \frac{\pi}{40}x$. **33.** 692.72 mi^2 **35.** $6\pi - 9\sqrt{3} \approx 3.26$ cm^2

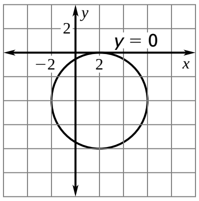
SELECTED ANSWERS

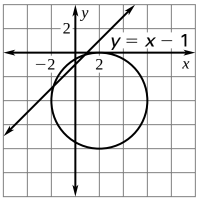
37. $768\pi - 576\sqrt{3} \approx 1415.08$ cm^2 **41.** No; the area of the ⊙ is quadrupled and the circumference is doubled. $A = \pi r^2$ and $C = 2\pi r$; $\pi(2r)^2 = 4\pi r^2 = 4A$ and $2\pi(2r) = 2(2\pi r) = 2C$.

11.5 Mixed Review (p. 698) **47.** $\frac{3}{16}$ **49.** $\frac{4}{11}$ **51.** 19.4 cm **53.** 68° **55.** $(x + 2)^2 + (y + 7)^2 = 36$ **57.** $(x + 4)^2 + (y - 5)^2 = 10.24$ **59.** $25\pi \approx 78.5$ in. **61.** $\frac{1896}{43\pi} \approx 14.0$ m

11.6 Practice (pp. 701–704) **5.** $\frac{1}{2} = 50\%$ **7.** $\overline{AB}$ and $\overline{BF}$ do not overlap and $AB + BF = AF$. So, any point K on $\overline{AF}$ must be on one of the two parts. Therefore, the sum of the two probabilities is 1. **9.** about 14% **11.** about 57% **13.** 25% **15.** about 42% **17.** $\frac{4-\pi}{4} \approx 21.5\%$ **19.** $\frac{1}{4} = 25\%$ **21.** $\frac{3\pi}{392\sqrt{3}} \approx 1.4\%$ **23.** $\frac{3\pi}{98\sqrt{3}} \approx 5.6\%$ **25.** $\frac{\pi - 2}{\pi} \approx 36\%$ **27.** $\frac{1}{6} \approx 16.7\%$ **29.** 10,000,000 yd^2 **31.** 1% **33.** 36% **37.** 60° **39.** 30° **41.** The probability is doubled.

11.6 Mixed Review (p. 705) **45.** No; since $11^2 = 121 \neq 100 + 16$, △ABC is not a right △. Then, $\overline{CB}$ is not ⊥ to $\overleftrightarrow{AB}$ and $\overleftrightarrow{AB}$ is not tangent to the ⊙. **47.** Yes; $25^2 = 625 = 49 + 576$, so △ABC is a right △ and $\overline{CA} \perp \overleftrightarrow{AB}$. Then, $\overleftrightarrow{AB}$ is tangent to the ⊙.

49. 

tangent; **51.** 

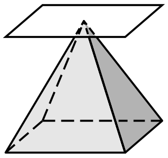
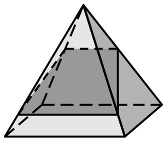
secant;

Quiz 2 (p. 705) **1.** $\frac{738}{17} \approx 43.4$ m **2.** $\frac{286\pi}{45} \approx 20.0$ in. **3.** $\frac{738}{23\pi} \approx 10.2$ ft **4.** $2500\pi \approx 7854.0$ mi^2 **5.** $\frac{343\pi}{24} \approx 44.9$ cm^2 **6.** $\frac{725\pi}{9} \approx 253.1$ ft^2 **7.** $\frac{\sqrt{3}}{64} \approx 2.7\%$

Chapter 11 Review (pp. 708–710) **1.** 140°, 40° **3.** 157.5°, 22.5° **5.** 45 **7.** 12 **9.** $36\sqrt{3} \approx 62.4$ cm^2 **11.** $\frac{75\sqrt{3}}{2} \approx 65.0$ m^2 **13.** sometimes **15.** always **17.** 5:3, 25:9 **19.** about 47.8 m, about 21.5 m **21.** about 1.91 in. **23.** $50\pi \approx 157.1$ in.^{2} **25.** $161\pi \approx 505.8$ cm^2 **27.** $196\pi \approx 615.75$ ft^2 **29.** $\frac{3}{10} = 30\%$ **31.** $\frac{3}{5} = 60\%$ **33.** $\frac{1}{4} = 25\%$

CHAPTER 12

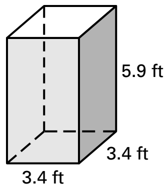
Skill Review (p. 718) **1.** 2:1 **2.** 3:4 **3.** $4\sqrt{3} \approx 6.9$ in.^{2} **4.** $54\sqrt{3} \approx 93.5$ m^2 **5.** 4.8 ft^2

12.1 Practice (pp. 723–726) **3.** Yes; the figure is a solid that is bounded by polygons that enclose a single region of space. **5.** No; it does not have faces that are polygons. **7.** 6 **9.** 30 **11.** Yes; the figure is a solid that is bounded by polygons that enclose a single region of space. **13.** 5, 5, 8 **15.** 10, 16, 24 **17.** Not regular, convex; the faces of the polyhedron are not congruent (2 are hexagons and 6 are squares); any 2 points on the surface of the polyhedron can be connected by a line segment that lies entirely inside or on the polyhedron. **19.** False; see the octahedron in part (b) of Example 2 on page 720. **21.** True; the faces are ≅ squares. **23.** False; it does not have polygonal faces. **25.** circle **27.** pentagon **29.** circle **31.** rectangle **33.** yes;  **35.** yes; 

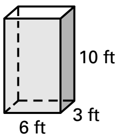
37. octahedron **39.** dodecahedron **41.** cube **43.** 5 faces, 6 vertices, 9 edges; 5 + 6 = 9 + 2 **45.** 5 faces, 6 vertices, 9 edges; 5 + 6 = 9 + 2 **47.** 12 vertices **49.** 24 vertices **51.** 12 vertices **53.** 6 molecules

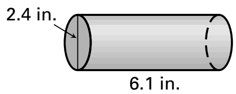
12.1 Mixed Review (p. 726) **61.** 280 ft^2 **63.** 110.40 m^2 **65.** 27.71 cm^2 **67.** 2866.22 in.^{2} **69.** 5808.80 ft^2

12.2 Practice (pp. 731–734) **3.** cylinder **5.** rectangular prism **7, 9.** Three answers are given. The first considers the top and bottom as the bases, the second, the front and back, and the third, the right and left sides. **7.** 5 cm; 8 cm; 3 cm **9.** 24 cm^2; 15 cm^2; 40 cm^2

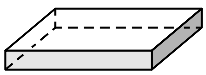
11. 

13. right hexagonal prism **15.** rectangle **17.** pentagonal prism **19.** triangular prism **21.** 190 m^2 **23.** $16\sqrt{2} + 115.2 \approx 137.83$ m^2 **25.** $12\sqrt{3} + 73.2 \approx 93.98$ in.^{2} **27.** $256\pi \approx 804.25$ cm^2

29. 

; 216 ft^2 **31.** 

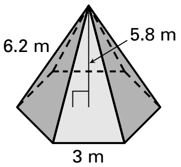
; $17.52\pi \approx 55.04$ in.^{2}

33. 27 m **35.** 16 in.^{2}; 24 in.^{2}; no **37.** $12\sqrt{3} + 12 \approx 32.8$ in.^{2}; $12\sqrt{3} + 24 \approx 44.8$ in.^{2}; no **39.**  **43.** $8\pi \approx 25$ in.^{2}

12.2 Mixed Review (p. 734) **51.** $m\angle A = 58°$, $BC \approx 16.80$, $AB \approx 19.81$ **53.** 1805 cos 36° sin 36° ≈ 858.33 m^2 **55.** $96\sqrt{3} \approx 166.28$ in.^{2} **57.** $\frac{8}{11} \approx 73\%$ **59.** $\frac{4}{11} \approx 36\%$

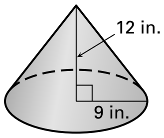
12.3 Practice (pp. 738–741) **3.** C **5.** B **7.** D **9.** about 7.62 ft **11.** about 100.09 ft^2 **13.** $25\sqrt{3} + 180 \approx 223.30$ in.^{2} **15.** 270.6 in.^{2} **17.** 506.24 mm^2 **19.** 219.99 cm^2 **21.** $2\sqrt{29} \approx 10.8$ cm **23.** 138.84π m^2 **25.** 73.73π in.^{2} **27.** right cone; 50.3 cm^2

29.



79.2 m^2

31.



678.6 in.^2

33. 101.1 sq. units **35.** $p = 9$ cm, $q = 15$ cm **37.** $\ell \approx 9.8$ m, $h \approx 7.7$ m **39.** about 1,334,817 ft^2 **41.** about 302 in.^2 **43.** The surface area of the cup is $\frac{1}{4}$ the surface area of the original paper $\odot$; about 29°.

12.3 Mixed Review (p. 741) **51.** 82.84 sq. units **53.** about 11 in.

Quiz 1 (p. 742) **1.** regular, convex; 4 vertices **2.** not regular, convex; 8 vertices **3.** not regular, not convex; 12 vertices **4.** 336.44 ft^2 **5.** 305.91 m^2 **6.** 773.52 mm^2

12.4 Practice (pp. 746–749) **3.** 255 **5.** 5.5 **7.** $540\pi \approx 1696 \text{ in.}^3$ **9.** 840 in.^3 **11.** 100 unit cubes; 4 layers of 5 rows of 5 cubes each **13.** 512 in.^3 **15.** $\frac{735\sqrt{3}}{4} \approx 318.26 \text{ in.}^3$ **17.** 288.40 ft^3 **19.** 240 m^3 **21.** 310.38 cm^3 **23.** 48,484.99 ft^3 **25.** 924 m^3 **27.** $\frac{135\sqrt{3}}{2} \approx 116.91 \text{ cm}^3$ **29.** $3\sqrt[3]{100} \approx 13.92$ yd **31.** $\frac{1211\sqrt{3}}{300} \approx 6.99$ in. **33.** $\sqrt{\frac{1131}{10\pi}} \approx 6.00$ m **35.** 150 ft^3 **37.** $605\pi \approx 1900.66 \text{ in.}^3$ **39.** about 92.6 yd **41.** No; the circumference of the base of the shorter cylinder is 11 in., so the radius is about 1.75 in. and the volume is about 82 in.^3. The circumference of the base of the taller cylinder is 8.5 in., so the radius is about 1.35 in. and the volume is about 63 in.^3. **43.** 7 candles **45.** Prism: volume = 36 in.^3, surface area = 66 in.^2; cylinder: volume ≈ 36 in.^3, surface area ≈ 62.2 in.^2; the cylinder and the prism hold about the same amount. The cylinder has smaller surface area, so less metal would be needed and it would be cheaper to produce a cylindrical can than one shaped like a prism. **47.** about 1,850,458 lb

12.4 Mixed Review (p. 749) **51.** 30°, 75°, 75° **53.** 45°, 60°, 75° **55.** 98 m^2 **57.** 462 in.^2 **59.** 144 cm^2

12.5 Practice (pp. 755–757) **5. a.** $4\pi \approx 12.6 \text{ ft}^2$ **b.** $\frac{16\pi}{3} \approx 16.8 \text{ ft}^3$ **9.** $\frac{3721\pi}{100} \approx 116.9 \text{ ft}^2$ **11.** 400 cm^3 **13.** $\frac{67{,}183\sqrt{3}}{750} \approx 155.2 \text{ ft}^3$ **15.** $710\sqrt{3} \approx 1229.8 \text{ mm}^3$ **17.** 48.97 ft^3 **19.** 667.06 in.^3 **21.** 5 in. **23.** 288 ft^3 **25.** 97.92 m^3 **27.** yes **29.** about 17.5 sec **31.** 301.59 cm^3 **33.** $16\pi \approx 50.3 \text{ m}^3$

12.5 Mixed Review (p. 758) **41.** 144°, 36° **43.** $163\frac{7}{11}°$, $16\frac{4}{11}°$ **45.** 168°, 12° **47.** $\frac{26{,}569\pi}{100} \approx 834.69 \text{ cm}^2$ **49.** $100\pi \approx 314.16 \text{ m}^2$ **51.** 24 vertices

Quiz 2 (p. 758) **1.** 1080 in.^3 **2.** 1020 ft^3 **3.** $350\pi \approx 1099.56 \text{ cm}^3$ **4.** $\frac{243\pi}{4} \approx 190.85 \text{ m}^3$ **5.** 21,168 mm^3 **6.** $\frac{147\sqrt{3}}{4} \approx 63.65 \text{ in.}^3$ **7.** about 5633 ft^3

12.6 Practice (pp. 762–765) **3.** *Sample answers:* $\overline{QS}$, $\overline{RT}$, or $\overline{TS}$ **5.** $\overline{QS}$ **7.** $36\pi \approx 113.10$ sq. units **9.** about $5.24 \times 10^{-25} \text{ cm}^3$ **11.** 4071.50 cm^2 **13.** a hemisphere **15.** 7.4 in. **17.** about 45.4 in.^2 **19.** The diameters of Neptune and its moons Triton and Nereid are, respectively, about 30,775 mi, about 1680 mi, and about 211 mi. Then, the surface areas are about 2,975,404,400 mi^2, about 8,866,800 m^2, and 139,900 mi^2. **21.** 65.45 in.^3 **23.** 14π mm, $196\pi \text{ mm}^2$, $\frac{1372\pi}{3} \text{ mm}^3$ **25.** 5 cm, $100\pi \text{ cm}^2$, $\frac{500\pi}{3} \text{ cm}^3$ **27. a.** 488.58 in.^2 **b.** 419.82 in.^3 **29. a.** 375.29 ft^2 **b.** 610.12 ft^3 **31.** $\frac{1}{3}; \frac{2}{3}; 1; \frac{4}{3}; \frac{5}{3}$ **35.** $y = 2$; $4\pi \approx 12.57$ sq. units **39.** about 267, 300 ft^2 **41, 43.** Answers are rounded to 2 decimal places. **41.** 3.43 cm **43.** 10.42 cm

12.6 Mixed Review (p. 765) **51.** translation, vertical line reflection, 180° rotation, glide reflection **53.** translation, 180° rotation **55.** yes; 36 sq. units **57.** about 14.4 revolutions

12.7 Practice (pp. 769–771) **5.** C **7.** 6 : 11 **9.** not similar **11.** similar **13.** always **15.** always **17.** $112\pi \text{ cm}^2$, $160\pi \text{ cm}^3$ **19.** $384\pi \text{ ft}^2$, $768\pi \text{ ft}^3$ **21.** 1 : 2 **23.** 2 : 3 **25.** 88 in. **27.** 8192 in.^3 **31.** about 4032 ft^2 **33.** about 34,051 ft^3, about 67 in.^3

12.7 Mixed Review (p. 772) **39.** $\overline{LK}$ **41.** $\overline{CA}$ **43.** $\angle BAC$ **45.** $\frac{225\sqrt{3}}{2} + 765 \approx 959.86 \text{ ft}^2$ **47.** $\frac{26{,}896\pi}{25} \approx 3379.85 \text{ in.}^2$ **49.** about 74.3 in.

Quiz 3 (p. 772) **1.** 1256.64 cm^2, 4188.79 cm^3 **2.** 44.41 in.^2, 27.83 in.^3 **3.** 366.44 ft^2, 659.58 ft^3 **4.** 14,137.17 m^2, 158,058.33 m^3 **5.** 6.5 cm; larger prism: 460 cm^2, 624 cm^3; smaller prism: 115 cm^2, 78 cm^3 **6.** 3 ft; smaller cone: $9\pi + 3\pi\sqrt{73} \approx 108.80 \text{ ft}^2$, $24\pi \approx 75.40 \text{ ft}^3$; larger cone: $\frac{81\pi + 27\pi\sqrt{73}}{4} \approx 244.80 \text{ ft}^2$, $81\pi \approx 254.47 \text{ ft}^3$ **7.** $40{,}000\pi \approx 125{,}663.71 \text{ ft}^2$, $\frac{4{,}000{,}000\pi}{3} \approx 4{,}188{,}790.21 \text{ ft}^3$ **8.** 5 ft, $100\pi \approx 314.16 \text{ ft}^2$, $\frac{500\pi}{3} \approx 523.60 \text{ ft}^3$

Chapter 12 Review (pp. 774–776) **1.** 60 **3.** 8 **5.** 414.69 ft^2 **7.** 96 cm^2 **9.** 124.71 in.^2 **11.** $\frac{123{,}039\sqrt{3}}{5} \approx 42{,}621.96 \text{ m}^3$ **13.** 10,500 in.^3 **15.** $320\pi \approx 1005.31 \text{ ft}^3$ **17.** $\pi \approx 3.14 \text{ in.}^2$, $\frac{\pi}{6} \approx 0.52 \text{ in.}^3$ **19.** no

CUMULATIVE PRACTICE (pp. 780–781) **1.** 30°, 30°, 150°, 150° **3.** Let M be the midpoint of $\overline{TS}$. By the Midpoint Formula, $M = (h, k)$. Then $RM = \sqrt{(h-0)^2 + (k-0)^2} = \sqrt{h^2 + k^2}$. Since $TS = \sqrt{(2h-0)^2 + (0-2k)^2} = 2\sqrt{h^2+k^2}$, $RM = \frac{1}{2}TS$. **5.** right; ∠Z, ∠Y

7. Statements	Reasons
1. *ABDE* and *CDEF* are parallelograms.	1. Given
2. $\overline{AB} \parallel \overline{DE}$ and $\overline{CF} \parallel \overline{DE}$	2. Definition of parallelogram
3. $\overline{AB} \parallel \overline{CF}$	3. Two lines ∥ to the same line are ∥.
4. ∠4 ≅ ∠5	4. Corresponding ⦞ Postulate
5. $m\angle 4 = m\angle 5$	5. Def. of congruent ⦞
6. $\overline{BD} \parallel \overline{AE}$	6. Definition of parallelogram
7. ∠5 and ∠6 are supplements.	7. Consecutive Interior Angles Theorem
8. $m\angle 5 + m\angle 6 = 180°$	8. Def. of supplementary ⦞
9. $m\angle 4 + m\angle 6 = 180°$	9. Substitution prop. of =
10. ∠4 and ∠6 are supplements.	10. Def. of supplementary ⦞

9. never **11.** *Sample answer:* $\overline{BC} \parallel \overline{DE}$, so corresp. angles ∠*ABC* and ∠*D* are ≅, as are corresp. angles ∠*ACB* and ∠*E*. Then, △*ABC* ~ △*ADE* by the AA Similarity Postulate. **13.** 5:8; 25:64 **15.** about 73.7°, about 16.3° **17.** 25° **19.** 90° **21.** 100° **23.** 230° **25.** They are supplementary angles; *ABPC* is a quadrilateral with two right angles, so the sum of the other two angles is 180°. **27.** 12 **29.** 20 **31.** 31.4 **33.** the bisectors of the right ⦞ formed **35.** 1800 tan 67.5° ≈ 4345.58 cm^2 **37.** $\frac{49\pi}{2} \approx 76.97$ ft^3 **39.** $8\pi \approx 25.13$ ft^2 **41.** 7.1 $in.^2$

SKILLS REVIEW HANDBOOK

PROBLEM SOLVING (p. 784) **1.** \$197.46 **3.** 32 kinds **5.** 10 33¢ stamps and 6 20¢ stamps **7.** not enough information (You need to know how much area a can of paint will cover.)

POSITIVE AND NEGATIVE NUMBERS (p. 785) **1.** –3.3 **3.** 2.7 **5.** $-1\frac{1}{12}$ **7.** 0 **9.** –1 **11.** –8 **13.** 9 **15.** 0 **17.** –1 **19.** –0.156 **21.** –3 **23.** –9 **25.** –2.88 **27.** $\frac{1}{30}$

EVALUATING EXPRESSIONS (p. 786) **1.** 100 **3.** –8 **5.** 225 **7.** 47 **9.** 64 **11.** $\frac{1}{8}$ **13.** –48 **15.** $\frac{1}{3}$ **17.** –12 **19.** 25 **21.** 12 **23.** –23

THE DISTRIBUTIVE PROPERTY (p. 787) **1.** $2a + 8$ **3.** $3x - 2$ **5.** $y^2 - 9y$ **7.** $4n - 7$ **9.** $4b^2 + 8b$ **11.** $16x^2 - 72xy$ **13.** $2rs + 2rt$ **15.** $-7x^2 + 21x - 14$ **17.** $6m + 4$ **19.** –1 **21.** $19g^3 + 9g^2$ **23.** $xy + 2x - 3y$ **25.** $3h - 3h^2$ **27.** $3y - 4$ **29.** $4r + 8$ **31.** $3n^2 - 13n + 16$

RECIPROCALS (p. 788) **1.** $\frac{1}{12}$ **3.** 4 **5.** –10 **7.** $\frac{13}{6}$ **9.** 5

RATIOS (p. 788) **1.** $\frac{2}{5}$ **3.** $\frac{9}{5}$ **5.** $\frac{1}{1}$ **7.** $\frac{80}{1}$ **9.** $\frac{13}{15}$ **11.** $\frac{2}{3}$

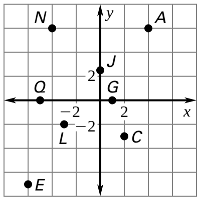
SOLVING LINEAR EQUATIONS (SINGLE-STEP) (p. 789) **1.** 13 **3.** 4 **5.** $-\frac{1}{8}$ **7.** –32 **9.** –8 **11.** –10 **13.** $\frac{21}{2}$ **15.** –80 **17.** 18 **19.** –23 **21.** $\frac{3}{4}$ **23.** –1

SOLVING LINEAR EQUATIONS (MULTI-STEP) (p. 790) **1.** 8 **3.** 8 **5.** –0.6, or $-\frac{3}{5}$ **7.** –15 **9.** 4 **11.** $\frac{7}{8}$ **13.** –18 **15.** 3 **17.** $-\frac{1}{3}$ **19.** 56 **21.** –10 **23.** 25 **25.** $\frac{13}{6}$ **27.** 29 **29.** 76 **31.** 6.6 **33.** $-\frac{25}{6}$ **35.** –11

SOLVING INEQUALITIES (p. 791) **1.** $x < 56$ **3.** $x > 7.3$ **5.** $x < 2$ **7.** $x > 3$ **9.** $x > 4$ **11.** yes **13.** yes **15.** no **17.** yes **19.** *Sample answers:* 4, 4.5, and 10; no; when $x = 3$, $(2x - 3) + (x + 5) = x + 8$.

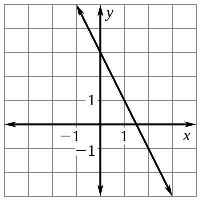
PLOTTING POINTS (p. 792) **1.** (–1, 0) **3.** (2, –2) **5.** (–5, 3) **7.** (5, –2) **9.** (–2, 5) **11.** (1, 1)

13–27 odd:

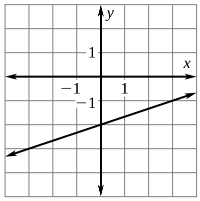


LINEAR EQUATIONS AND THEIR GRAPHS (p. 793)

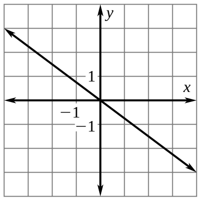
1.



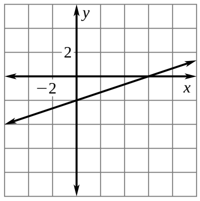
3.



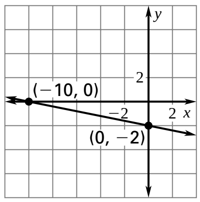
5.



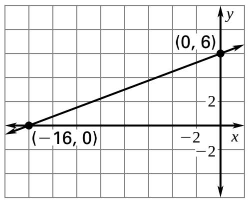
7.



9.



11.



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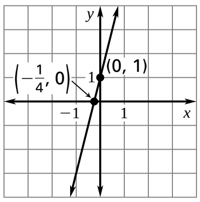
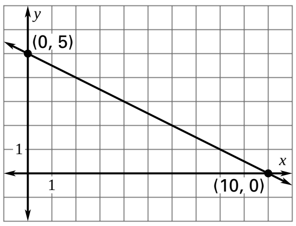
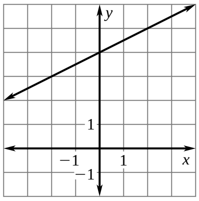
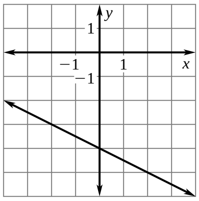


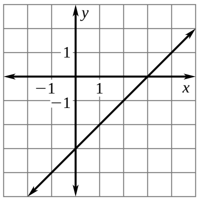
15.

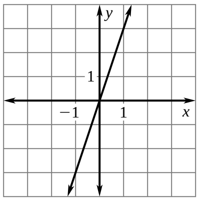


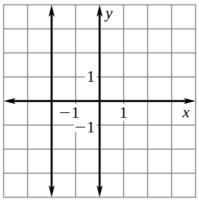
SLOPE–INTERCEPT FORM (p. 794)

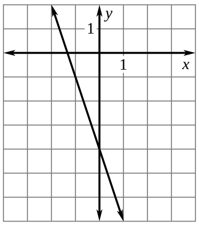
1. 

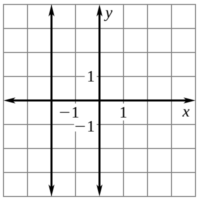
3. 

5. 

7. 

9. 

11. 

13. 

; The graph has no slope because a vertical line has the same x-coordinate for every point on the line. If you try to evaluate the slope using any two points, you get zero in the denominator, and division by zero is undefined. The graph has no y-intercept because it does not intersect the y-axis.

WRITING LINEAR EQUATIONS (p. 795)

1. $y = x - 4$ **3.** $y = \frac{5}{2}x - \frac{3}{4}$ **5.** $y = 0.7x$ **7.** $y = 2x - 7$ **9.** $y = 12x + 66$ **11.** $y = -11$ **13.** $y = \frac{1}{6}x + \frac{17}{6}$ **15.** $y = 8x + 41$ **17.** $y = \frac{5}{8}x - \frac{5}{4}$ **19.** $y = -x - 1$ **21.** $y = -0.64x + 3.596$ **23.** $y = \frac{6}{7}x + \frac{11}{7}$

SOLVING SYSTEMS OF EQUATIONS (p. 796)

1. (1, 6) **3.** (–2, –14) **5.** $\left(0, \frac{3}{4}\right)$ **7.** $\left(\frac{104}{9}, \frac{100}{9}\right)$ **9.** (3, –1.2) **11.** (–15, –19.5) **13.** $\left(\frac{3}{8}, -\frac{7}{8}\right)$ **15.** (2.35, 0.95)

PROPERTIES OF EXPONENTS (p. 797)

1. $-\frac{8}{27}$ **3.** $\frac{1}{32}a^5b^5$ **5.** 1 **7.** $\frac{4}{x^3y^6}$ **9.** 262,144 **11.** $\frac{125}{m^3}$ **13.** $8b^4$ **15.** x^2 **17.** a^4 **19.** $\frac{a^2}{2bc^3}$ **21.** $-175a^2b^8c$ **23.** $32z^4$

MULTIPLYING BINOMIALS (p. 798)

1. $x^2 + 2x + 1$ **3.** $3c^2 - 3$ **5.** $4a^2 + 13a - 35$ **7.** $4f^2 - 16$ **9.** $6h^2 + 9h + 3$

SQUARING BINOMIALS (p. 798)

1. $x^2 + 4x + 4$ **3.** $x^2 + 16x + 64$ **5.** $n^2 - 10n + 25$ **7.** $225 - 30x + x^2$, or $x^2 - 30x + 225$

RADICAL EXPRESSIONS (p. 799)

1. 8 and –8 **3.** $\frac{7}{9}$ and $-\frac{7}{9}$ **5.** 0.3 and –0.3 **7.** $\sqrt{13} \approx 3.61$ **9.** $5\sqrt{2} \approx 7.07$ **11.** –14 **13.** $2\sqrt{15} \approx 7.75$ **15.** $6\sqrt{2} \approx 8.49$ **17.** $30\sqrt{14} \approx 112.25$ **19.** $\frac{1}{5} = 0.2$ **21.** $\frac{1}{4} = 0.25$ **23.** $3\sqrt{2} \approx 4.24$ **25.** $\frac{4\sqrt{3}}{9} \approx 0.77$

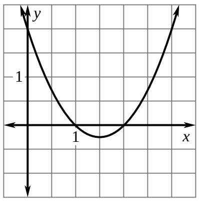
SOLVING $AX^2 + C = 0$ (p. 800)

1. 25, –25 **3.** $\sqrt{5} \approx 2.24$, $-\sqrt{5} \approx -2.24$ **5.** 2, –2 **7.** no solution **9.** 2.4 **11.** 13

SOLVING $AX^2 + BX + C = 0$ (p. 801)

1. –4, –1 **3.** 0, –6 **5.** $\frac{9 + \sqrt{77}}{2} \approx 8.89$, $\frac{9 - \sqrt{77}}{2} \approx 0.11$ **7.** $\frac{-2 + \sqrt{2}}{2} \approx -0.29$, $\frac{-2 - \sqrt{2}}{2} \approx -1.71$ **9.** $\frac{4 + \sqrt{13}}{3} \approx 2.54$, $\frac{4 - \sqrt{13}}{3} \approx 0.13$ **11.** $\frac{5 + 3\sqrt{5}}{10} \approx 1.17$, $\frac{5 - 3\sqrt{5}}{10} \approx -0.17$

13. 1, 2; The solutions of the quadratic equation are the same as the x-intercepts of the graph.



SOLVING FORMULAS (p. 802)

1. $b = \frac{A}{h}$ **3.** $b = P - a - c$ **5.** $a = \frac{P - 2b}{2}$ **7.** $\ell = \frac{S - 2wh}{2w + 2h}$ **9.** $\ell = \frac{S - \pi r^2}{\pi r}$ **11.** $y = 9 - 3x$ **13.** $y = -\frac{1}{2}x - \frac{3}{2}$ **15.** $y = \frac{6}{7}x - 6$ **17.** $y = \frac{c - ax}{b}$

EXTRA PRACTICE

CHAPTER 1 (pp. 803–804)

1. Multiply by $\frac{1}{2}$; $\frac{1}{2}$. **3.** powers of 5; 625 **5.** Multiply by 1.5; 162. **7.** negative **15.** 19 **17.** 12 **19.** 16 **21.** yes **23.** Q; $\overrightarrow{QP}$, $\overrightarrow{QR}$; $\angle PQR$, $\angle RQP$ **25.** B; $\overrightarrow{BA}$, $\overrightarrow{BC}$; $\angle ABC$, $\angle CBA$ **27.** 65° **29.** obtuse; ≈ 150° **31.** acute; ≈ 25° **33.** (3, –1) **35.** 42° **37.** 74° **39.** 45°, 135° **41.** 28; 49 **43.** 36; 60 **45.** 31.4; 78.5 **47.** 33; 67.0625

CHAPTER 2 (pp. 805–806)

1. If you read it in a newspaper, then it must be true. **3.** If a number is odd, then its square is odd. **5.** If you are not indoors, then you are caught in a rainstorm; If you are not caught in a rainstorm, then you are indoors; If you are caught in a rainstorm, then you are not indoors. **7.** If two angles are not vertical angles, then they are not congruent; If two angles are congruent, then they are vertical angles; If two angles are not congruent, then they are not vertical angles. **9.** If $x = 6$, then $2x - 5 = 7$; true. **11.** If two angles are right angles, then they are supplementary; If two angles are supplementary, then they are right angles. **13.** yes **15.** no **17.** If we don't stop at the bank, then we won't see our friends. **19.** We go shopping if and only if we need a shopping list. **21.** We go shopping if and only if we stop at the bank.

SELECTED ANSWERS

23. *p*: The hockey teams wins the game tonight. *q*: They will play in the championship. $\sim p \to \sim q$; If the hockey team doesn't win the game tonight, they won't play in the championship. $\sim q \to \sim p$; If the hockey team doesn't play in the championship, then they didn't win the game tonight. **25.** *AB* **27.** $AB = DF$ **29.** $6 - 4$ (or 2) **31.** $\angle 6$ **33.** $\angle 3 \cong \angle 5$ by the Congruent Complements Theorem. **35.** $b = 8$; $c = 27$

37.

Statements	Reasons
1. $\angle 1 \cong \angle 3$	1. Vertical angles are ≅.
2. $\angle 4 \cong \angle 2$	2. Vertical angles are ≅.
3. $\angle 1$ and $\angle 4$ are complementary.	3. Given
4. $m\angle 1 + m\angle 4 = 90°$	4. Definition of complementary
5. $m\angle 1 = m\angle 3$	5. Definition of congruence
6. $m\angle 4 = m\angle 2$	6. Definition of congruence
7. $m\angle 3 + m\angle 2 = 90°$	7. Substitution property of equality
8. $\angle 3$ and $\angle 2$ are complementary.	8. Definition of complementary

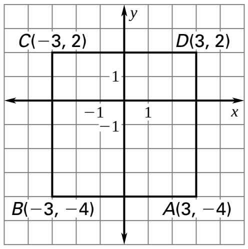
CHAPTER 3 (pp. 807–808) **1.** parallel **3.** skew **5.** *Sample answers:* $\overleftrightarrow{AB}$, $\overleftrightarrow{BC}$, $\overleftrightarrow{GE}$, $\overleftrightarrow{HG}$ **7.** *Sample answers: HAD, ADF, DFH, FHA* **9.** alternate interior **11.** consecutive interior

13.

Statements	Reasons
2. $\angle ABC$ is a right angle.	1. Given
7. $m\angle ABD$	3. Def. of a right ∠
	4. Given
	5. Def. of ∠ bisector
	6. If 2 sides of 2 adj. acute ∠s are ⊥, then the ∠s are complementary.
	8. Distributive prop.
	9. Division prop. of equality

15. $x = 30$; $y = 150$ **17.** $x = 125$; $y = 125$ **19.** $x = 118$; $y = 118$ **21.** $\overleftrightarrow{CG} \parallel \overleftrightarrow{DE}$ **23.** Corresponding angles are congruent. **25.** Alternate interior angles are congruent. **27.** $\overleftrightarrow{AB}$: 0; $\overleftrightarrow{CD}$: $-\frac{1}{3}$; $\overleftrightarrow{EF}$: $-\frac{11}{14}$; none **29.** $y = 6x + 19$ **31.** $x = -9$ **33.** yes **35.** $y = \frac{1}{2}x - 3$ **37.** $y = -2x - 11$

CHAPTER 4 (pp. 809–810) **1.** 20, 60, 100; obtuse **3.** 40, 90, 50; right **5.** 90°, 45°, 45° **7.** $ABGH \cong BEFG \cong CDEB$; $AEFH \cong CGFD$ **9.** $\angle A, \angle F$; $\angle B, \angle E$; $\angle C, \angle D$; $\overline{AB}, \overline{FE}$; $\overline{BC}, \overline{ED}$; $\overline{AC}, \overline{FD}$ **11.** 13 **13.** SSS **15.** SAS **17.** yes; AAS **19.** no **21.** ASA; corresp. parts of ≅ △s are ≅. **23.** SSS; corresponding parts of ≅ △s are ≅. **25.** Paragraph proof: Given that $\triangle CBD \cong \triangle BAF$, $\overline{BC} \cong \overline{AB}$ by corresp. parts of ≅ △s are ≅. **27.** $x = 60$; $y = 60$ **29.** $x = 45$; $y = 45$ **31.** *Sample answer:*



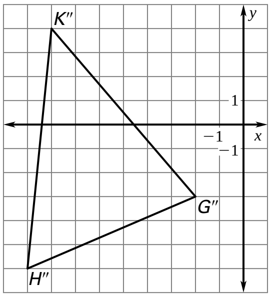
33. 100 **35.** $7\sqrt{2}$

CHAPTER 5 (pp. 811–812) **1.** 12 **3.** *E* is on $\overrightarrow{DB}$. **5.** *K* is on $\overrightarrow{EH}$. **7.** 9 **9.** 10 **11.** 8 **15.** The orthocenter should be at the vertex of the right angle of the triangle. **17.** $\overline{AC}$ **19.** 5 **21.** 9 **23.** $\overline{BC}, \overline{AC}$ **25.** $\overline{GJ}, \overline{GH}$ **27.** $\angle Q, \angle P$ **29.** $<$ **31.** $=$ **33.** $=$ **35.** $=$ **37.** $<$

CHAPTER 6 (pp. 813–814) **1.** no **3.** yes; hexagon; convex **5.** no **7.** 25 **9.** 13 **11.** $\angle VYX$; If a quadrilateral is a parallelogram, then its opposite angles are congruent. **13.** $\overline{TX}$; If a quadrilateral is a parallelogram, then its diagonals bisect each other. **15.** $\overline{VY}$; If a quadrilateral is a parallelogram, then its opposite sides are parallel. **17.** $\overline{VX}$ and $\overline{YW}$; If a quadrilateral is a parallelogram, then its diagonals bisect each other. **19.** Yes; opposite angles are congruent. **21.** *Sample answer:* The slope of $\overline{AD}$ = slope of $\overline{BC} = -\frac{3}{5}$ and the slope of $\overline{AB}$ = slope of $\overline{DC} = -\frac{7}{2}$. If opposite sides of a quadrilateral are parallel, then it is a parallelogram. **23.** *Sample answer:* The slope of $\overline{RS}$ = slope of $\overline{UT} = -\frac{1}{11}$. Since $RS = UT = \sqrt{122}$, $\overline{RS} \cong \overline{UT}$ by definition of congruence. If one pair of opposite sides of a quadrilateral are congruent and parallel, then the quadrilateral is a parallelogram. **25.** parallelogram, rhombus, rectangle, square **27.** rectangle, square **29.** rhombus, square **31.** rhombus **33.** square **35.** $m\angle A = 70°$; $m\angle B = 110°$; $m\angle D = 70°$ **37.** $m\angle G = 115°$; $m\angle E = 115°$ **39.** 23 **41.** $AB = 25$, $BC = 25$, $AD = 39$, $CD = 39$ **43.** $KM = 8\sqrt{10}$, $KP = 8\sqrt{10}$, $MN = 10$, $NP = 10$ **45.** rectangle or parallelogram **47.** 160 **49.** 55

CHAPTER 7 (pp. 815–816) **1.** Z **3.** *Sample answers:* $\overline{QR} \cong \overline{ZY}$; $\overline{RP} \cong \overline{YX}$; $\overline{PQ} \cong \overline{XZ}$ **5.** $(-7, 3)$ **7.** translation; slide 8 units to the right; $E(3, 1)$, $F(3, 3)$, $G(6, 3)$, $H(6, 1)$ **9.** $\triangle GHJ$ **11.** $\triangle FED$ **13.** $\triangle GFE$ **15.** $\triangle NPM$ **17.** $(2, 4)$ **19.** $(1, -12)$ **21.** $(7, 0)$ **23.** $H'(2, 0)$, $E'(5, -2)$, $F'(5, -5)$, $G'(2, -7)$ **25.** $J'(4, -4)$, $K'(1, -2)$, $M'(4, 0)$, $N'(7, -2)$ **27.** *a*, *b* **29.** $\langle -3, 5 \rangle$ **31.** $\langle -7, 7 \rangle$ **33.** $(-5, -1)$

35.



37. TR

CHAPTER 8 (pp. 817–818) **1.** $\frac{2}{1}$ **3.** $\frac{5}{8}$ **5.** 60°, 80°, 100°, 120° **7.** 7 **9.** 3 **11.** 1 **13.** $\frac{10}{y}$ **15.** $\frac{x}{y}$ **17.** 6 **19.** 5 **21.** 32 **23.** 6.25 **25.** 3 : 2 **27.** $u = 9$, $y = 4$, $z = 10$ **29.** yes; $\triangle ABC \sim \triangle DEF$ **31.** no **33.** (0, 12.5) **35.** (0, –12) **37.** no **39.** yes; $\triangle ACE \sim \triangle BCD$; 12 **41.** yes; $\triangle EFG \sim \triangle HJK$; 8 **43.** yes; $\frac{4}{8} = \frac{1}{2}$ **45.** 20 **47.** $A'(10, 0)$, $B'(25, 15)$, $C'(20, 25)$, $D'(5, 15)$ **49.** $A'(1, -1)$, $B'(1.5, 1)$, $C'(0.5, 2)$, $D'(-2, -1)$

CHAPTER 9 (pp. 819–820) **1.** $\triangle ABC \sim \triangle ACD \sim \triangle CBD$; AC **3.** $\triangle JLK \sim \triangle JKM \sim \triangle KLM$; JL **5.** 10 **7.** $\sqrt{61}$; no **9.** 50; yes **11.** 13 **13.** 175 **15.** 28 **17.** about 91.2 cm^2 **19.** yes **21.** yes **23.** yes; right **25.** yes; obtuse **27.** yes; obtuse **29.** $x = 16$; $y = 8\sqrt{3}$ **31.** $\sin S = 0.8615$, $\cos S = 0.5077$, $\tan S = 1.6970$; $\sin T = 0.5077$, $\cos T = 0.8615$, $\tan T = 0.5893$ **33.** $\sin X = 0.7241$, $\cos X = 0.6897$, $\tan X = 1.05$; $\sin Z = 0.6897$, $\cos Z = 0.7241$, $\tan Z = 0.9524$ **35.** $x = 8.8$; $y = 3.7$ **37.** $AC = 9$, $m\angle A = 53.1°$, $m\angle B = 36.9°$ **39.** $MP = 171$, $m\angle N = 50.7°$, $m\angle M = 39.3°$ **41.** $\langle 4, 11 \rangle$; 11.7 **43.** $\langle -4, 7 \rangle$ **45.** $\langle 3, 3 \rangle$

CHAPTER 10 (pp. 821–822) **1.** D **3.** G **5.** H **7.** A **9.** internal **11.** internal **13.** D; 2 **15.** $y = 3$, $x = 5$, $y = -1$ **17.** 55° **19.** 35° **21.** 145° **23.** 270° **25.** 70 **27.** 240 **29.** 80 **31.** 70 **33.** 4 **35.** 10 **37.** 4 **39.** (12, –3); 7 **41.** (–3.8, 4.9); 0.9 **43.** $(x - 5)^2 + (y - 8)^2 = 36$ **45.** $(x - 2)^2 + (y - 2)^2 = 4$ **47.** $x = 4$ **49.** $y = -2$, $y = 6$

CHAPTER 11 (pp. 823–824) **1.** 6120° **3.** 10,440° **5.** 140 **7.** 120 **9.** 15° **11.** 10° **13.** 20 **15.** 4 **17.** 20° **9.** 4° **21.** 16.97; 18 **23.** 48.50; 169.74 **25.** 25.98; 32.48 **27.** 3 : 1; 9 : 1 **29.** 125 square inches **31.** about 9.07 **33.** about 147 **35.** about 11.78 **37.** about 95.49 **39.** about 452.39 **41.** about 41.89 **43.** about 19.63 **45.** about 67% **47.** about 83% **49.** about 68%

CHAPTER 12 (pp. 825–826) **1.** polyhedron; not regular; convex **3.** polyhedron; regular; convex **5.** $F = 7$, $V = 7$, $E = 12$; $7 + 7 = 12 + 2$ **7.** square **9.** 220 cm^2 **11.** 120 $in.^2$ **13.** 339.29 cm^2 **15.** 85 $in.^2$ **17.** 282.74 cm^2 **19.** about 1060.29 ft^3 **21.** about 2001.19 $in.^3$ **23.** about 247.59 ft^3 **25.** 701.48 cm^3 **27.** about 513.13 $in.^3$ **29.** about 871.27 ft^3 **31.** 2123.72 m^2; 9202.77 m^3 **33.** 216 m^2; 216 m^3 **35.** 196π cm^2; $457\frac{1}{3}\pi$ cm^3

SELECTED ANSWERS