Answers

Chapter 1

1.1 Extra Practice

1. $\overleftrightarrow{DC}$, line m

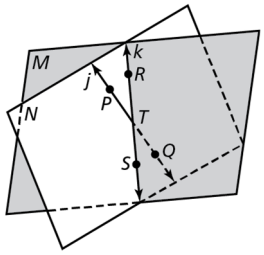
2. *Sample answer:* plane ABE

3. A, C, B; *Sample answer:* E

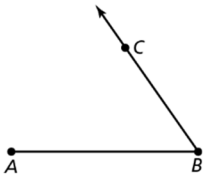
4. D **5.** $\overline{QP}$ **6.** $\overrightarrow{RT}$

7. $\overrightarrow{TP}$, $\overrightarrow{TS}$, $\overrightarrow{TR}$, $\overrightarrow{TQ}$; $\overrightarrow{TP}$ and $\overrightarrow{TQ}$ are opposite rays, $\overrightarrow{TR}$ and $\overrightarrow{TS}$ are opposite rays.

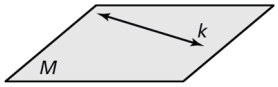
8. *Sample answer:*



9. *Sample answer:*



10. *Sample answer:*



1.1 Review & Refresh

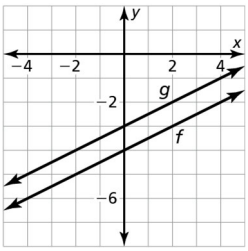
1. Lines a and c are parallel; They have the same slope.

2. $x = 11$

3. $|4t - 600| = 40$; $t = 140$ and $t = 160$

4. 9

5.



The graph of g is a horizontal translation 2 units left of the graph of f.

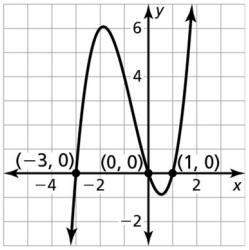
6. *Sample answer:* $\overleftrightarrow{AB}$, $\overleftrightarrow{GH}$

7. *Sample answer:* A, B, C

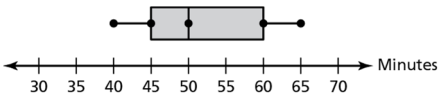
8. *Sample answer:* plane AGD, plane BHF

9. *Sample answer:* $\overline{DE}$, $\overline{BC}$

10.



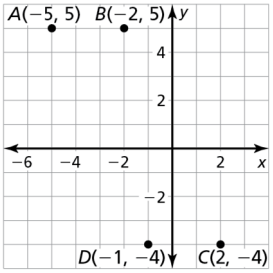
11.



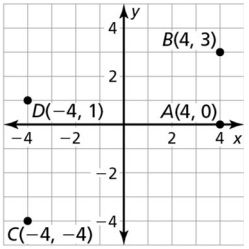
1.2 Extra Practice

1. 12.7 cm

2. yes

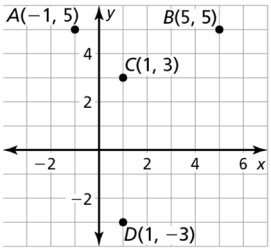


3. no



Answers

4. yes



5. 23 **6.** 12

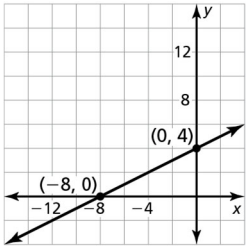
7. 75 **8.** 3.5 km

1.2 Review & Refresh

1. $y = 5$ **2.** $x = -4$

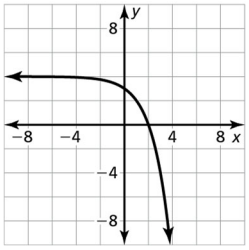
3. $-8 < x \leq -2$

4.



5. not a function; The input 5 is paired with two outputs, 6 and 8. The input 6 is paired with two outputs, 8 and 10.

6.



The asymptote is $y = 4$. The domain is all real numbers. The range is $y < 4$.

7. 7

8. 3 senior portraits, 5 young professional portraits

9. $y = -2x + 7$

1.3 Extra Practice

1. point M; 26 **2.** $\overrightarrow{MC}$; 16

3. line ℓ; 52 **4.** $\overrightarrow{MT}$; 12

5. line m; 36 **6.** point M; 16

7. $M(-2, 4)$ **8.** $M(4, 2)$

9. $M(6, -9)$ **10.** $K(-5, -6)$

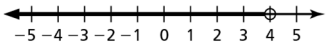
11. $J(5, -2)$ **12.** $K(-11, -2)$

13. about 4.5 mi

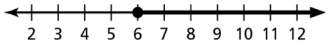
1.3 Review & Refresh

1. 12 in., 9 in.^{2} **2.** 24 cm, 24 cm^2

3. $a < 4$



4. $z \geq 6$



5. $(1, 0); 10$ **6.** $y = -6x + 2$

7. $7z(z - 3)$ **8.** $(9x + 5)(9x - 5)$

9. $\overrightarrow{TP}$ and $\overrightarrow{TQ}$, $\overrightarrow{TR}$ and $\overrightarrow{TS}$

10. d **11.** 40 favors **12.** 3800 m

1.4 Extra Practice

1. pentagon; concave **2.** octagon; convex

3. octagon; concave **4.** dodecagon; convex

5. about 14.3 units, 6 square units

6. about 12.2 units, 5 square units

7. 30 square units **8.** $a = 9$

1.4 Review & Refresh

1. linear; As x increases by 1, y increases by 3.

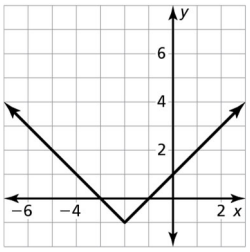
2. $x = 10$ **3.** $x = -7$ **4.** $\overline{DC}$

5. $(-3, 1)$, $2\sqrt{5}$, or about 4.5

6. $y = 100(1.0025)^{12t}$

Answers

7.



The graph of g is a translation 2 units left and 1 unit down of the graph of f.

8. 14 units, 10 square units

1.5 Extra Practice

1. $\angle EFG$, $\angle GFH$, $\angle EFH$

2. a. 115°; obtuse

b. 50°; acute

3. 116°

4. 22°

5. 100°, 80°

6. 18°, 72°

7. 46°, 46°

8. 70°, 140°

1.5 Review & Refresh

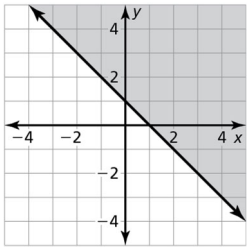
1. $12 + \sqrt{74}$, or about 20.6 units; 17.5 square units

2. $x = 5$

3. $3\sqrt{2}$

4. cord connecting Pillar B to Pillar C; about 23.8 ft

5.



6. 150°

7. $(-3, -5)$; Explanations will vary.

8. 32

1.6 Extra Practice

1. $\angle TOS$ and $\angle TOP$

2. $\angle LJM$ and $\angle TOP$, $\angle LJM$ and $\angle QOR$

3. 54°

4. 63°

5. $m\angle BAC = 42°$, $m\angle CAD = 48°$

6. $m\angle EFH = 55°$, $\angle HFG = 125°$

7. $\angle 1$ and $\angle 2$, $\angle 1$ and $\angle 4$

8. $\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$, $\angle 5$ and $\angle 8$, $\angle 6$ and $\angle 9$, $\angle 7$ and $\angle 10$

9. no; The noncommon sides of $\angle 6$ and $\angle 7$ are not opposite rays.

10. 45°, 135°

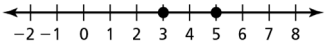
1.6 Review & Refresh

1. 16 square units

2. $(-3, 2)$

3. point E; 22

4. $z = 3$ and $z = 5$



5. $3x^2 + 5x - 2$

6. The graph of g is a horizontal shrink by a factor of $\frac{2}{3}$ of the graph of f.

7. $-3; -2$

8. 31°, 31°

9. 48°

Chapter 1 Test Prep

1. B, E

2. B

3. D

4. 12.9

5. 5 units

6. B

7. C

8. A

9. B

10. C

11. $f(x) = -\frac{2}{9}(x - 25)^2 + 200$

12. A

13. C

14. B, C

15. A

16. A

17. 65°; acute

18. 69.8 degrees

19. 100 watts

20. C

21. D

Chapter 2

2.1 Extra Practice

1. If $x = -1$, then $13x - 5 = -18$.

2. If a polygon is a triangle, then the sum of the measures of its interior angles is 180°.

Answers

3. conditional: If quadrilateral $ABCD$ is a rectangle, then the sum of its angle measures is $360°$; true converse: If the sum of the angle measures is $360°$, then quadrilateral $ABCD$ is a rectangle; false inverse: If quadrilateral $ABCD$ is not a rectangle, then the sum of its angle measures is not $360°$; false contrapositive: If the sum of the angle measures is not $360°$, then quadrilateral $ABCD$ is not a rectangle; true

4. true; The bisector symbol in the diagram indicates that $\overline{JR} \cong \overline{RK}$.

5. false; There is no right angle symbol in the diagram to indicate that $\angle JRL$ is a right angle.

6. true; $\overrightarrow{RM}$ and $\overrightarrow{RL}$ are opposite rays, and $\overrightarrow{RQ}$ and $\overrightarrow{RP}$ are opposite rays. So, $\angle MRQ$ and $\angle PRL$ are vertical angles. $\angle MRQ$ and $\angle PRL$ are congruent by the Vertical Angles Congruence Theorem.

7. An angle is acute if and only if it measures greater than $0°$ and less than $90°$.

2.1 Review & Refresh

1. 14, 17, 20

2. yes; Every input has exactly one output.

3. The graph of g is a vertical stretch by a factor of 2 of the graph of f.

4. $9°$, $171°$

5. $4 + 4\sqrt{2}$, or about 9.66 units; 4 square units

6. 1,876,000

7. $56°$, $112°$

8. $m^2 - 5m - 8$

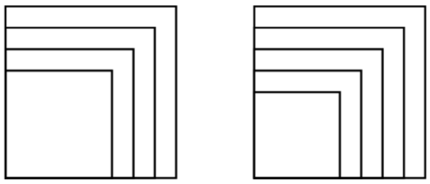
9. $x \geq 4$

10. If you post a video, then your video goes viral.

2.2 Extra Practice

1. The difference between two numbers is one more than the difference between the previous two numbers; $5, -1$

2. This is a sequence of squares, each square having one more smaller square than the previous one.

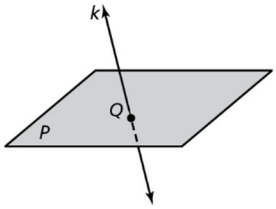


3. The sum of any two negative integers is a negative integer. *Sample answer:* $-3 + (-3) = -6$, $-41 + (-50) = -91$, $-100 + (-900) = -1000$

4. The product of three consecutive nonzero integers is an even number.
Sample answer: $2 \bullet 3 \bullet 4 = 24$, $-27 \bullet (-26) \bullet (-25) = -17{,}550$, $99 \bullet 100 \bullet 101 = 999{,}900$

5. *Sample answer:* $\left(\frac{3}{2}\right)^2 = \frac{3}{2} \bullet \frac{3}{2} = \frac{9}{4} > \frac{3}{2}$

6. Line k and plane P can intersect at point Q at any angle.



7. Each angle measure of $\triangle ABC$ is $60°$.

8. not possible

9. If it does not rain, then I will wear my sneakers.

10. If $x > 1$, then $(3x)^2 > 9$.

2.2 Review & Refresh

1. hypothesis: there is fracking; conclusion: microearthquakes occur; If there is fracking, then microearthquakes will occur.

2. quadrilateral; concave

3. $a_1 = 25, a_n = a_{n-1} - 4$

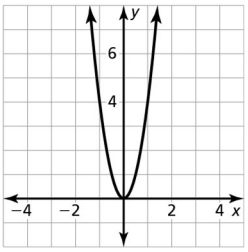
4. $y = -x + 4$

5. nonlinear

6. $x = 2$

Answers

7.



The graph of g is a vertical stretch by a factor of 4 of the graph of f.

8. a. 5 **b.** 4.6

9. $5p^2 - 4$

10. $x = 5$

2.3 Extra Practice

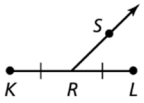
1. Two Point Postulate

2. Plane-Line Postulate

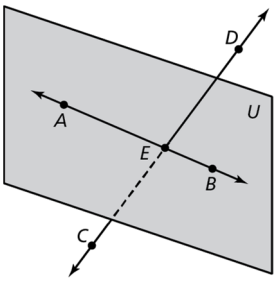
3. *Sample answer:* Plane P contains at least three noncollinear points.

4. *Sample answer:* The intersection of plane P and plane Q is line k.

5. *Sample answer:*



6. *Sample answer:*



7. yes **8.** yes

9. yes **10.** no

2.3 Review & Refresh

1. *Sample answer:* rectangle

2. $z = 1$; Subtraction Property of Equality, Simplify.

3. $y = -6$; Multiplication Property of Equality, Simplify

4. 93° **5.** 4 in., 2 in.

6. $-27, -81, -243$

7. Your phone vibrates if and only if you have an unread notification.

8. yes **9.** yes **10.** no

2.4 Extra Practice

1.

Equation	Explanation and Reason
$3x - 7 = 5x - 19$	Write the equation. Given
$3x - 7 - 5x = 5x - 19 - 5x$	Subtract $5x$ from each side. Subtraction Property of Equality
$-2x - 7 = -19$	Combine like terms. Simplify.
$-2x - 7 + 7 = -19 + 7$	Add 7 to each side. Addition Property of Equality
$-2x = -12$	Combine constant terms. Simplify.
$x = 6$	Divide each side by -2. Division Property of Equality

2.

Equation	Explanation and Reason
$20 - 2(3x - 1) = x - 6$	Write the equation. Given
$20 - 6x + 2 = x - 6$	Multiply. Distributive Property
$20 - 6x + 2 - x = x - 6 - x$	Subtract x from each side. Subtraction Property of Equality
$-7x + 22 = -6$	Combine like terms. Simplify.
$-7x + 22 - 22 = -6 - 22$	Subtract 22 from each side. Subtraction Property of Equality
$-7x = -28$	Combine constant terms. Simplify.
$x = 4$	Divide each side by -7. Division Property of Equality

Answers

3.

Equation	Explanation and Reason
$-5(2u+10) = 2(u-7)$	Write the equation. Given
$-10u - 50 = 2u - 14$	Multiply. Distributive Property
$-10u - 50 - 2u = 2u - 14 - 2u$	Subtract $2u$ from each side. Subtraction Property of Equality
$-12u - 50 = -14$	Combine like terms. Simplify.
$-12u - 50 + 50 = -14 + 50$	Add 50 to each side. Addition Property of Equality
$-12u = 36$	Combine constant terms. Simplify.
$u = -3$	Divide each side by -12. Division Property of Equality

4.

Equation	Explanation and Reason
$9x + 2y = 5$	Write the equation. Given
$9x + 2y - 9x = 5 - 9x$	Subtract $9x$ from each side. Subtraction Property of Equality
$2y = 5 - 9x$	Combine like terms. Simplify.
$y = \frac{5}{2} - \frac{9}{2}x$	Divide each side by 2. Division Property of Equality

5.

Equation	Explanation and Reason
$\frac{1}{15}s - \frac{2}{3}t = -2$	Write the equation. Given
$\frac{1}{15}s - \frac{2}{3}t + \frac{2}{3}t = -2 + \frac{2}{3}t$	Add $\frac{2}{3}t$ to each side. Addition Property of Equality
$\frac{1}{15}s = -2 + \frac{2}{3}t$	Combine like terms. Simplify.
$s = 15\left(-2 + \frac{2}{3}t\right)$	Multiply each side by 15. Multiplication Property of Equality
$s = -30 + 10t$	Multiply. Distributive Property

6.

Equation	Explanation and Reason
$S = \pi r^2 + \pi rs$	Write the equation. Given
$S - \pi r^2 = \pi r^2 + \pi rs - \pi r^2$	Subtract πr^2 from each side. Subtraction Property of Equality
$S - \pi r^2 = \pi rs$	Combine like terms. Simplify.
$\frac{S - \pi r^2}{\pi r} = s$	Divide each side by πr. Division Property of Equality
$s = \frac{S - \pi r^2}{\pi r}$	Rewrite the expression. Symmetric Property of Equality
$s \approx 5.0$ ft	

7.

Equation	Explanation and Reason
$m\angle AFD = m\angle EFB$	Given
$m\angle AFD = m\angle AFB + m\angle BFD$	Add measures of adjacent angles. Angle Addition Postulate
$m\angle EFB = m\angle EFD + m\angle BFD$	Add measures of adjacent angles. Angle Addition Postulate
$m\angle AFB + m\angle BFD = m\angle EFD + m\angle BFD$	Substitution Property of Equality
$m\angle AFB + m\angle BFD - m\angle BFD = m\angle EFD + m\angle BFD - m\angle BFD$	Subtraction Property of Equality
$m\angle AFB = m\angle EFD$	Simplify.

Because $\angle AFB$ and $\angle EFD$ represent the left and right work regions, the regions are equal.

2.4 Review & Refresh

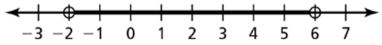
1. Segment Addition Postulate

2.

Equation	Explanation and Reason
$8x + 4y = 4$	Write the equation. Given
$2x + y = 1$	Divide each side by 4. Division Property of Equality
$2x + y - 2x = 1 - 2x$	Subtract $2x$ from each side. Subtraction Property of Equality
$y = 1 - 2x$	Combine like terms. Simplify.

Answers

3. $-2 < x < 6$



4. If the battery drops below 10%, then the smartphone displays a warning.

5. $x \geq 10$

$x \leq 15$

$y \geq 10x$

6. The square of an even integer is an even integer; Let n be an integer. Then $2n$ is an even integer because it is the product of 2 and an integer. $(2n)^2$ represents the square of an even integer. $2n \bullet 2n = 4n^2$, which is an even integer because it is the product of 2 and an integer $2n^2$.

7. The function is positive when $x < -2$ and $0 < x < 1$ and is negative when $-2 < x < 0$ and $x > 1$. The function is increasing when $-1.22 < x < 0.5$ and decreasing when $x < -1.22$ and $x > 0.5$. $y \to +\infty$ as $x \to -\infty$ and $y \to -\infty$ as $x \to +\infty$.

2.5 Extra Practice

1. Definition of segment bisector; Transitive Property of Equality; Definition of congruent segments; $AB = AM + BM$; Substitution Property of Equality

2. $m\angle AEB + m\angle BEC = 90°$; Angle Addition Postulate; Transitive Property of Equality; $m\angle AED + 90° = 180°$; Subtraction Property of Equality

2.5 Review & Refresh

1. $x = \pm 4$; Explanations will vary.

2. nonlinear **3.** 83°

4. The sum of an integer and its square is even; Let $2m + 1$ represent an odd integer. Then $(2n + 1) + (2m + 1)^2 = 2m + 1 + 4m^2 + 4m + 1$ $= 2(2m^2 + 3m + 1)$, which is even. Let $2n$ represent an even integer. Then $2n + 4n^2 = 2(n + 2n^2)$, which is even.

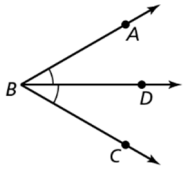
5.

Equation	Explanation and Reason
$-2(3x + 5) = 3x + 17$	Write the equation. Given
$-6x - 10 = 3x + 17$	Multiply. Distributive Property
$-6x - 10 + 10 = 3x + 17 + 10$	Add 10 to each side. Addition Property of Equality
$-6x = 3x + 27$	Combine constant terms. Simplify.
$-6x - 3x = 3x + 27 - 3x$	Subtract $3x$ from each side. Subtraction Property of Equality
$-9x = 27$	Combine like terms. Simplify.
$x = -3$	Divide each side by -9. Division Property of Equality.

6. Reflexive Property of Equality

7. \$60

8. *Sample answer:*



Answers

2.6 Extra Practice

1. Definition of supplementary angles; $m\angle ACB + m\angle ACD = m\angle EGF + m\angle ACD$; $\angle EGF$ and $\angle ACD$ are supplementary; Definition of supplementary angles; Definition of congruent angles.

STATEMENTS	REASONS
1. $\angle ACB$ and $\angle ACD$ are supplementary. $\angle EGF$ and $\angle ACD$ are supplementary.	**1.** Given
2. $m\angle ACB + m\angle ACD = 180°$ $m\angle EGF + m\angle ACD = 180°$	**2.** Definition of supplementary angles
3. $m\angle ACB + m\angle ACD =$ $m\angle EGF + m\angle ACD$	**3.** Transitive Property of Equality
4. $m\angle ACB = m\angle EGF$	**4.** Subtraction Property of Equality
5. $\angle ACB \cong \angle EGF$	**5.** Definition of congruent angles

2. $x = 7$

2.6 Review & Refresh

1. *Sample answer:* B, C, and D

2. *Sample answer:* Because F, G, and H are noncollinear, there is exactly one plane through points F, G, and H.

3. a. $a = \dfrac{v_f - v_i}{t}$

b. 1.25 meters per second squared

4. $x^2 - 12x + 36 = (x - 6)^2$

5.

STATEMENTS	REASONS
1. $\angle ABD$ is a straight angle. $\angle CBE$ is a straight angle.	**1.** Given
2. $\angle ABC$ and $\angle CBD$ are supplementary.	**2.** Definition of supplementary angles
3. $\angle DBE$ and $\angle CBD$ are supplementary.	**3.** Definition of supplementary angles
4. $\angle ABC \cong \angle DBE$	**4.** Congruent Supplements Theorem

Chapter 2 Test Prep

1. obtuse **2.** D **3.** D

4. 99 **5.** 11.5° **6.** C

7. D **8.** C, E

9. Addition Property of Equality

10. B **11.** D **12.** A

13. B, D, E **14.** A **15.** B

16. C **17.** A **18.** 34 seconds

Chapter 3

3.1 Extra Practice

1. $\overleftrightarrow{BC}$ **2.** $\overleftrightarrow{BG}$

3. $\overleftrightarrow{AB}$ **4.** plane ABC

5. $\overleftrightarrow{WX}$ and $\overleftrightarrow{YZ}$, $\overleftrightarrow{QR}$ and $\overleftrightarrow{UV}$

6. $\overleftrightarrow{ST}$ and $\overleftrightarrow{UV}$

7. no; They are intersecting lines.

8. yes; $\overleftrightarrow{ST}$ is marked as perpendicular to $\overleftrightarrow{NV}$.

9. $\angle 1$ and $\angle 5$; $\angle 1$ and $\angle 9$; $\angle 2$ and $\angle 6$; $\angle 2$ and $\angle 10$; $\angle 3$ and $\angle 7$; $\angle 3$ and $\angle 11$; $\angle 4$ and $\angle 8$; $\angle 4$ and $\angle 12$; $\angle 5$ and $\angle 10$; $\angle 6$ and $\angle 12$; $\angle 7$ and $\angle 9$; $\angle 8$ and $\angle 11$

10. $\angle 2$ and $\angle 7$; $\angle 3$ and $\angle 10$; $\angle 4$ and $\angle 5$; $\angle 4$ and $\angle 9$; $\angle 7$ and $\angle 12$; $\angle 8$ and $\angle 10$

Answers

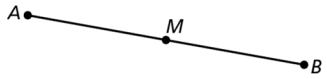
11. $\angle 1$ and $\angle 8$; $\angle 1$ and $\angle 12$; $\angle 2$ and $\angle 11$; $\angle 3$ and $\angle 6$; $\angle 5$ and $\angle 11$; $\angle 6$ and $\angle 9$

12. $\angle 2$ and $\angle 5$; $\angle 3$ and $\angle 9$; $\angle 4$ and $\angle 7$; $\angle 4$ and $\angle 10$; $\angle 7$ and $\angle 10$; $\angle 8$ and $\angle 12$

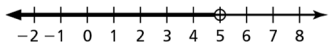
13. 2 pairs; 6 pairs; $(n^2 - n)$ pairs

3.1 Review & Refresh

1.



2. $x < 5$



3. Symmetric Property of Angle Congruence

4. alternate interior angles

5. $(-8, -1)$

6. $\overline{WX} \cong \overline{QR}$

7.

STATEMENTS	REASONS
1. M is the midpoint of $\overline{AB}$. $\overline{CM} \cong \overline{MB}$	**1.** Given
2. $\overline{AM} \cong \overline{MB}$	**2.** Definition of midpoint
3. $\overline{MB} \cong \overline{CM}$	**3.** Symmetric Property of Segment Congruence
4. $\overline{AM} \cong \overline{CM}$	**4.** Transitive Property of Segment Congruence

8. $y = -3x + 10$

9. -3

10. 923.6 cubic meters

3.2 Extra Practice

1. *Sample answer*: $m\angle 1 = 110°$ by Alternate Interior Angles Theorem; $m\angle 2 = 110°$ by Corresponding Angles Theorem

2. *Sample answer*: $m\angle 1 = 63°$ by Corresponding Angles Theorem; $m\angle 2 = 117°$ by Consecutive Interior Angles Theorem

3. *Sample answer*: $m\angle 1 = 95°$ by Vertical Angles Congruence Theorem; $m\angle 2 = 95°$ by Corresponding Angles Theorem

4. *Sample answer*: $m\angle 1 = 101°$ by Vertical Angles Congruence Theorem; $m\angle 2 = 101°$ by Corresponding Angles Theorem

5. 98; $(x + 12)° = 110°$

$x = 98$

6. 15; $m\angle 2 + 153° = 180°$

$(2x - 3)° + 153° = 180°$

$2x + 150 = 180$

$2x = 30$

$x = 15$

7.

STATEMENTS	REASONS
1. $\angle 1 \cong \angle 2$	**1.** Given
2. $\angle 1 \cong \angle 3$	**2.** Vertical Angles Congruence Theorem
3. $\angle 2 \cong \angle 3$	**3.** Transitive Property of Angle Congruence

$m\angle 1 = 90°$; Because $\angle 1$ is congruent and supplementary to $\angle 2$, the measure of each angle must be 90°.

3.2 Review & Refresh

1. $\overleftrightarrow{GH}$ and $\overleftrightarrow{QR}$

2. no; Because consecutive interior angles are not supplementary, the lines are not parallel.

3. *Sample answer*: $m\angle 1 = 73°$ by Alternate Interior Angles Theorem; $m\angle 2 = 107°$ by Consecutive Interior Angles Theorem

4. Symmetric Property of Segment Congruence

5. Transitive Property of Angle Congruence

6. $16x^4(x + 2)(x - 2)$

7. $(-3, 0)$, $(0, 8)$

8. $6x - 3$; 33 in.^{2}

9. $x = 17$

3.3 Extra Practice

1. $x = 5$; Lines m and n are parallel when the marked corresponding angles are congruent.

$(8x + 55)° = 95°$

$8x = 40$

$x = 5$

Answers

2. $x = 35$; Lines m and n are parallel when the marked alternate exterior angles are congruent.

$$(200 - 2x)^\circ = 130^\circ$$
$$-2x = -70$$
$$x = 35$$

3. yes; Corresponding Angles Converse

4. no **5.** no

6. yes; Alternate Exterior Angles Converse

7. no; The labeled angles must be congruent to prove the wings are parallel.

3.3 Review & Refresh

1. 17 **2.** $\sqrt{61}$ **3.** $x = 21$

4. 263; The ball reaches a maximum height of 263 feet after 4 seconds.

5. $x = 24$; Lines k and ℓ are parallel when the marked alternate interior angles are congruent.

$$(5x - 72)^\circ = 2x^\circ$$
$$3x = 72$$
$$x = 24$$

6. $\overleftrightarrow{XS}$ and $\overleftrightarrow{QV}$

7. no; There is no information to prove the lines are parallel.

8. $(-20, 18)$; Explanations will vary.

9. $(2, 25)$; Explanations will vary.

10. $f(-3) = 38$; $f(2) = -2$; $f(6) = -34$

3.4 Extra Practice

1. $2\sqrt{2}$ units **2.** $2\sqrt{5}$ units

3. none; The only thing that can be concluded in this diagram is that $p \perp s$. In order to say that lines are parallel, you need to know something about both of the intersections between the transversal and the two lines.

4. $p \parallel q$; Because $p \perp r$ and $q \perp r$, lines p and q are parallel by the Lines Perpendicular to a Transversal Theorem. The other lines may or may not be parallel.

5. $j \parallel k$ and $m \parallel n$; Because $j \perp m$ and $k \perp m$, lines j and k are parallel by the Lines Perpendicular to a Transversal Theorem. Because $j \parallel k$ and $n \perp k$, lines n and j are perpendicular by the Perpendicular Transversal Theorem. Because $m \perp j$ and $n \perp j$, lines m and n are parallel by the Lines Perpendicular to a Transversal Theorem.

6. $s \parallel t$ and $m \parallel n$; Because $\angle 1 \cong \angle 2$, lines n and s are perpendicular by the Linear Pair Perpendicular Theorem. Because $n \perp s$ and $n \perp t$, lines s and t are parallel by the Lines Perpendicular to a Transversal Theorem. Because $m \perp s$ and $n \perp s$, lines m and n are parallel by the Lines Perpendicular to a Transversal Theorem.

7. no; Infinitely many lines can be drawn perpendicular to the given segment.

8. $w \parallel x$, $x \parallel z$, and $w \parallel z$; Because $w \perp b$ and $x \perp b$, lines w and x are parallel by the Line Perpendicular to a Transversal Theorem. Because $x \perp b$ and $z \perp b$, lines x and z are parallel by the Line Perpendicular to a Transversal Theorem. Because $w \parallel x$ and $x \parallel z$, lines w and z are parallel by the Transitive Property of Parallel Lines. The other lines may or may not be parallel.

3.4 Review & Refresh

1. $m = -\frac{2}{3}, b = 1$ **2.** $m = -7, b = 16$

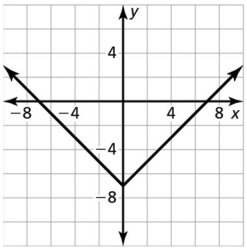
3. 86° **4.** $m = -\frac{1}{2}$

5. a. 412 yards
b. 1326 yards

6. $(-4, 3), (-1, -3)$ **7.** $\overleftrightarrow{MJ}$

8. $\overleftrightarrow{MN}$ **9.** plane MNP

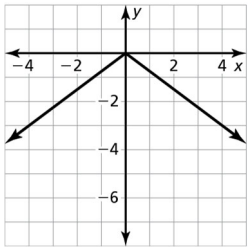
10.



The graph of g is a vertical translation 7 units down of the graph of f; domain: all real numbers, range: $y \geq -7$

Answers

11.



The graph of g is a vertical shrink by a factor of $\frac{3}{4}$ and a reflection in the x-axis of the graph of f; domain: all real numbers, range: $y \leq 0$

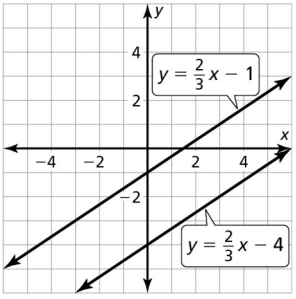
3.5 Extra Practice

1. $P(-3.5, 2.5)$ **2.** $P(5, -0.2)$

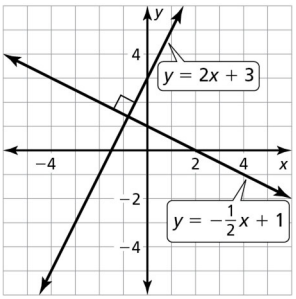
3. $p \parallel q$; $r \parallel t$; $s \perp p$; $s \perp q$

4. perpendicular; Because $m_1 m_2 = \left(-\frac{2}{4}\right)\left(\frac{6}{3}\right) = -1$, lines 1 and 2 are perpendicular.

5. $y = \frac{2}{3}x - 4$



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



7. $\sqrt{10}$ units

3.5 Review & Refresh

1. $x = 12$; Lines m and n are parallel when the marked alternate interior angles are congruent.

$$(11x + 4)^\circ = 136^\circ$$
$$11x = 132$$
$$x = 12$$

2. The product of three consecutive even numbers is even; *Sample answer*: $2 \bullet 4 \bullet 6 = 48$; $6 \bullet 8 \bullet 10 = 480$; $10 \bullet 12 \bullet 14 = 1680$

3. $7 + 2\sqrt{10} + \sqrt{61} \approx 21.13$ units

4. $x = -4$

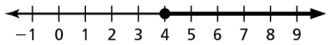
5. $b \parallel c$; Because the marked angles are congruent, $b \parallel c$ by the Corresponding Angles Converse.

6. $(3x + 2)(2x + 1)$ **7.** $y = -2x + 5$

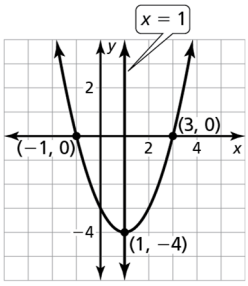
8. $x \geq -\frac{3}{8}$ **9.** $x = -18, x = 0$

10. $m\angle 2 = 128^\circ$; The measures of consecutive interior angles are supplementary by the Consecutive Interior Angles Theorem.

11. $w \geq 4$



12.



domain: all real numbers; range: $y \geq -4$

Chapter 3 Test Prep

1. B **2.** D **3.** $x = 3.25$

4. $x = 11$ **5.** B **6.** C

7. A **8.** A **9.** A, C

10. $y = -\frac{1}{3}x - 3$ **11.** C

12. 56.5 degrees **13.** $(0.5, 2)$ **14.** C

15. B, C, F **16.** B **17.** D **18.** A

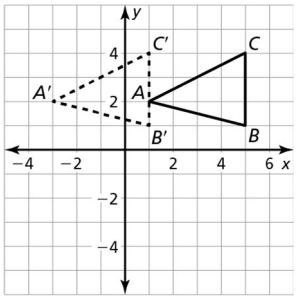
Chapter 4

4.1 Extra Practice

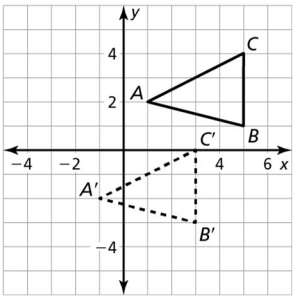
1. $\overline{MN}$; $\langle 4, 6 \rangle$ **2.** $\overline{BA}$; $\langle -5, -1 \rangle$ **3.** $\overline{KJ}$; $\langle -5, 3 \rangle$

Answers

4.



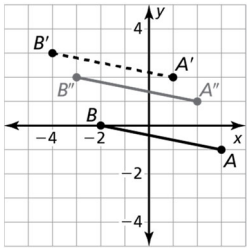
5.



6. $(x, y) \rightarrow (x + 4, y + 3)$

7. $(x, y) \rightarrow (x + 1, y - 3)$

8.

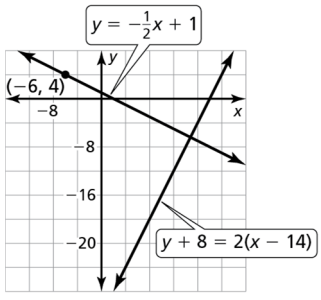


9. $(x, y) \rightarrow (x - 3, y + 4)$

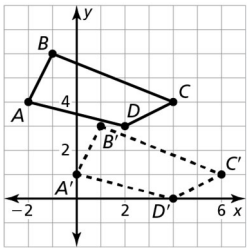
4.1 Review & Refresh

1. yes; Alternate Interior Angles Converse

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



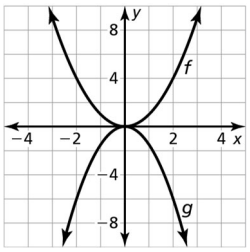
3.



4. $a_n = 11 - 4n$, $a_{10} = -29$

5. $x = -5$, $x = 0$, $x = 5$

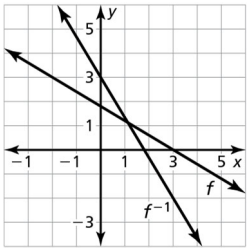
6.



The graph of g is a vertical stretch by a factor of 1.5 and a reflection in the x-axis of the graph of f.

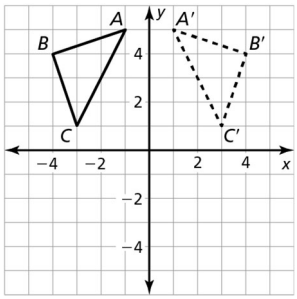
7. $\frac{4 - \sqrt{5}}{4}$, or about 0.441 sec and $\frac{4 + \sqrt{5}}{4}$, or about 1.559 sec

8. $f^{-1}(x) = -\frac{5}{3}x + 3$



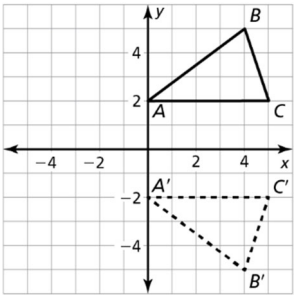
4.2 Extra Practice

1.

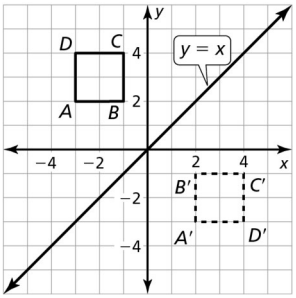


Answers

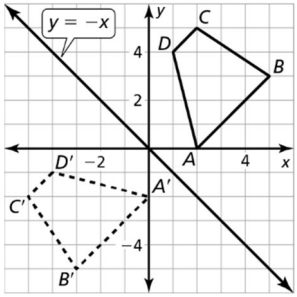
2.



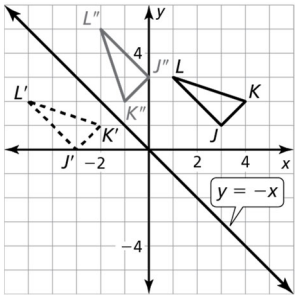
3.



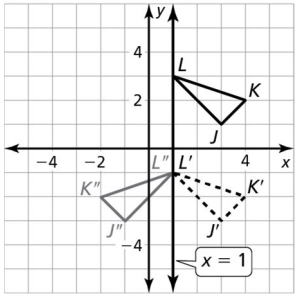
4.



5.



6.



7. none

8. WOW

9. KID

10. DOCK

11. $a = 1$

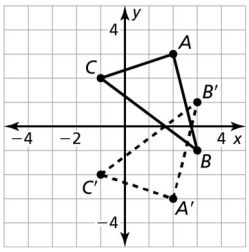
4.2 Review & Refresh

1. $2\sqrt{5}$, or about 4.5 units

2. $x = -2, x = 1$

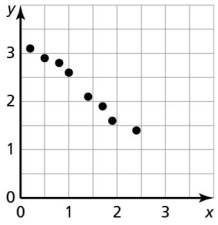
3. $x = 1$

4.



5. Symmetric Property of Angle Congruence

6.



The data show a negative correlation.

7. $\sqrt{5}$, or about 2.2 units

8. $h(-2) = -17$

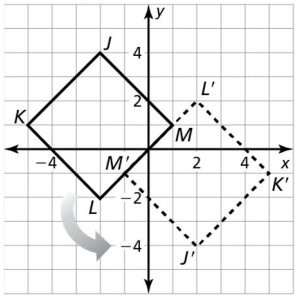
9. $A'(2, 4)$

10. $-(2t - 3)(2t - 5)$

11. $x^2 + 2x - 80$

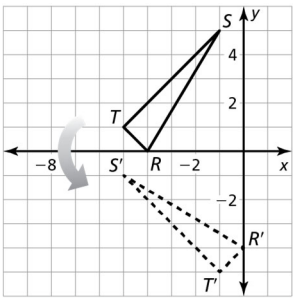
4.3 Extra Practice

1.

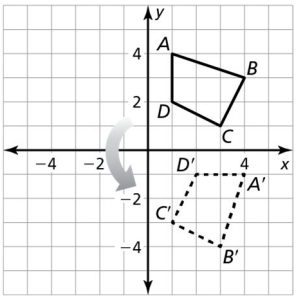


Answers

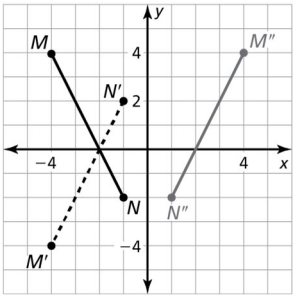
2.



3.



4.



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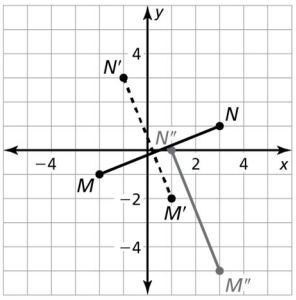
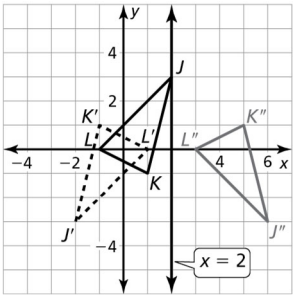
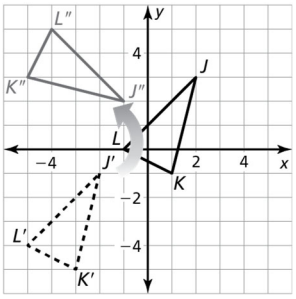


6.



7.



8. yes; Rotations of 72° and 144° about the center both map the regular pentagon onto itself.

9. no

10. H, I, N, O, S, X, Z; H: 180°; I: 180°; N: 180°; O: all angles; S: 180°; X: 90°, 180°; Z: 180°

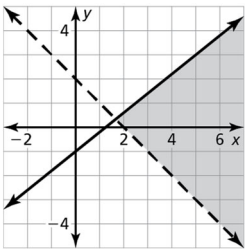
4.3 Review & Refresh

1. $m\angle EDF = 61°$, $m\angle CDE = 122°$

2. $\angle C$ and $\angle K$, $\angle D$ and $\angle L$, $\angle E$ and $\angle M$, $\angle F$ and $\angle N$; $\overline{CD}$ and $\overline{KL}$, $\overline{DE}$ and $\overline{LM}$, $\overline{EF}$ and $\overline{MN}$, $\overline{FC}$ and $\overline{NK}$

3. $P(4, 7)$

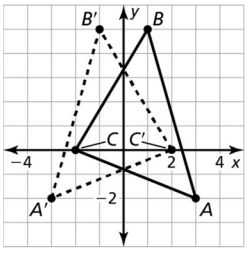
4.



Sample answer: (4, 1)

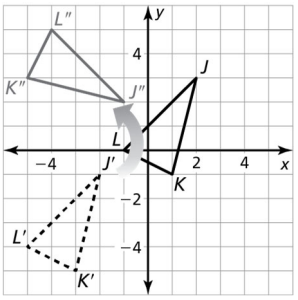
5. linear; As x increases by 1, y increases by 4.

6.



Answers

7.



8. The leftmost tie is parallel to the rightmost tie by the Transitive Property of Parallel Lines.

4.4 Extra Practice

1. $\square ABCD \cong \square MNOP$, $\square STUV \cong \square EFGH$, $\triangle PQR \cong \triangle JKL$, $\square MNOP$ is a translation 5 units left and 2 units down of $\square ABCD$. $\square STUV$ is a reflection of $\square EFGH$ in the line $y = x$. $\triangle JKL$ is a 90° rotation of $\triangle PQR$.

2. *Sample answer:* reflection in the line $x = 1$, followed by a translation 2 units right and 5 units down

3. yes; $\triangle DEF$ is a reflection in the x-axis of $\triangle ABC$.

4. no; M and N are translated 4 units left and 4 units down of their corresponding vertices, I and J, but K and L are translated 5 units left and 4 units down of their corresponding vertices, G and H. So, this is not a rigid motion.

5. line k and line m

6. line k and line m are parallel

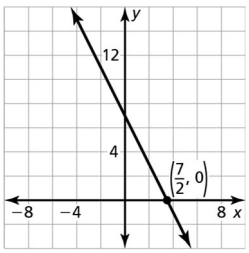
7. 10 inches **8.** 120°

4.4 Review & Refresh

1. $x = -3$ **2.** $n = 3$ **3.** 37.5%

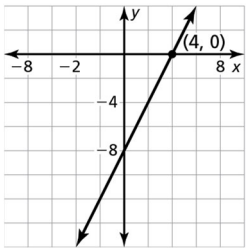
4. *Sample answer*: translation 2 units right and 2 units down followed by a reflection in the x-axis

5.



x-intercept: $\frac{7}{2}$

6.



x-intercept: 4

7. $x < \frac{7}{2}$

8. conditional statement: If you bake cookies, then you turn the oven on.; true
converse: If you turn the oven on, then you bake cookies.; false
inverse: If you do not bake cookies, then you do not turn the oven on.; false
contrapositive: If you do not turn the oven on, then you do not bake cookies.; true

9. 7; $8x° = 56°$
$x = 7$

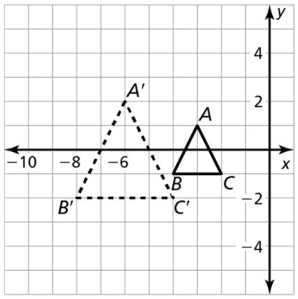
10. 11.5; $(4x + 26)° + 108° = 180°$
$4x + 134 = 180$
$4x = 46$
$x = 11.5$

4.5 Extra Practice

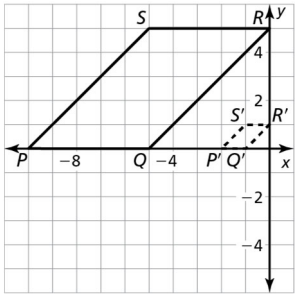
1. $\frac{1}{2}$; reduction **2.** $\frac{5}{4}$; enlargement

3. 3; enlargement

4.



5.



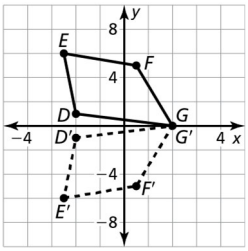
Answers

6. 4 **7.** 0.8 cm

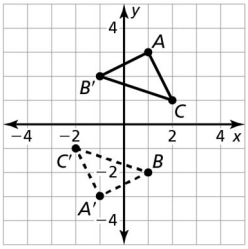
8. the old film-style camera

4.5 Review & Refresh

1.



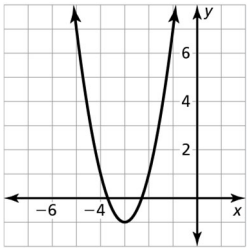
2.



3. $\frac{3}{x^3}$ **4.** 315 in.^{2}

5. *Sample answer*: rotation of 90° about the origin, followed by a reflection in the *y*-axis

6.



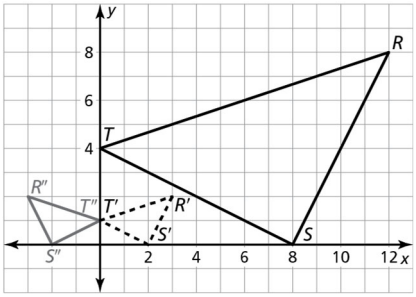
The graph of *g* is a translation 3 units left, followed by a vertical stretch by a factor of 2, then a translation 1 unit down of the graph of *f*.

7. $16x^2 - 56x + 49$ **8.** $-5y^2 - 7y + 24$

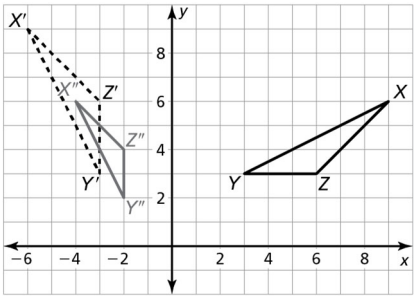
9. $(2, -1)$

4.6 Extra Practice

1.



2.



3. *Sample answer*: dilation with a scale factor of $\frac{1}{2}$, followed by a translation 4 units right and 1 unit down

4. *Sample answer*: reflection in the *y*-axis, followed by a dilation with a scale factor of 2

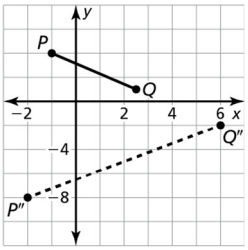
5. Rotate $\triangle PQR$ so that side *a* is parallel to side *b*. Translate $\triangle GHI$ so that point *G* maps to point *P*. Because translations preserve angle measure, and all the angles of an equilateral triangle are 60°, $\triangle GHI$ lies on $\triangle PQR$. Because $\overrightarrow{GI}$ coincides with $\overrightarrow{PR}$ and $\overrightarrow{GH}$ coincides with $\overrightarrow{PQ}$, $\overline{GI}$ lies on $\overline{PR}$ and $\overline{GH}$ lies on $\overline{PQ}$. Finally, dilate $\triangle PQR$ about point *P* by a scale factor of $\frac{a}{b}$ so that it is the same size as $\triangle GHI$. Because a similarity transformation maps $\triangle GHI$ to $\triangle PQR$, the triangles are similar.

4.6 Review & Refresh

1. right **2.** acute

3. obtuse **4.** straight

5.



6. $y = \frac{3}{2}x + 9$

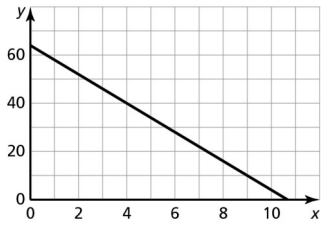
Answers

7.

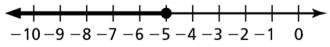
Equation	Explanation and Reason
$7x + 15 = 3x - 9$	Write the equation. Given
$4x + 15 = -9$	Subtract $3x$ from each side. Subtraction Property of Equality
$4x = -24$	Subtract 15 from each side. Subtraction Property of Equality
$x = -6$	Divide each side by 4. Division Property of Equality

8. a. $0 \le g \le 10\frac{2}{3}$; continuous; You can pour any portion of a glass.

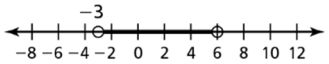
b.



9. $x \le -5$



10. $-3 < a < 6$



Chapter 4 Test Prep

1. B, C, E **2.** 22

3. C **4.** D **5.** A

6. $y - x = -10$

7. $w + x + y + z = 13.45$

8. B **9.** C **10.** C

11. B **12.** 7.6 inches

13. $(x, y) \rightarrow (x + 6, y - 1)$

14. A **15.** D **16.** B

17. B **18.** A, C, D

Chapter 5

5.1 Extra Practice

1. obtuse scalene **2.** right scalene

3. acute isosceles **4.** scalene; right

5. 106° **6.** 155° **7.** 10°, 80°

8. no; An exterior angle will be acute when it is adjacent to the obtuse angle of an obtuse triangle.

9. 145°

5.1 Review & Refresh

1. yes; $\triangle GHI$ is a translation 1 unit left and 4 units down of $\triangle DEF$.

2. 18°, 72° **3.** $y = \frac{3}{2}$, $y = 4$

4. $t = 2$ **5.** $k = \frac{7}{4}$; enlargement

6. exponential growth; 30%

7. *Sample answer*: $\triangle XYZ$ is a dilation with a scale factor of $\frac{1}{2}$, followed by a translation 3 units right and 1 unit down of $\triangle LMN$.

8. $\overleftrightarrow{HB} \parallel \overleftrightarrow{FD}$ **9.** $\overleftrightarrow{AE} \perp \overleftrightarrow{GC}$

5.2 Extra Practice

1. Corresponding angles: $\angle P \cong \angle S$, $\angle Q \cong \angle T$, $\angle R \cong \angle U$;
Corresponding sides: $\overline{PQ} \cong \overline{ST}$, $\overline{QR} \cong \overline{TU}$, $\overline{RP} \cong \overline{US}$;
Sample answer: $\triangle RQP \cong \triangle UTS$

2. Corresponding angles: $\angle A \cong \angle E$, $\angle B \cong \angle F$, $\angle C \cong \angle G$, $\angle D \cong \angle H$;
Corresponding sides: $\overline{AB} \cong \overline{EF}$, $\overline{BC} \cong \overline{FG}$, $\overline{CD} \cong \overline{GH}$, $\overline{AD} \cong \overline{EH}$;
Sample answer: $BCDA \cong FGHE$

3. $x = 25$, $y = 2$ **4.** $x = 6$, $y = 10$

5. From the diagram, $\overline{KL} \cong \overline{GH}$, $\overline{LM} \cong \overline{HI}$, $\overline{MN} \cong \overline{IJ}$, and $\overline{NK} \cong \overline{JG}$. Also from the diagram, $\angle K \cong \angle G$, $\angle L \cong \angle H$, $\angle M \cong \angle I$, and $\angle N \cong \angle J$. Because all corresponding parts are congruent, $KLMN \cong GHIJ$.

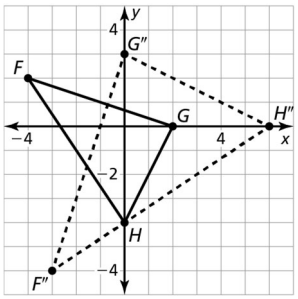
Answers

6. 33°

5.2 Review & Refresh

1. 139°

2.



3. *Sample answer*: $\triangle ABC \cong \triangle DFE$;
Corresponding angles: $\angle A \cong \angle D$, $\angle B \cong \angle F$, $\angle C \cong \angle E$;
Corresponding sides: $\overline{AB} \cong \overline{DF}$, $\overline{BC} \cong \overline{FE}$, $\overline{AC} \cong \overline{DE}$

4. $k = \frac{5}{2}$

5. $(x - 5)(x + 3)$ **6.** $(5x - 3)(x + 4)$

7. The graph of g is a horizontal shrink by a factor of $\frac{1}{2}$, a reflection in the x-axis, and a vertical translation 3 units up of the graph of f.

8. The graph of g is a vertical shrink by a factor of $\frac{1}{3}$ and a vertical translation 1 unit down of the graph of f.

9. $f(x) = \begin{cases} -x + 1, & \text{if } x < -1 \\ -1, & \text{if } -1 \le x \le 2 \\ 2x - 4, & \text{if } x > 2 \end{cases}$

5.3 Extra Practice

1.

STATEMENTS	REASONS
1. $\overline{JN} \cong \overline{MN}$, $\overline{NK} \cong \overline{NL}$	**1.** Given
2. $\angle JNK \cong \angle MNL$	**2.** Vertical Angles Congruence Theorem
3. $\triangle JNK \cong \triangle MNL$	**3.** SAS Congruence Theorem

2. $\triangle EPF \cong \triangle GPH$; Because all points on a circle are the same distance from the center, $\overline{PE} \cong \overline{PG}$ and $\overline{PF} \cong \overline{PH}$. It is given that $\angle EPF \cong \angle GPH$. So, $\triangle EPF \cong \triangle GPH$ by the SAS Congruence Theorem.

3. *Sample answer*: $\triangle ABC \cong \triangle BCD$; Because the sides of a regular hexagon are congruent, $\overline{AB} \cong \overline{BC}$ and $\overline{BC} \cong \overline{CD}$. Also, because the angles of a regular hexagon are congruent, $\angle ABC \cong \angle BCD$. So, $\triangle ABC \cong \triangle BCD$ by the SAS Congruence Theorem.

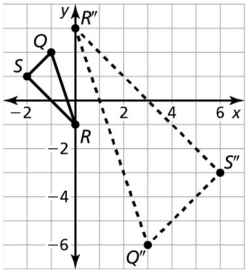
4. Because $\overline{PS} \parallel \overline{QR}$, you know that $\angle SPR \cong \angle QRP$ by the Alternate Interior Angles Theorem. Also, by the Reflexive Property of Segment Congruence, $\overline{PR} \cong \overline{RP}$. It is given that $\overline{PS} \cong \overline{RQ}$, so $\triangle PQR \cong \triangle RSP$ by the SAS Congruence Theorem.

5. no; The SAS Congruence Theorem applies after a translation, reflection, or rotation, which are congruence transformations, but not after a dilation, which changes the size of the figure.

5.3 Review & Refresh

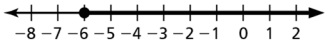
1. obtuse scalene **2.** right isosceles

3.

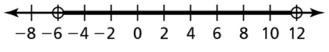


4. yes; Because $\overline{PQ} \parallel \overline{ST}$, $\angle PQR \cong \angle STR$ by the Alternate Interior Angles Theorem. It is given that $\overline{PQ} \cong \overline{ST}$ and $\overline{QR} \cong \overline{TR}$. So, $\triangle PQR \cong \triangle STR$ by the SAS Congruence Theorem.

5. $x \ge -6$



6. $-6 < d < 12$



7. $x = 3$, $y = 8$

Answers

8. no; The sample size is not large enough to make a valid conclusion about the population.

5.4 Extra Practice

1. J, M; Base Angles Theorem

2. M, MNL; Base Angles Theorem

3. $\overline{NK}$, $\overline{NM}$; Converse of the Base Angles Theorem

4. $\overline{LJ}$, $\overline{LN}$; Converse of the Base Angles Theorem

5. $x = 31$ **6.** $x = 30$

7. $x = 50,\ y = 75$ **8.** $x = 70,\ y = 20$

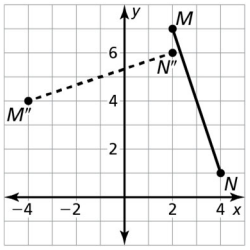
9. Because they are vertical angles, $\angle DCE \cong \angle BCA$. Because they both measure 70°, $\angle B \cong \angle D$. So, $\angle A \cong \angle E$ by the Third Angles Theorem. Because they are the base angles of an isosceles triangle, $\angle E \cong \angle D$. Therefore, $m\angle E = 70°$ and $m\angle A = 70°$. Because they have equal measures, $\angle A \cong \angle B$. By the Converse of the Base Angles Theorem, $\overline{AC} \cong \overline{BC}$. So, $\triangle ABC$ is isosceles by definition.

10. yes; An isosceles triangle is obtuse when the vertex angle is obtuse.

5.4 Review & Refresh

1. $\angle H$, $\angle E$ **2.** $\angle I$, $\angle T$ **3.** 39°

4.



5. $m\angle F = 84°$; $GH = 6$ m

6. $3\sqrt{10}$, or about 9.5 units

7. $x = 7,\ y = -4$

8. mean: 24, median: 23, mode: none, range: 16, standard deviation: about 5.3

5.5 Extra Practice

1. no; You are given that $\overline{UV} \cong \overline{YX}$, $\overline{UW} \cong \overline{YZ}$, and $\overline{WV} \cong \overline{ZX}$. So, $\triangle UVW \cong \triangle YXZ$ by the SSS Congruence Theorem.

2. yes; You are given that $\overline{GH} \cong \overline{JK}$ and $\overline{GK} \cong \overline{JH}$. Also, $\overline{HK} \cong \overline{HK}$ by the Reflexive Property of Segment Congruence. So, $\triangle KGH \cong \triangle HJK$ by the SSS Congruence Theorem.

3.

STATEMENTS	REASONS
1. $\overline{MN} \cong \overline{PQ}$, $\angle M$ and $\angle P$ are right angles.	1. Given
2. $\overline{NQ} \cong \overline{QN}$	2. Reflexive Property of Segment Congruence
3. $\triangle MNQ$ and $\triangle PQN$ are right Triangles.	3. Definition of right triangles
4. $\triangle MNQ \cong \triangle PQN$	4. HL Congruence Theorem

4. stable; The diagonal support in this figure forms triangles with fixed side lengths. By the SSS Congruence Theorem, these triangles cannot change shape, so the figure is stable.

5. a. You know that the shared sides of the adjacent triangular faces are congruent, so you need to measure the remaining two sides of each triangular face to determine whether the SSS Congruence Theorem applies.

b. a regular hexagon

5.5 Review & Refresh

1. no; $m\angle VYZ = 37°$ and $m\angle YVW = 153°$ because vertical angles are congruent. Because $m\angle VYZ + m\angle YVW = 37° + 153° = 190°$, the consecutive interior angles are not supplementary. So, $\overleftrightarrow{UW}$ and $\overleftrightarrow{XZ}$ are not parallel.

2. 39° **3.** $f(x) = 6x - 7$

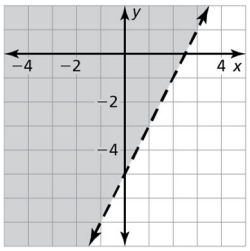
4. $x = 26,\ y = 128°$

Answers

5.

STATEMENTS	REASONS
1. E is the midpoint of $\overline{AC}$ and $\overline{BD}$.	**1.** Given
2. $\overline{AE} \cong \overline{CE}$ and $\overline{BE} \cong \overline{DE}$	**2.** Definition of midpoint
3. $\angle AEB \cong \angle CED$	**3.** Vertical Angles Congruence Theorem
4. $\triangle AEB \cong \triangle CED$	**4.** SAS Congruence Theorem

6.



7. no; The corresponding vertices are not written in the same order.

5.6 Extra Practice

1. yes; AAS Congruence Theorem

2. yes; ASA Congruence Theorem

3. yes; $\triangle LMN \cong \triangle PQR$ by the AAS Congruence Theorem

4. no; $\angle L$ and $\angle R$ do not correspond.

5.

STATEMENTS	REASONS
1. $\overline{AC}$ bisects $\angle DAB$ and $\angle DCB$.	**1.** Given
2. $\angle CAB \cong \angle CAD$	**2.** Definition of angle bisector
3. $\angle ACB \cong \angle ACD$	**3.** Definition of angle bisector
4. $\overline{AC} \cong \overline{AC}$	**4.** Reflexive Property of Segment Congruence
5. $\triangle ABC \cong \triangle ADC$	**5.** Subtraction Property of Equality

6. **Given:** $\overline{AB} \cong \overline{CD}$, $\angle ABD \cong \angle CDB$; $\overline{BD} \cong \overline{DB}$ by the Reflexive Property of Segment Congruence. So, $\triangle ABD \cong \triangle CDB$ by the SAS Congruence Theorem.

Given: $\overline{AB} \cong \overline{EF}$, $\angle ABD \cong \angle F$; $\angle ADB \cong \angle EDF$ by the Vertical Angles Congruence Theorem. So, $\triangle ABD \cong \triangle EFD$ by the AAS Congruence Theorem.

Given: $\triangle ABD \cong \triangle CDB$ and $\triangle ABD \cong \triangle EFD$; So, $\triangle CDB \cong \triangle EFD$ by the Transitive Property of Triangle Congruence.

There is not enough information to show that $\triangle AGD$ is congruent to any other triangle.

5.6 Review & Refresh

1. $(-1, -2)$

2. Either the pair of corresponding third sides are congruent or the pair of corresponding included angles are congruent.

3. $\overline{QP}$, $\overline{QT}$; Converse of the Base Angles Theorem

4. QTR, QRT; Base Angles Theorem

5. 4 mm

6. yes; SAS Congruence Theorem

7. yes; ASA Congruence Theorem

5.7 Extra Practice

1. From the diagram, $\angle T \cong \angle W$ and $\overline{TV} \cong \overline{WV}$. Also, $\angle UVT \cong \angle XVW$ by the Vertical Angles Congruence Theorem. So, by the ASA Congruence Theorem, $\triangle TUV \cong \triangle WXV$. Because corresponding parts of congruent triangles are congruent, $\overline{UV} \cong \overline{XV}$.

2. From the diagram, $\angle J \cong \angle M$, $\overline{JL} \cong \overline{ML}$, and $\overline{JK} \cong \overline{MN}$. So, by the SAS Congruence Theorem, $\triangle LJK \cong \triangle LMN$. Because corresponding parts of congruent triangles are congruent, $\angle JLK \cong \angle MLN$.

3. Because of the Vertical Angles Congruence Theorem, $\angle FJG \cong \angle HJI$. Use the ASA Congruence Theorem to prove that $\triangle FJG \cong \triangle HJI$. So, $\angle 1 \cong \angle 2$ because corresponding parts of congruent triangles are congruent.

Answers

4. Because of the Reflexive Property of Segment Congruence, $\overline{AC} \cong \overline{CA}$. Use the SSS Congruence Theorem to prove that $\triangle ABC \cong \triangle ADC$. Then, state that $\angle ACB \cong \angle ACD$ because corresponding parts of congruent triangles are congruent. Because of the Reflexive Property of Segment Congruence, $\overline{EC} \cong \overline{CE}$. Use the SAS Congruence Theorem to prove that $\triangle BCE \cong \triangle DCE$. So, $\angle 1 \cong \angle 2$ because corresponding parts of congruent triangles are congruent.

5.

STATEMENTS	REASONS
1. $\overline{AB} \cong \overline{AC}$, $\overline{BD} \cong \overline{CD}$	**1.** Given
2. $\overline{AD} \cong \overline{AD}$	**2.** Reflexive Property of Segment Congruence
3. $\triangle ABD \cong \triangle ACD$	**3.** SSS Congruence Theorem
4. $\angle BAD \cong \angle CAD$	**4.** Corresponding parts of congruent triangles are congruent

5.7 Review & Refresh

1. From the diagram, $\overline{CD} \cong \overline{CA}$ and $\overline{CE} \cong \overline{CB}$. Also, $\angle DCE \cong \angle ACB$ by the Vertical Angles Congruence Theorem. So, by the SAS Congruence Theorem, $\triangle DCE \cong \triangle ACB$. Because corresponding parts of congruent triangles are congruent, $\angle B \cong \angle D$.

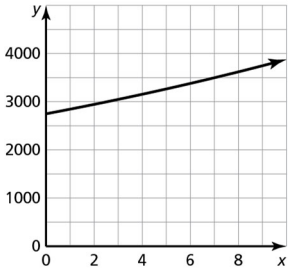
2. $8\sqrt{2}$, or about 11.3 units

3. $x = 5$ **4.** $7m - 9$

5. yes; AAS Congruence Theorem

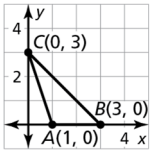
6. yes; SSS Congruence Theorem

7. $y = 2750(1.035)^t$



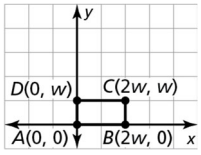
5.8 Extra Practice

1. *Sample answer:*



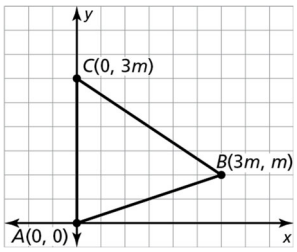
It is easy to find the lengths of horizontal and vertical segments and distances from the origin.

2. *Sample answer:*



It is easy to find the lengths of horizontal and vertical segments and distances from the origin.

3.



$AC = 3m$, $m_{\overline{AC}}$ = undefined, $M_{\overline{AC}} = \left(0, \frac{3m}{2}\right)$,

$BC = m\sqrt{13}$, $m_{\overline{BC}} = -\frac{2}{3}$, $M_{\overline{BC}} = \left(\frac{3m}{2}, 2m\right)$,

$AB = m\sqrt{10}$, $m_{\overline{AB}} = \frac{1}{3}$, $M_{\overline{AB}} = \left(\frac{3m}{2}, \frac{m}{2}\right)$; no;

no; Because $m_{\overline{BC}} \cdot m_{\overline{AB}} \neq -1$, $\overline{BC}$ is not perpendicular to $\overline{AB}$. So, $\angle ABC$ is not a right angle and $\triangle ABC$ is not a right triangle. None of the sides are congruent because $AB \neq BC \neq AC$. So, $\triangle ABC$ is not an isosceles triangle.

Answers

4. Use the Distance Formula to find the side lengths RO, OP, PQ, and QR. So, $\overline{RO} \cong \overline{PQ}$ and $\overline{OP} \cong \overline{QR}$. Use the Reflexive Property of Segment Congruence to show that $\overline{PR} \cong \overline{RP}$. Finally, use the SSS Congruence Theorem to show that $\triangle OPR \cong \triangle QRP$.

5. $OE = \sqrt{h^2 + k^2}$, $OG = \sqrt{h^2 + k^2}$;
$EF = \sqrt{9h^2 + k^2}$, $GF = \sqrt{9h^2 + k^2}$;
$FO = 4h$
So, $\overline{OE} \cong \overline{OG}$, $\overline{EF} \cong \overline{GF}$, and $\overline{FO} \cong \overline{FO}$. By the SSS Congruence Theorem, $\triangle OEF \cong \triangle OGF$.

6. Using the Distance Formula, $AB = \sqrt{746}$ in., $BC = \sqrt{674}$ in., and $CA = 18$ in. Because none of the sides are congruent, $\triangle ABC$ is a scalene triangle by definition. The table may be unstable because $\overline{AB}$ is longer than $\overline{BC}$. Move point C to (22,0) so that $\triangle ABC$ is isosceles.

5.8 Review & Refresh

1.

Equation	Explanation and Reason
$25 - 8x = 1$	Write the equation. Given
$-8x = -24$	Subtract 25 from each side. Subtraction Property of Equality
$x = 3$	Divide each side by –8. Division Property of Equality

2.

Equation	Explanation and Reason
$-4(x + 3) = 6 - x$	Write the equation. Given
$-4x - 12 = 6 - x$	Multiply. Distributive Property
$-3x - 12 = 6$	Add x to each side. Addition Property of Equality.
$-3x = 18$	Add 12 to each side. Addition Property of Equality
$x = -6$	Divide each side by –3. Division Property of Equality

3. $(7m + 5)(3m + 1)$

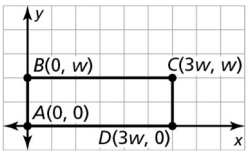
4. Because $\triangle STR$ and $\triangle UTR$ are both isosceles triangles, $\angle TSR \cong \angle TRS$ and $\angle TUR \cong \angle TRU$. It is given that $\angle TSR \cong \angle TUR$, so $\angle TRS \cong \angle TRU$ by the Transitive Property of Angle Congruence. So, $\triangle STR \cong \triangle UTR$ by the AAS Congruence Theorem. Because corresponding parts of congruent triangles are congruent, $\overline{SR} \cong \overline{UR}$.

5. no

6.

STATEMENTS	REASONS
1. $\overline{AB} \cong \overline{DE}$, C is the center of the circle.	**1.** Given
2. $\overline{AC} \cong \overline{DC}$	**2.** All points on a circle are the same distance from the center.
3. $\overline{BC} \cong \overline{EC}$	**3.** All points on a circle are the same distance from the center.
4. $\triangle ABC \cong \triangle DEC$	**4.** SSS Congruence Theorem

7.



8. $x = 8$

Chapter 5 Test Prep

1. D **2.** C

3. 2.4375 square units **4.** 9.8 units

5. B, D **6.** $(2, 0.5)$

7. A, C **8.** $\sqrt{b^2 + h^2}$ units

9. D **10.** A **11.** D

12. A **13.** C **14.** B

15. $x = -2.75$ **16.** B

17. B **18.** C **19.** A

20. B **21.** $\triangle LKJ$

Answers

Chapter 6

6.1 Extra Practice

1. yes; It is given that $\angle L \cong \angle M$. By the Reflexive Property of Segment Congruence, $\overline{PN} \cong \overline{PN}$. Because $\angle LNP$ and $\angle MNP$ form a linear pair and $\angle MNP$ is a right angle, $\angle LNP$ is also a right angle and $\angle LNP \cong \angle MNP$. By the AAS Congruence Theorem, $\triangle LNP \cong \triangle MNP$. Then $\overline{LP} \cong \overline{MP}$ because corresponding parts of congruent triangles are congruent. Because point P is equidistant from L and M, point P is on the perpendicular bisector of $\overline{LM}$ by the Converse of the Perpendicular Bisector Theorem.

2. yes; Because point N is equidistant from L and M, point N is on the perpendicular bisector of $\overline{LM}$ by the Converse of the Perpendicular Bisector Theorem. Because only one line can be perpendicular to $\overline{LM}$ through point P, $\overleftrightarrow{PN}$ must be the perpendicular bisector of $\overline{LM}$.

3. 9; Because $BD = CD$ and $\overleftrightarrow{AD} \perp \overline{BC}$, point A is on the perpendicular bisector of $\overline{BC}$. So, by the Perpendicular Bisector Theorem, $AB = AC = 9$.

4. 6; Because $\overleftrightarrow{HF} \perp \overline{EG}$ and point F is equidistant from E and G, point F is on the perpendicular bisector of $\overline{EG}$ by the Converse of the Perpendicular Bisector Theorem. So, by definition of segment bisector, $EH = GH = 3$ and $EG = 3 + 3 = 6$.

5. 6; Because $\overleftrightarrow{RU} \perp \overline{ST}$ and point R is equidistant from S and T, point R is on the perpendicular bisector of $\overline{ST}$ by the Converse of the Perpendicular Bisector Theorem. So, by definition of segment bisector, $SU = TU$. So, $2x + 2 = 3x$ and the solution is $x = 2$. So, $SU = 2x + 2 = 2(2) + 2 = 6$.

6. 40°; Because $\overleftrightarrow{AC} \perp \overline{CD}$, $\overleftrightarrow{AB} \perp \overline{BD}$, and $\overline{CD} \cong \overline{BD}$, $\overrightarrow{AD}$ bisects $\angle CAB$ by the Converse of the Angle Bisector Theorem. So, by definition of angle bisector, $\angle CAD \cong \angle BAD$. So, $m\angle CAD = m\angle BAD = 20°$, which means that $m\angle CAB = m\angle CAD + m\angle BAD = 20° + 20° = 40°$.

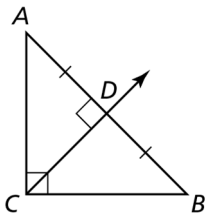
7. 5; Because $\overrightarrow{AD}$ bisects $\angle BAC$, $\overleftrightarrow{AC} \perp \overline{CD}$, and $\overleftrightarrow{AB} \perp \overline{BD}$, $\overline{BD} \cong \overline{CD}$ by the Angle Bisector Theorem. So, $CD = BD = 5$.

8. 4; Because $\overleftrightarrow{AC} \perp \overline{CD}$, $\overleftrightarrow{AB} \perp \overline{BD}$, and $\overrightarrow{AD}$ bisects $\angle CAB$, $\overline{BD} \cong \overline{CD}$ by the Angle Bisector Theorem. So, $BD = CD$, which means $3x + 1 = 5x - 1$ and the solution is $x = 1$. So, $BD = 3x + 1 = 3(1) + 1 = 4$.

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

10. Because any point on the perpendicular bisector of a segment is equidistant from the endpoints of the segment, you can draw an isosceles triangle by drawing segments from each endpoint of the segment to the same point on the perpendicular bisector.

11. yes; In a right triangle, the bisector of the right angle is also the perpendicular bisector of the hypotenuse when the right triangle is isosceles. The figure shows that when $\angle C$ of $\triangle ABC$ is bisected by $\overrightarrow{CD}$ and $\overrightarrow{CD}$ is the perpendicular bisector of $\overline{AB}$, $\triangle ACD \cong \triangle BCD$ by either the SAS Congruence Theorem or the ASA Congruence Theorem. Then the corresponding sides $\overline{AC}$ and $\overline{BC}$ must be congruent, so $\triangle ABC$ is isosceles.



6.1 Review & Refresh

1. obtuse isosceles **2.** right scalene

3. 102°; Because the lines are parallel, $\angle 2$ and the 78° angle are supplementary by the Consecutive Interior Angles Theorem.

4. It is given that $\angle ADE \cong \angle CBE$ and $\overline{DE} \cong \overline{BE}$. By the Vertical Angles Congruence Theorem, $\angle CEB \cong \angle AED$. So, $\triangle AED \cong \triangle CEB$ by the ASA Congruence Theorem. Because corresponding parts of congruent triangles are congruent, $\angle DAE \cong \angle BCE$ and $\overline{AD} \cong \overline{CB}$. By the Reflexive Property of Segment Congruence, $\overline{CA} \cong \overline{AC}$. By the SAS Congruence Theorem, $\triangle DAC \cong \triangle BCA$.

5. $-6x^7 + 24x^5 - 39x^4$

Answers

6. 21; Because $FH = EH$ and $\overline{FE} \perp \overleftrightarrow{GH}$, point G is on the perpendicular bisector of $\overline{FE}$. By the Perpendicular Bisector Theorem, $FG = EG$. So, $4y - 15 = 2y + 3$ and the solution is $y = 9$. So, $EG = 2y + 3 = 2(9) + 3 = 21$.

7. 34°; Because $\overline{ML} \perp \overline{LP}$, $\overline{MN} \perp \overline{NP}$, and $\overline{LP} \cong \overline{NP}$, $\overline{MP}$ bisects $\angle LMN$ by the Converse of the Angle Bisector Theorem. So, by definition of angle bisector $\angle LMP \cong \angle NMP$. So, $m\angle LMP = m\angle NMP = 17°$, which means that $m\angle LMN = m\angle LMP + m\angle NMP = 17° + 17° = 34°$.

8. $\overline{ST} \cong \overline{WX}$; $\angle U \cong \angle Y$

6.2 Extra Practice

1. 13 **2.** 10 **3.** 2 **4.** $(2, 1)$

5. $(6, 3)$ **6.** 1 **7.** 4 **8.** 7

9. Construct the circumcenter of the triangle formed by the locations of the three buildings. The cell tower is located at the circumcenter.

6.2 Review & Refresh

1. yes; $\triangle TUV$ is a translation 3 units right and 2 units down of $\triangle QRS$.

2. 86°; acute

3. It is given that $\overline{CD} \cong \overline{ED}$ and $\angle DFE$ is a right angle. Because $\angle DFE$ and $\angle DFC$ form a linear pair, $\angle DFC$ is a right angle. Therefore, $\triangle DFE$ and $\triangle DFC$ are right triangles. By the Reflexive Property of Segment Congruence, $\overline{DF} \cong \overline{DF}$. So, $\triangle DFE \cong \triangle DFC$ by the HL Congruence Theorem. Then, $\angle CDF \cong \angle EDF$ because corresponding parts of congruent triangles are congruent.

4. $4h^4(h - 4)(h + 4)$ **5.** 6

6. Using the Distance Formula, $XY = \sqrt{(5 - (-5))^2 + (3 - 1)^2} = 2\sqrt{26}$ and $YZ = \sqrt{(3 - 5)^2 + (-7 - 3)^2} = 2\sqrt{26}$. Because $XY = YZ$, $\triangle XYZ$ is isosceles.

7. $M(-3, 3)$; 6

8. linear; As x increases by 3, y decreases by 4.

6.3 Extra Practice

1. $PN = 22$, $QP = 11$ **2.** $CD = 14$, $CE = 21$

3. $(1, 2)$ **4.** $(-3, 2)$

5. on; $(3, 0)$ **6.** inside; $(9, 2)$

7. orthocenter; When the strings are pulled tight, they form perpendicular segments from the vertices to the opposite sides. So, three altitudes are formed, which are concurrent at the orthocenter.

8. no; The orthocenter and the centroid are the same point in an equilateral triangle.

6.3 Review & Refresh

1. 65°; Because $\overline{AD} \perp \overline{BD}$, $\overline{CD} \perp \overline{BD}$, and $\overline{AD} \cong \overline{CD}$, $\overline{BD}$ bisects $\angle ABC$ by the Converse of the Angle Bisector Theorem. So, by definition of angle bisector, $\angle ABD \cong \angle CBD$. So, $m\angle ABD = m\angle CBD$, which means that $(13 - 2x)° = (7 - 3x)°$ and the solution is $x = -6$.
Then,
$m\angle CBD = (7 - 3x)° = (7 - 3(-6))° = 25°$.
Because $\triangle CBD$ is a right triangle, $m\angle BDC = 90° - 25° = 65°$.

2. $(0, 1.5)$ **3.** inside; $(-1, 6)$ **4.** no

5. $(3, -5)$ **6.** $(1, -1)$

7. $n = \pm 5i$ **8.** $x = -2 \pm \sqrt{19}$

9.

		Cross Country Team		
		Try Out	**Not Try Out**	**Total**
Gender	**Female**	28	67	95
	Male	21	72	93
	Total	49	139	188

Answers

10. *Sample answer*: It is given that $\overline{WY} \perp \overline{XZ}$. So, $\angle YWX$ and $\angle YWZ$ are right angles, which means $\triangle WXY \cong \triangle WZY$ are right triangles. Next, find XY and ZY using the Distance Formula. Then, $\overline{XY} \cong \overline{ZY}$ by the definition of congruent segments. Use the Reflexive Property of Segment Congruence to show that $\overline{YW} \cong \overline{YW}$. Finally, prove that $\triangle WXY \cong \triangle WZY$ by the HL Congruence Theorem.

6.4 Extra Practice

1. 14 **2.** 30 **3.** 9

4. 48 **5.** 13 **6.** 12 cm^2

7. a. 8.5 ft **b.** 7.5 ft

8. 116 ft

6.4 Review & Refresh

1. *Sample answer*: $-3 + 1 = -2$, and $-2 < 0$

2. 41; Because $\overline{ML} \cong \overline{KL}$ and $\overleftrightarrow{JL} \perp \overline{MK}$, point L is on the perpendicular bisector. By the Perpendicular Bisector Theorem, $\overline{JM} \cong \overline{JK}$. So, $JM = JK$, which means $4x + 17 = 7x - 1$ and the solution is $x = 6$. Then, $JK = 7x - 1 = 7(6) - 1 = 41$.

3. $(5, 3)$ **4.** 11

5. $x = 6,\ y = 18$

6. $y = \begin{cases} 40, & 0 < x \le 3 \\ 50, & 3 < x \le 6 \\ 60, & 6 < x \le 9 \\ 70, & 9 < x \le 12 \end{cases}$; \$60

7. linear; The function is of the form $y = mx + b$.

8. nonlinear; The function is a quadratic function.

6.5 Extra Practice

1. Assume temporarily that there are numbers a and b such that $a = \dfrac{b}{0}$.

2. Assume temporarily that there are integers a and b such that $\sqrt{2} = \dfrac{a}{b}$ in simplest form.

3. A and B; If $\triangle LMN$ is equilateral, it cannot have two sides of unequal length.

4. A and C; If $\triangle ABC$ is a right triangle, it cannot contain an obtuse angle.

5. $\angle C, \angle A, \angle B$ **6.** $\overline{GJ}, \overline{GH}, \overline{HJ}$

7. $8 \text{ in.} < x < 18 \text{ in.}$

8. no; $17 > 3 + 12$ **9.** no; $21 = 5 + 16$

10. yes **11.** yes **12.** $\frac{5}{3} < x < 19$

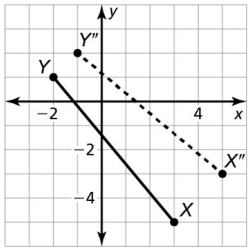
6.5 Review & Refresh

1. $(-1, 4), (0, 2), (3, 5)$

2. $k = \frac{3}{2}$ **3.** 2

4. outside; $(12, 5)$

5.



6. yes; ASA Congruence Theorem

7. 14

8. *Sample answer*:

Equation	Explanation and Reason
$\frac{2}{5}x - \frac{4}{3}y = 2$	Write the equation. Given
$6x - 20y = 30$	Multiply each side by 15. Multiplication Property of Equality
$-20y = -6x + 30$	Subtract $6x$ from each side. Subtraction Property of Equality
$y = \frac{3}{10}x - \frac{3}{2}$	Divide each side by -20. Division Property of Equality

Answers

6.6 Extra Practice

1. <; By the Hinge Theorem, because $\overline{BC}$ is the third side of the triangle with the smaller included angle, it is shorter than $\overline{EF}$.

2. >; By the Hinge Theorem, because $\overline{BC}$ is the third side of the triangle with the larger included angle, it is longer than $\overline{EF}$.

3. =; The triangles are congruent by the SAS Congruence Theorem. So, $\overline{AB} \cong \overline{DC}$ because corresponding parts of congruent triangles are congruent.

4. =; The triangles are congruent by the SSS Congruence Theorem. So, $\angle A \cong \angle D$ because corresponding parts of congruent triangles are congruent.

5. <; By the Converse of the Hinge Theorem, because $\angle A$ is the included angle in the triangle with the shorter third side, its measure is less than that of $\angle D$.

6. >; By the Converse of the Hinge Theorem, because $\angle 1$ is the included angle in the triangle with the longer third side, its measure is greater than that of $\angle 2$.

7.

STATEMENTS	REASONS
1. $\overline{XY} \cong \overline{ZY}$, $WX > WZ$	1. Given
2. $\overline{YW} \cong \overline{YW}$	2. Reflexive Property of Segment Congruence
3. $m\angle WYX > m\angle WYZ$	3. Converse of the Hinge Theorem

8.

STATEMENTS	REASONS
1. $\overline{AD} \cong \overline{CB}$, $m\angle DAC > m\angle BCA$	1. Given
2. $\overline{AC} \cong \overline{CA}$	2. Reflexive Property of Segment Congruence
3. $DC > BA$	3. Hinge Theorem

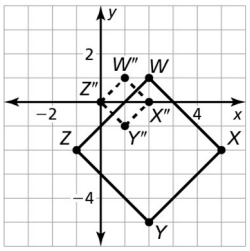
9. When the angle between the scissor blades becomes greater, the rubber band that constitutes the third side of the triangle is stretched to become longer.

10. The first crow; First, use a linear pair to find the included angle formed by the route the first crow takes. The angle formed between the north and northeast segments of the first crow's path is $180° - 45° = 135°$. The angle formed between the south and west segments of the second crow's path is 90°. Because $135° > 90°$, the first crow's distance from Crow Valley is greater than the second crow's distance by the Hinge Theorem.

6.6 Review & Refresh

1. $x = 32$ **2.** $x = 10.5$

3.



4. $\overline{AB}$; By the Hinge Theorem, because $\overline{AB}$ is the third side of the triangle with the larger included angle, it is longer than $\overline{QR}$.

5. a. circumcenter

b. no; This point is not equidistant from the sidewalks. The incenter would be equidistant from the three sidewalks.

Chapter 6 Test Prep

1. $x = 14.6$ **2.** $k = 2.625$

3. C **4.** A **5.** D **6.** B

7. 37 in. **8.** B **9.** D **10.** A

11. $y = 12.2$ **12.** A

13. D **14.** $y = 2x + 3$

15. A, D, F **16.** D, E **17.** D

18. C **19.** D **20.** C

21. D **22.** A **23.** C

Chapter 7

7.1 Extra Practice

1. 1080° **2.** 2340° **3.** 3960°

4. heptagon **5.** 11-gon **6.** 18-gon

7. $x = 155$ **8.** $x = 90$

Answers

9. $x = 140$ **10.** $x = 20$

11. 120° **12.** 144 people

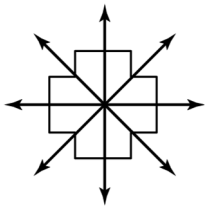
7.1 Review & Refresh

1. $x = 118$ **2.** $x = 98$

3. $m\angle 1$; By the Converse of the Hinge Theorem, $\angle 1$ is the included angle in the triangle with the longer third side, so its measure is greater than that of $\angle 2$.

4. $8 \text{ ft} < x < 20 \text{ ft}$ **5.** $y = \frac{1}{4}x - 7$

6. yes; The polygon has 4 lines of symmetry, as shown.



A reflection in any of the lines of symmetry maps the polygon onto itself.

7. $x = 13.5$ **8.** 15-gon

9. $(x - 11)(x + 6)$ **10.** 155°

7.2 Extra Practice

1. $x = 10,\ y = 40$ **2.** $x = 21.5,\ y = 415$

3. $x = 6,\ y = 8$

4. 24; By the Parallelogram Opposite Sides Theorem, $MN = PO$.

5. 14; By the Parallelogram Diagonals Theorem, $MQ = OQ$.

6. 26; By the Parallelogram Opposite Sides Theorem, $MP = NO$.

7. 20.7; By the Parallelogram Diagonals Theorem, $NQ = PQ$.

8. 112°; By the Parallelogram Consecutive Angles Theorem, $\angle PMN$ and $\angle MNO$ are supplementary. So, $m\angle PMN = 180° - 68° = 112°$.

9. 112°; By the Parallelogram Consecutive Angles Theorem, $\angle NOP$ and $\angle MNO$ are supplementary. So, $m\angle NOP = 180° - 68° = 112°$.

10. 68°; By the Parallelogram Opposite Angles Theorem, $m\angle OPM = m\angle MNO$.

11. 59°; By the Alternate Interior Angles Theorem, $m\angle NMO = m\angle POM$.

12.

STATEMENTS	REASONS
1. $PQRS$ is a parallelogram.	**1.** Given
2. $\overline{PQ} \cong \overline{RS}$	**2.** Parallelogram Opposite Sides Theorem
3. $\overline{QT} \cong \overline{ST}$	**3.** Parallelogram Diagonals Theorem
4. $\overline{PT} \cong \overline{RT}$	**4.** Parallelogram Diagonals Theorem
5. $\triangle PQT \cong \triangle RST$	**5.** SSS Congruence Theorem

13. $X(-1, 1);\ (1, 3.5)$

7.2 Review & Refresh

1. $\overline{BC},\ \overline{AB},\ \overline{AC}$

2. 17.2; By the Parallelogram Opposite Sides Theorem, $QR = ST$.

3. 85°; By the Parallelogram Opposite Angles Theorem, $m\angle S = m\angle Q$.

4. 95°; By the Parallelogram Consecutive Angles Theorem, $\angle T$ and $\angle Q$ are supplementary. So, $m\angle T = 180° - 85° = 95°$.

5. $x = 96$ **6.** $y = -x$

7. yes; Consecutive Interior Angles Converse

8. $m\angle ADB < m\angle CBD$ by the Converse of the Hinge Theorem.

7.3 Extra Practice

1. Opposite Sides Parallel and Congruent Theorem

2. Parallelogram Opposite Angles Converse

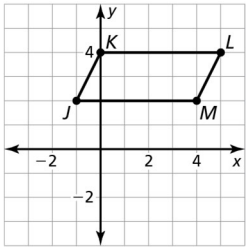
3. Parallelogram Diagonals Converse

4. $x = 40, y = 25$ **5.** $x = 17, y = 17$

Answers

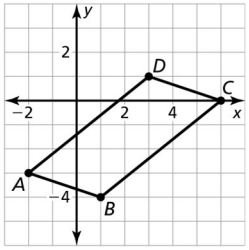
6. $x = 4, y = 2$

7.



Sample answer: Because $JM = KL = 5$, $\overline{JM} \cong \overline{KL}$. Because both $\overline{JM}$ and $\overline{KL}$ are horizontal lines, their slope is 0, and they are parallel. $\overline{JM}$ and $\overline{KL}$ are opposite sides that are both congruent and parallel. So, *JKLM* is a parallelogram by the Opposite Sides Parallel and Congruent Theorem.

8.



Sample answer: Because $AB = CD = \sqrt{10}$ and $AD = BC = \sqrt{41}$, $\overline{AB} \cong \overline{CD}$ and $\overline{AD} \cong \overline{BC}$. Because both pairs of opposite sides are congruent, *JKLM* is a parallelogram by the Parallelogram Opposite Sides Converse.

9. a. Because $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$, *ABDC* is a parallelogram by the Opposite Sides Parallel and Congruent Theorem.

b. Because *ABDC* is a parallelogram, $\overline{AC} \parallel \overline{BD}$. So, $\overline{CE} \parallel \overline{DF}$. From the diagram, $\overline{CD} \parallel \overline{EF}$. Because opposite sides are parallel, *CDFE* is a parallelogram by definition.

c. no; You are given that only one pair of opposite sides are parallel, which is not enough information to prove that *EFHG* is a parallelogram.

d. $m\angle ACD = 35°$, $m\angle DCE = 145°$, $m\angle CEF = 35°$, $m\angle EFD = 145°$

7.3 Review & Refresh

1.

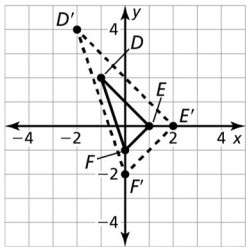
Equation	Explanation and Reason
$4 - 2y = 5 - 6x$	Write the equation. Given
$-2y = 1 - 6x$	Subtract 4 from each side. Subtraction Property of Equality
$y = 3x - \frac{1}{2}$	Divide each side by -2. Division Property of Equality

2. $x = 84$

3. $\sqrt{178}$, or about 13.3 units

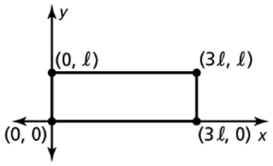
4. $D(-6, -2)$

5.



6. Opposite Sides Parallel and Congruent Theorem

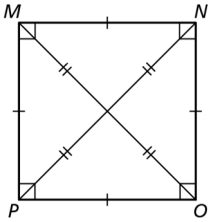
7.



$\ell\sqrt{10}$ units

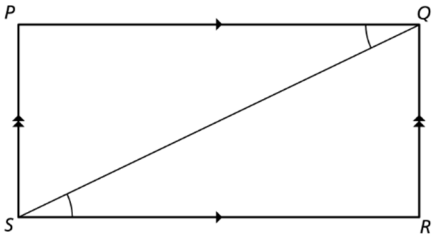
7.4 Extra Practice

1. sometimes; Some rhombuses are squares.



Answers

2. always; By definition, a rectangle is a parallelogram. Because opposite sides are parallel, the alternate interior angles formed by the diagonal are congruent.



3. 9 **4.** 14 **5.** 92°

6. 59° **7.** 17 **8.** 59°

9. $\frac{1}{2}$ **10.** 90° **11.** 45°

12. rhombus; *Sample answer*: The diagonals are perpendicular and not congruent.

13. rectangle; *Sample answer*: The sides are perpendicular and only opposite sides are congruent.

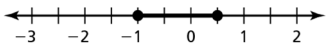
7.4 Review & Refresh

1. The graph of g is a horizontal translation 5 units left of the graph of f.

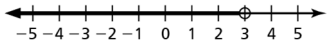
2. The graph of g is a horizontal shrink by a factor of $\frac{1}{3}$ of the graph of f.

3. A segment is a midsegment of a triangle if and only if the segment connects the midpoints of two sides of the triangle.

4. $-1 \le m \le \frac{1}{2}$



5. $t < 3$



6. $x = 6,\ y = 3$ **7.** 168°, 12°

8. $6 + \sqrt{5} + \sqrt{17}$, or about 12.4 units; 3 square units

9. yes; $\triangle DEF \cong \triangle QRS$ by the AAS Congruence Theorem.

10. $AB = 12$; $\overline{AB} \cong \overline{CB}$ by the Converse of the Perpendicular Bisector Theorem. So, $2x = 3(x - 2)$, which has solution $x = 6$. So, $AB = 2x = 2(6) = 12$.

7.5 Extra Practice

1. $m_{\overline{QT}} = m_{\overline{RS}}$, so $\overline{QT} \parallel \overline{RS}$ and $m_{\overline{RQ}} \neq m_{\overline{ST}}$, so $\overline{RQ}$ is not parallel to $\overline{ST}$. Because $QRST$ has exactly one pair of parallel sides, it is a trapezoid. $RQ = ST$, so $QRST$ is an isosceles trapezoid. $\frac{9\sqrt{2}}{2}$, or about 6.4 units

2. $m\angle K = 157°,\ m\angle L = 23°$

3. $m\angle K = 70°,\ m\angle L = 70°$

4. 24 **5.** 3

6. $x = 9$ **7.** $x = 100$

8. rhombus; The diagram shows $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{DA}$. So, $ABCD$ is a rhombus by definition. Because there is no information given about the angle measures, you cannot determine whether it is a square.

9. kite; The diagram shows $\overline{RS} \cong \overline{RU}$ and $\overline{ST} \cong \overline{UT}$. Because there are two pairs of consecutive congruent sides with no opposite sides congruent, $RSTU$ is a kite by definition.

7.5 Review & Refresh

1. yes

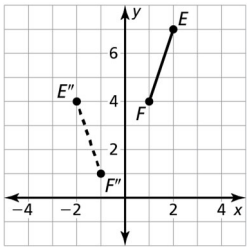
2. $7\sqrt{2}$, or about 9.9 units

3. rectangle

4. $DB = 12$; By the Parallelogram Diagonals Theorem, $DE = EB$. So, $DB = DE + EB = 6 + 6 = 12$.

5. Parallelogram Opposite Angles Converse

6.



Answers

7. 511 feet

Chapter 7 Test Prep

1. 14.2 **2.** 154.5 degrees

3. B **4.** C **5.** A

6. D **7.** B **8.** C, E, F

9. A, B, E **10.** B **11.** D

12. $3\sqrt{2} + \sqrt{10}$, or about 7.4 units

13. A **14.** D **15.** B

16. 13 units **17.** 60 units **18.** $(3, 6)$

19. C **20.** A **21.** A

22. B **23.** B, D, E **24.** D

Chapter 8

8.1 Extra Practice

1. $x = \frac{14}{3}$ **2.** $x = 10$ **3.** $\frac{3}{2}$ **4.** $\frac{2}{3}$

5. $\angle A \cong \angle K$, $\angle B \cong \angle L$, $\angle C \cong \angle M$, $\angle D \cong \angle N$, and $\angle E \cong \angle P$

6. $\frac{AB}{KL} = \frac{BC}{LM} = \frac{CD}{MN} = \frac{DE}{NP} = \frac{AE}{KP}$

7. $x = \frac{3}{2}$, $y = \frac{9\sqrt{2}}{2}$, $z = 45$

8. $6 + 3\sqrt{2}$, $9 + \frac{9\sqrt{2}}{2}$

9. 3 : 2 **10.** 9 : 4

11. 48 feet **12.** sometimes

8.1 Review & Refresh

1. $x = 63$ **2.** $x = 85$

3. 11 units **4.** $x = 53$, $y = 127$

5. $-(5x + 6)(x - 3)$ **6.** $(x - 2)(x^2 - 3)$

7. $x = 21$ **8.** quadratic

9. $x = 3$ **10.** $x = \pm\frac{3\sqrt{2}}{2}$ **11.** 8

8.2 Extra Practice

1. no; $m\angle A = 34°$ so the triangles cannot have two congruent pairs of angles.

2. $\angle AEC \cong \angle BDC$ and $\angle EAC \cong \angle DBC$ by the Corresponding Angles Theorem. So, $\triangle ACE \sim \triangle BCD$ by the AA Similarity Theorem.

3. 27° **4.** 27° **5.** 63°

6. 3 **7.** $\frac{3}{2}$ **8.** $\triangle DGF$

9. $\triangle EFG \sim \triangle EDG$, $\triangle EFG \sim \triangle BAG$, $\triangle EFG \sim \triangle BCG$

10. no; $m\angle J = 34°$ so the triangles cannot have two congruent pairs of angles.

11. $BC = 72$ m; It is given that $\angle ABC \cong \angle EDC$. $\angle ACB \cong \angle ECD$ by the Vertical Angles Congruence Theorem. So, the triangles are similar by the AA Similarity Theorem.

8.2 Review & Refresh

1. yes; HL Congruence Theorem

2. yes; $\triangle ACD \sim \triangle ABE$; $\angle ADC \cong \angle AEB$ and $\angle ACD \cong \angle ABE$ by the Corresponding Angles Theorem, so $\triangle ACD \sim \triangle ABE$ by the AA Similarity Theorem.

3. a. 120°
b. 60°

4. 29° **5.** 324 square feet

6. rectangle, rhombus, square

8.3 Extra Practice

1. $\triangle RST$ **2.** $x = -3$

3. $\frac{AC}{DC} = \frac{BC}{EC}$ and $\angle ACB \cong \angle DCE$, so $\triangle ABC \sim \triangle DEC$ by the SAS Similarity Theorem.

4. $\frac{28}{12} = \frac{35}{15} = \frac{56}{24}$; $\frac{7}{3}$

5. $\frac{35}{2}$, $\frac{45}{2}$ **6.** 4, $\frac{14}{3}$

7. yes; Because the corresponding side lengths of the two triangles are proportional, $\triangle DEF \sim \triangle PQR$ by the SSS Similarity Theorem.

Answers

8.3 Review & Refresh

1. The longest bar is parallel to the shortest bar by the Transitive Property of Parallel Lines.

2. $\angle B \cong \angle B$ and $\angle BAC \cong \angle BDA$, so $\triangle ABC \sim \triangle DBA$ by the AA Similarity Theorem.

3. $P(1, 1.5)$

4. $9 < x < 23$

5. no; Because the input $x = 1$ has two outputs, $y = 1$ and $y = 3$, the relation is not a function.

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

7. 118°

8. 108°

9. yes; ASA Congruence Theorem

8.4 Extra Practice

1. 3

2. $\frac{14}{9}$

3. no

4. yes

5. XZ

6. UV

7. ZX

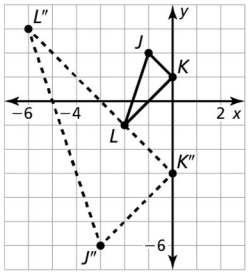
8. $x = 3$

9. $b = 8$

10. 256 ft; If $\overline{BE} \parallel \overline{CF}$, then by the Three Parallel Lines Theorem, $\frac{AB}{BC} = \frac{DE}{EF}$. By substitution, $\frac{100}{320} = \frac{80}{EF}$ and $EF = 256$.

8.4 Review & Refresh

1.



2. Place the entrance at the incenter of the triangle.

3. $x = 12$

4. $b_1 = \frac{2A}{h} - b_2$

5. $\angle D \cong \angle M$ and $\angle F \cong \angle L$, so $\triangle DEF \sim \triangle MNL$ by the AA Similarity Theorem.

6. $x = 2$

Chapter 8 Test Prep

1. A, C

2. D

3. D

4. 21 units

5. 82.5 feet

6. $(-4, 5)$

7. B

8. A, C

9. D

10. $\frac{3}{2}$ or 1.5

11. C

12. B

13. D

14. A

15. B

16. $x = 7$

17. A

18. A

19. C

20. D

21. B

Chapter 9

9.1 Extra Practice

1. $x = 135$; yes

2. $x = 4\sqrt{3} \approx 6.9$; no

3. $x = 25$; yes

4. $x = 2\sqrt{34} \approx 11.7$; no

5. $x = 22\sqrt{6} \approx 53.9$; no

6. $x = 102$; yes

7. 0.4 mile

8. 5630 feet

9. yes; right

10. yes; obtuse

11. yes; acute

9.1 Review & Refresh

1. $6\sqrt{3}$

2. $\frac{15 - 5\sqrt{2}}{7}$

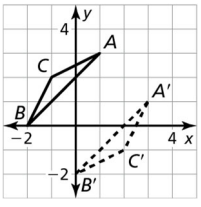
3. $m\angle A = m\angle B = 75°$, $m\angle D = 105°$

4. yes; Because $\overline{JL} \parallel \overline{MN}$, $\angle J \cong \angle KMN$ and $\angle L \cong \angle KNM$ by the Corresponding Angles Theorem. Then, $\triangle JKL \sim \triangle MKN$ by the AA Similarity Theorem.

5. no

6. $\frac{DE}{HI} = \frac{EF}{IG} = \frac{FD}{GH}$, so $\triangle DEF \sim \triangle HIG$ by the SSS Similarity Theorem.

7.



9.2 Extra Practice

1. $x = 1$

2. $x = 8$

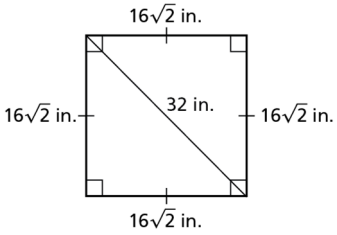
3. $x = 6\sqrt{2}$

Answers

4. $x = 15\sqrt{3},\ y = 30$ **5.** $x = 11\sqrt{3},\ y = 11$

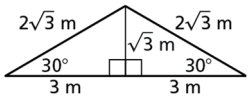
6. $x = 3\sqrt{3},\ y = 6\sqrt{3}$

7.



$64\sqrt{2}$ in.

8.



6 m

9. $98\sqrt{3}$ m^2 **10.** 6 ft; $6\sqrt{2}$ ft; $6\sqrt{3}$ ft

9.2 Review & Refresh

1. $x = 18$ **2.** yes; acute

3. $x = 9\sqrt{3},\ y = 9$ **4.** $M(2, 1)$

5. yes; $\triangle ABC$ can be mapped to $\triangle DEF$ by a translation 3 units left and 1 unit down.

6. The tiles with side lengths 5.6 cm, 5.6 cm, 8 cm and 3.5 cm, 3.5 cm, 5 cm are similar because the corresponding side lengths are proportional.

7. $X(3, 1)$

8. A quadrilateral is a trapezoid if and only if it has exactly one pair of parallel sides.

9.3 Extra Practice

1. $\triangle HJI \sim \triangle HKJ \sim \triangle JKI$

2. $\triangle OMN \sim \triangle OPM \sim \triangle MPN$

3. $x = 7.2$ **4.** $x = \frac{120}{13}$ **5.** $x = 6.72$

6. $2\sqrt{3}$ **7.** 15 **8.** $12\sqrt{2}$

9. $x = 12$ **10.** $y = 3\sqrt{11}$ **11.** $a = 8$

12. about 67.8 cm

9.3 Review & Refresh

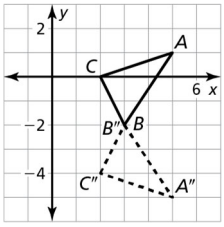
1. $x = 11$ **2.** 12 **3.** 19

4. $\sqrt{39} \approx 6.2$ ft

5. no **6.** $y = 4.5$

7. yes; $m\angle F = 180° - 70° - 42° = 68°$, $\angle E \cong \angle T$, and $\angle F \cong \angle U$, so $\triangle DEF \sim \triangle STU$ by the AA Similarity Theorem.

8.



9.4 Extra Practice

1. $\tan R = \frac{45}{24} = 1.875$, $\tan S = \frac{24}{45} \approx 0.5333$

2. $\tan J = \frac{7}{5} = 1.4$, $\tan L = \frac{5}{7} \approx 0.7143$

3. $\tan A = \sqrt{2} \approx 1.4142$, $\tan C = \frac{\sqrt{2}}{2} \approx 0.7071$

4. $x \approx 28.4$ **5.** $x \approx 26.7$ **6.** $x \approx 39.9$

7. Because $\triangle ABC$ is not a right triangle, the tangent ratio cannot be used; not possible

8. $\tan D = \frac{3}{4}$ **9.** about 101.5 ft

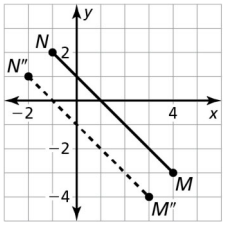
10. about 59.5 units

9.4 Review & Refresh

1. $x = 5\sqrt{5}$; no **2.** $8\sqrt{3}$

3. 6 square units

4.



5. $(-1, 0)$ **6.** $x = 12$

7. $x = 72$ **8.** $x \approx 9.0$

9. $x = 6\sqrt{3}$ **10.** $m\angle 2 = 60°$

Answers

9.5 Extra Practice

1. $\sin F = \frac{12}{13} \approx 0.9231$, $\sin G = \frac{5}{13} \approx 0.3846$, $\cos F = \frac{5}{13} \approx 0.3846$, $\cos G = \frac{12}{13} \approx 0.9231$

2. $\sin F = \frac{65}{97} \approx 0.6701$, $\sin G = \frac{72}{97} \approx 0.7423$, $\cos F = \frac{72}{97} \approx 0.7423$, $\cos G = \frac{65}{97} \approx 0.6701$

3. $\sin F = \frac{\sqrt{2}}{2} \approx 0.7071$, $\sin G = \frac{\sqrt{2}}{2} \approx 0.7071$, $\cos F = \frac{\sqrt{2}}{2} \approx 0.7071$, $\cos G = \frac{\sqrt{2}}{2} \approx 0.7071$

4. $\cos 81°$ **5.** $\cos 60°$ **6.** $\cos 13°$

7. $\sin 75°$ **8.** $\sin 7°$ **9.** $\sin 45°$

10. $m \approx 15.5$, $n \approx 47.6$ **11.** $c \approx 10.7$, $d \approx 14.7$

12. $a \approx 13.1$, $b \approx 30.9$

13. a. about 110.3 ft
b. about 453.2 ft

9.5 Review & Refresh

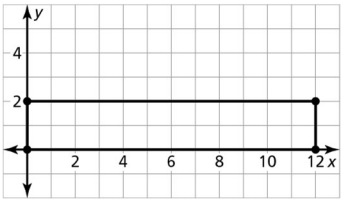
1. $x = \sqrt{39}$; no **2.** $x = 26$; yes

3. $\sin 19°$ **4.** $x \approx 6.9$ **5.** 165.6°; 14.4°

6. $\triangle WXY \sim \triangle WZX \sim \triangle XZY$; $x = 2\sqrt{3}$

7. $x = \frac{4\sqrt{3}}{3}$, $y = \frac{8\sqrt{3}}{3}$ **8.** $x = 15$, $y = 4$

9.



$2\sqrt{37}$, or about 12.2 units

10. $P(2.4, 3.8)$

9.6 Extra Practice

1. $\angle F$ **2.** $\angle E$

3. about 11.5° **4.** 45° **5.** about 70.7°

6. $ED = 72$, $m\angle C \approx 73.7°$, $m\angle D \approx 16.3°$

7. $LM \approx 1.8$, $MN \approx 2.4$, $m\angle N = 38°$

8. $XZ \approx 32.5$, $YZ \approx 37.1$, $m\angle Y = 61°$

9. about 28.7° **10.** about 27.4° **11.** about 499.3 ft

9.6 Review & Refresh

1. $\sin X = \frac{16}{65} \approx 0.2462$, $\cos X = \frac{63}{65} \approx 0.9692$, $\tan X = \frac{16}{63} \approx 0.2540$

2. $x = 119$ **3.** $x = 2.0625$

4. $\triangle ABC \sim \triangle ADB \sim \triangle BDC$; $y = 4\sqrt{21} \approx 18.3$

5. $x = 6$, $y = 2$

6. $m\angle 1 = 56°$; Consecutive Interior Angles Theorem

7. $RS \approx 15.1$, $m\angle Q \approx 40°$, $m\angle R \approx 50°$

8. $GH \approx 6.2$, $FH \approx 3.3$, $m\angle F = 62°$

9. yes; A rotation of 120° about the center maps the model onto itself.

9.7 Extra Practice

1. about -0.7071 **2.** about -0.3584

3. about -9.5144 **4.** about 61.8 square units

5. about 85.0 square units

6. $m\angle C = 100°$, $a \approx 33.7$, $c \approx 43.3$

7. $m\angle B \approx 39.3°$, $m\angle C \approx 58.7°$, $c \approx 21.6$

8. $m\angle A \approx 38.2°$, $m\angle B = 120°$, $m\angle C \approx 21.8°$

9. $m\angle A = 79°$, $b \approx 11.6$, $c \approx 17.4$

10. $m\angle A \approx 42.3°$, $m\angle B \approx 109.6°$, $m\angle C \approx 28.1°$

11. $m\angle A \approx 53.4°$, $m\angle C \approx 98.6°$, $b \approx 7.6$

12. about 20.7°, 32.1°, and 127.2°

9.7 Review & Refresh

1. $x = 8\sqrt{3}$ **2.** $x \approx 10.4$

3. $x = 5\sqrt{2}$ **4.** $x = 24$

5. $6 < x < 16$

Answers

6. yes; Quadrilateral $ABCD$ can be mapped to quadrilateral $EFGH$ by a reflection in the line $y = x$, followed by a translation 2 units right and 4 units down.

7. $x = -4$ **8.** $x \approx 27.2$, $y \approx 10.6$

9. Parallelogram Opposite Sides Converse

10. $(7, -1)$

11. $m\angle B \approx 53.1°$, $m\angle C \approx 36.9°$, $c = 6$

12. $m\angle A \approx 77.9°$, $m\angle B \approx 63.1°$, $a \approx 18.6$

Chapter 9 Test Prep

1. B **2.** D **3.** A, B

4. A, B, D **5.** C **6.** A

7. C **8.** D **9.** D

10. 15.825 **11.** 122.87 square units

12. $\triangle EDC$ **13.** D **14.** B

15. C **16.** A **17.** D

18. cos 14° **19.** A **20.** C

21. C **22.** B **23.** 7.16 meters

24. A, C, D

Chapter 10

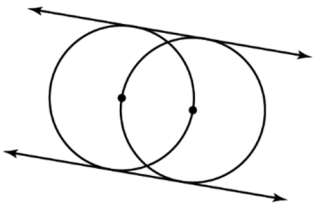
10.1 Extra Practice

1. $\odot A$ **2.** $\overline{AB}$, $\overline{AD}$, and $\overline{AF}$

3. $\overline{CE}$, $\overline{DE}$, and $\overline{DF}$ **4.** $\overline{DF}$

5. $\overleftrightarrow{DE}$ **6.** $\overleftrightarrow{BG}$, point B

7. 2; Both are external tangents.



8. $r = \frac{9}{4}$ **9.** $r = 6$

10. $r = 8$ **11.** $x = 9$

12. $x = 9$ **13.** $x = -\frac{3}{4}$, $x = 1$

14. a. 40 ft; By the External Tangent Congruence Theorem, the sidewalks are the same length.

b. 60 ft

10.1 Review & Refresh

1. $m\angle U = 51°$, $ST \approx 6.2$, $SU \approx 7.9$

2. $c \approx 11.0$, $m\angle A \approx 45.0°$, $m\angle B \approx 32.0°$

3. 108° **4.** 13

5. parallel **6.** $x = 8$

7. about 5.46 ft **8.** $AP = 28$, $DP = 14$

10.2 Extra Practice

1. minor arc; 55° **2.** minor arc; 95°

3. semicircle; 180° **4.** major arc; 235°

5. minor arc; 125° **6.** major arc; 275°

7. 79.2° **8.** 198° **9.** 270°

10. congruent; They are arcs of the same circle and they have congruent central angles.

11. not congruent; The circles are not congruent.

12. $x = 25$; 125°

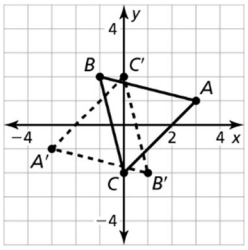
10.2 Review & Refresh

1. $x = -1$, $x = \frac{9}{2}$ **2.** $\overset{\frown}{AB}$, 135°; $\overset{\frown}{ADB}$, 225°

3. $\sqrt{53}$, or about 7.3 ft **4.** $12\sqrt{5}$

5. $x = 5\sqrt{2}$ **6.** $x = 120$

7.



Answers

8. 58°; By the Converse of the Angle Bisector Theorem, $\overrightarrow{BD}$ bisects $\angle ABC$. So, $m\angle ABD = m\angle CBD$ and $(4x - 7)° = (2x + 11)°$, which has the solution $x = 9$. So,

$$\begin{aligned} m\angle ABC &= 2(m\angle ABD) \\ &= 2(4x - 7)° \\ &= 2[4(9) - 7]° \\ &= 58°. \end{aligned}$$

10.3 Extra Practice

1. 42° **2.** 3.6 **3.** 9.2 **4.** 138°

5. $x = 3.6$ **6.** $x = 6$

7. Place the scarecrow at the center of the circle that passes through the bushes.

8. yes; $\triangle ACE \cong \triangle ADE$ by the SSS Congruence Theorem, so $\angle AEC$ and $\angle AED$ are right angles. So, $\overline{AB}$ is a perpendicular bisector of $\overline{CD}$, and $\overline{AB}$ is a diameter of the circle by the Perpendicular Chord Bisector Converse.

9. no; $CE \neq ED$

10. 5 **11.** $\sqrt{149}$, or about 12.2

10.3 Review & Refresh

1. $x = 7$ **2.** 96° **3.** 145°

4. congruent; The circles are congruent and the arcs have congruent central angles.

5. about 218.1 m **6.** 137°

10.4 Extra Practice

1. 85° **2.** 41° **3.** 106°

4. 133° **5.** 114° **6.** 66°

7. 180° **8.** 90° **9.** 62°

10. $\sqrt{68.5}$, or about 8.3

11. 56° **12.** 124°

13. $\angle A \cong \angle D$, $\angle B \cong \angle C$

14. $m = 115$, $n = 80$ **15.** $a = 28.5$, $b = 10$

10.4 Review & Refresh

1. *Sample answer*: A 90° rotation about the origin, followed by a translation 3 units right and 2 units up maps $\triangle ABC$ to $\triangle DEF$.

2. 5 **3.** minor arc; 50°

4. semicircle; 180° **5.** major arc; 310°

6. no; $\triangle ABC$ is not a right triangle.

7. 87° **8.** 35°

9. your friend; First, use linear pairs to find the included angles formed by the paths you and your friend take. The included angle formed by your path is $180° - 30° = 150°$. The included angle formed by your friend's path is $180° - 15° = 165°$. Because $165° > 150°$, your friend's distance from the school is greater than your distance by the Hinge Theorem.

10.5 Extra Practice

1. 140° **2.** 144° **3.** 52°

4. $x = 71$ **5.** $x = 20$ **6.** $x = 148$

7. $x = 50$ **8.** $x = 14$ **9.** $x = 31$

10. about 3°

10.5 Review & Refresh

1. $21 + \sqrt{233}$, or about 36.3 units; 52 square units

2. 53°; Because the measure of the entire circle is 360°,

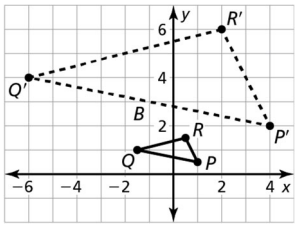
$$\begin{aligned} m\overset{\frown}{AC} &= 360° - m\overset{\frown}{AB} - m\overset{\frown}{BC} \\ &= 360° - 180° - 127° \\ &= 53°. \end{aligned}$$

3. $x = 109$ **4.** $x = 259$

5. $19 < x < 29$

6. 47.5° **7.** 119°

8.



10.6 Extra Practice

1. $x = 5$ **2.** $x = 1$ **3.** $x = 5$

4. $x = 7$ **5.** $x = 5$ **6.** $x = 6$

7. 11.2 ft **8.** about 14.2 ft

Answers

10.6 Review & Refresh

1. 53 **2.** about 5.5 m

3. 16 **4.** 164° **5.** 136°

6. $m\angle F = 180° - 121° - 42° = 17°$. So, $\angle F \cong \angle EGH$. $\angle E \cong \angle E$ by the Reflexive Property of Angle Congruence. So, $\triangle EGH \sim \triangle EFG$ by the AA Similarity Theorem.

7. $x = 13$; By the Consecutive Interior Angles Converse, $m \parallel n$ when the 49° angle is supplementary to the $(9x + 14)°$ angle. So, $49 + 9x + 14 = 180$, and $x = 13$.

10.7 Extra Practice

1. $x^2 + y^2 = 64$

2. $(x - 2)^2 + (y - 2)^2 = 16$

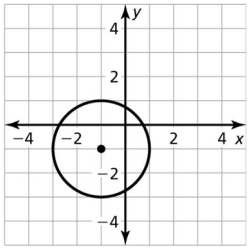
3. $x^2 + y^2 = \frac{1}{9}$

4. $(x + 3)^2 + (y + 5)^2 = 64$

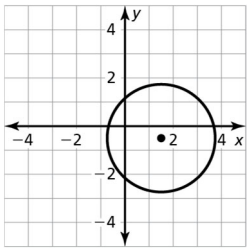
5. $x^2 + y^2 = 25$

6. $(x - 4)^2 + (y - 5)^2 = 25$

7. center: $(-1, -1)$, radius: 2



8. center: $\left(\frac{3}{2}, -\frac{1}{2}\right)$, radius: $\sqrt{5}$



9. The radius of the circle is $3\sqrt{2}$. $\sqrt{[-1 - (-4)]^2 + [2 - (-1)]^2} = 3\sqrt{2}$, so $(-1, 2)$ does lie on the circle.

10. The epicenter is at about $(2, 0)$.

10.7 Review & Refresh

1. $(x + 3)^2 + (y - 5)^2 = 169$

2. $x = 91$ **3.** $x = 3$

4. major arc; 265° **5.** minor arc; 122°

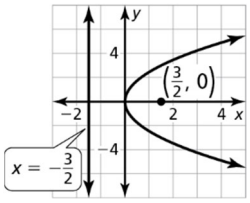
6. major arc; 238° **7.** semicircle; 180°

8. 64° **9.** 118° **10.** $x = 5$

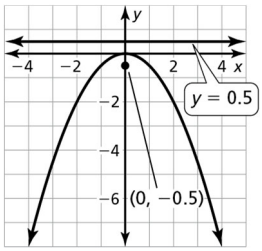
10.8 Extra Practice

1. $y = -\frac{1}{32}x^2$ **2.** $y = \frac{1}{4}x^2$

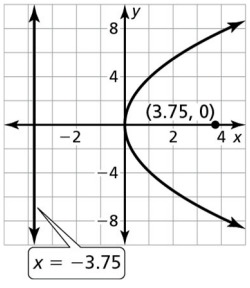
3. The focus is $\left(\frac{3}{2}, 0\right)$. The directrix is $x = -\frac{3}{2}$. The axis of symmetry is $y = 0$.



4. The focus is $(0, -0.5)$. The directrix is $y = 0.5$. The axis of symmetry is $x = 0$.



5. The focus is $(3.75, 0)$. The directrix is $x = -3.75$. The axis of symmetry is $y = 0$.



6. $y = \frac{1}{20}x^2$ **7.** $x = -\frac{1}{12}y^2$

8. $x = -\frac{1}{4}(y + 1)^2 - 3$ **9.** $y = 0.5(x - 4)^2 + 1$

10. $y = \frac{1}{16}(x - 6)^2 + 5$ **11.** $x = -\frac{1}{2}(y + 8)^2 - 7$

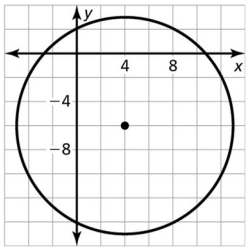
Answers

12. $x = -\frac{1}{4}y^2$ **13.** $y = -\frac{1}{16}x^2$

10.8 Review & Refresh

1. $x = 12$ **2.** $x = 14$

3. center: $(4, -6)$ radius: 9



4. $x = -\frac{1}{12}(y + 1)^2 + 4$

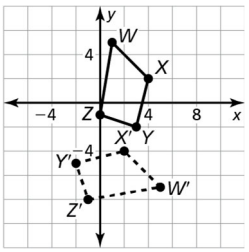
5. $m\angle ABD = 81°$, $m\angle CBD = 99°$

6. $\left(-\frac{9}{2}, -\frac{5}{2}\right)$

7. Compass B; Because $100° > 60°$, the ends of compass B are farther apart by the Hinge Theorem. So, compass B can make a larger circle.

8. $x = \frac{5\sqrt{3}}{3}$, $y = \frac{10\sqrt{3}}{3}$

9.



Chapter 10 Test Prep

1. D **2.** A

3. $(x + 5)^2 + (y - 12)^2 = 25$

4. D **5.** D **6.** B, D, E, F

7. B **8.** D **9.** B

10. C **11.** A, D **12.** C

13. A **14.** –25 **15.** 17.867

16. B **17.** B **18.** 36

19. C **20.** B **21.** A

22. $x = \frac{1}{12}(y - 1)^2 + 6$

23. A **24.** C

25. $X'(-8, 4)$, $Y'(12, -4)$, $Z'(4, 16)$

Chapter 11

11.1 Extra Practice

1. about 3.18 in. **2.** about 18.85 cm

3. about 1.27 ft **4.** about 7.54 m

5. about 3.67 in. **6.** about 147.02°

7. about 8.00 ft **8.** about 22.85 units

9. about 60.41 units **10.** $\frac{\pi}{3}$ radians

11. 150°

12. a. 1257 ft

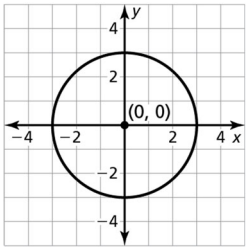
b. 880 ft

11.1 Review & Refresh

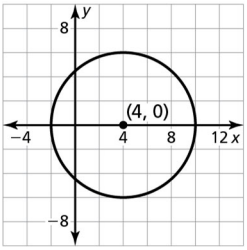
1. 30 square units **2.** 72 square units

3. 8.5

4. center: $(0, 0)$ radius: 3



5. center: $(4, 0)$, radius: 6



6. $x = 15.4$ **7.** $x = 10$

8. $y = -\frac{1}{136}(x - 87)^2 + 56$

11.2 Extra Practice

1. about 2.54 in.^{2} **2.** about 3.57 ft

3. about 4.55 cm **4.** about 116.90 yd^2

Answers

5. about 19.55 cm^2; about 30.72 cm^2

6. about 59.38 $in.^2$; about 195.09 $in.^2$

7. about 13.96 ft^2; about 64.58 ft^2

8. 59.04 ft^2

9. about 3.50 m

10. about 452.39 $in.^2$

11. about 26.14 m^2

12. about 41.20 ft^2

13. The coverage area is four times greater;

$$\frac{\text{new coverage area}}{\text{old coverage area}} \approx \frac{7260.57 \text{ ft}^2}{1815.14 \text{ ft}^2} \approx 4$$

11.2 Review & Refresh

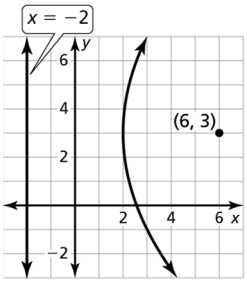
1. about 9.13 ft^2

2. about 110.01°

3. 46°

4. focus: $(6, 3)$, directrix: $x = -2$,

axis of symmetry: $y = 3$



5. $3\sqrt{5}$, or about 6.7 units

6. $DE = 9$, $BE = 27$

7. By the AAS Congruence Theorem, the right triangles that represent each half of the pediment are congruent. Because corresponding parts of congruent triangles are congruent, the lengths of both sides of the pediment are the same.

8. 17

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

11.3 Extra Practice

1. 140 $in.^2$

2. 16 cm^2

3. 45°

4. 9 sides

5. about 254.61 square units

6. about 41.57 square units

7. about 276 square units

8. about 38.04 square units

9. about 346.41 square units

10. about 138.19 square units

11. about 2.89 square units

12. about 49.97 square units

13. a. about 73.88 ft

b. 3 containers; The area of the floor is about 416.5 square feet. Because $416.5 \div 200 \approx 2.08$ and you cannot buy part of a container, you will need 3 containers of wood sealer.

11.3 Review & Refresh

1. about 26.53 m^2

2. about 4.92 ft

3. $y = \frac{1}{12}(x - 2)^2 + 4$

4. yes; *Sample answer*: $\triangle ABC$ maps to $\triangle DEF$ by a dilation with a scale factor of 2, followed by a translation 2 units right and 1 unit down.

5. $x \approx 4.6$

6. $x = 4.5$

7. about 1527.67 square units

8. a. Parallelogram Opposite Sides Converse

b. 130°, 130°, 50°

9. 107°

11.4 Extra Practice

1. about 6 people per mi^2

2. about 25 people per mi^2

3. about 34,605 people

4. about 7.9 km

5. about 6.8 mi

6. $18,379

7. 3 billion bits per $in.^2$

8. a. about 14.4 mi^2

b. about 1123 people

11.4 Review & Refresh

1. about 199.57°

2. about 83.41 $in.^2$; about 171.06 $in.^2$

3. about 68.41 square units

4. about 12.2 mi

5. 150 m, 120 m

6. $JL < SQ$; Because $\overline{JL}$ is the third side of the triangle with the smaller included angle, it is shorter than $\overline{SQ}$ by the Hinge Theorem.

Answers

7. $a \approx 34.2$, $b \approx 14.5$ **8.** 3780°

9. 40

Chapter 11 Test Prep

1. A **2.** D **3.** A

4. D **5.** B **6.** B

7. A, B, D, F **8.** C **9.** A

10. B **11.** B

12. $y = \frac{1}{8}(x - 2)^2 + 3$ **13.** B

14. C **15.** 146.3 square units

16. B **17.** C **18.** 31.36 yd^2

19. 6.79 m **20.** 10.27 m^2 **21.** C

22. B **23.** A, C, E **24.** A, F

Chapter 12

12.1 Extra Practice

1. yes; pentagonal prism **2.** no

3. yes; octagonal pyramid **4.** square

5. triangle **6.** trapezoid **7.** heptagon

8. a.

rectangle

b. 10 in.

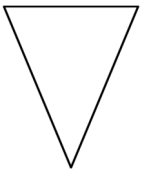
c. 6 $in.^2$

12.1 Review & Refresh

1. It is given that $\overline{QU} \cong \overline{TU}$. First, $\overline{RU} \cong \overline{SU}$ by the Converse of the Base Angles Theorem. Then $\angle QUR \cong \angle TUS$ by the Vertical Angles Congruence Theorem. $\triangle QUR \cong \triangle TUS$ by the SAS Congruence Theorem. Finally, $\overline{QR} \cong \overline{TS}$ because corresponding parts of congruent triangles are congruent.

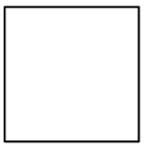
2. 18 oz per yd^2

3.



triangle

4.



square

5. yes; Because $60^2 + 91^2 = (60 + 49)^2$, $\triangle ABC$ is a right triangle.

6. $X(-2, -3)$

7. $DE \approx 24.6$, $EF \approx 8.5$, $m\angle F = 71°$

8. $29 + 34 > 51$; obtuse

9. 142.5 $units^2$ **10.** 40 $units^2$

12.2 Extra Practice

1. 40 $in.^3$ **2.** 392 ft^3

3. 11.25 cm^3 **4.** about 137.4 $in.^3$

5. about 138.2 cm^3 **6.** about 831.8 cm^3

7. $p \approx 2$ in. **8.** $x = 2$ yd

9. $y = 10.5$ cm **10.** about 166.6 cm^3

11. $S = 756\pi$ m^2, $V = 2295\pi$ m^3

12.2 Review & Refresh

1. $x = 17, y = 7$

2. no **3.** yes; triangular pyramid

4. yes; $m\angle P = 74°$, so $\triangle PQR \sim \triangle STU$ by the AA Similarity Theorem.

5. $x = 7$ **6.** about 863.3 mi

7. 52 m^3 **8.** about 377.0 $in.^3$

9. about 268.4 $units^2$

12.3 Extra Practice

1. 36 cm^3 **2.** 96 $in.^3$ **3.** 45 cm^3

4. $4 + 2\sqrt{13}$ cm **5.** 9 yd

6. 6 ft **7.** about 37.0 $in.^3$

8. $326\frac{2}{3}$ ft^3 **9.** $32\frac{2}{3}$ m

Answers

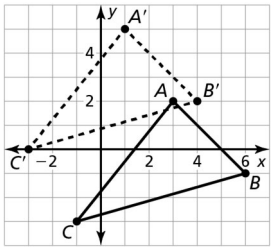
12.3 Review & Refresh

1. $x \approx 14.4$ **2.** $x \approx 7.2$

3. about 10 miles **4.** 54 yd^3

5. 10.5 cm^3 **6.** hexagon

7.



8. yes; The campsite is 100 feet from the trail.

9. If it is Saturday, then it is the weekend; true; If it is not the weekend, then it is not Saturday; true

12.4 Extra Practice

1. about 75.4 cm^2 **2.** about 11.4 $in.^2$

3. about 37.7 cm^3 **4.** about 314.2 ft^3

5. height ≈ 14 m, slant height ≈ 15.2 m

6. 2093.75 cm^3 **7.** about 79.6 $in.^3$

8. cylindrical container; The cost of the cylindrical container is about \$0.02 per cubic inch, whereas the cost of the cone-shaped container is about \$0.03 per cubic inch.

9. $3h$; $r\sqrt{3}$; *Sample answer:* The original volume is $V = \frac{1}{3}\pi r^2 h$ and the new volume is $V = \pi r^2 h$.

12.4 Review & Refresh

1. 64π, or about 201.1 m^2 **2.** 36 in.

3. about 452.9 ft^2 **4.** about 188.5 $in.^3$

5. 46.8 ft, 130 ft

6. about 10.1 in., about 8.0 $in.^2$

7. 312 m^3

8. yes; The arcs are in the same circle and $m\overset{\frown}{XY} = m\overset{\frown}{YZ}$.

12.5 Extra Practice

1. about 314.2 cm^2 **2.** about 254.5 $in.^2$

3. about 153.9 cm^2 **4.** 9 cm

5. 52 yd **6.** about 1767.1 $in.^3$

7. about 9202.8 cm^3 **8.** about 113.1 ft^3

9. about 9.4 ft^2, about 2.1 ft^3

10. about 1182.2 m^2, about 2942.5 m^3

11. about 2144.7 $in.^3$ **12.** about 4188.8 ft^3

13. about 2827.4 $in.^3$ **14.** about 6335.5 m^3

15. about 12.6 yd^2; The edge length of the cube is 2 yards, which is the diameter of the sphere.

12.5 Review & Refresh

1. $m\angle A \approx 107.0°$, $m\angle C \approx 56.0°$, $b \approx 4.6$

2. $m\overset{\frown}{AC} \approx 20.2°$ **3.** 1715π ft^3

4. $h \approx 12$ m **5.** 47 units

6. yes; $\frac{SR}{RQ} = \frac{ST}{TU}$, so $\overline{RT} \parallel \overline{QU}$ by the Converse of the Triangle Proportionality Theorem.

7. about 3631.7 mm^2, about 20,579.5 mm^3

8. about 3078.8 yd^2, about 8796.5 yd^3

12.6 Extra Practice

1. about 1456.1 g **2.** about 1.1 cm

3. about 15,816.2 g **4.** about 0.0016 cm

5. a. about 85,399.0 kg

b. about 8.3 m^3

c. The amount of sand accumulated will not be the same each hour because the differences between the volumes from hour to hour are increasing.

6. about 0.09 cm

12.6 Review & Refresh

1. Because $m_{\overline{WX}} = -\frac{5}{3}$ and $m_{\overline{YZ}} = -\frac{5}{3}$, $\overline{WX} \parallel \overline{YZ}$. Because $m_{\overline{XY}} = 9$ and $m_{\overline{WZ}} = -\frac{1}{7}$, $\overline{XY}$ is not parallel to $\overline{WZ}$. The quadrilateral has exactly one pair of parallel sides, so it is a trapezoid; Because $XY = \sqrt{82}$ and $WZ = 5\sqrt{2}$, the trapezoid is not isosceles.

2. about 172.9 g

3. about 7854.0 $in.^2$, about 65,449.8 $in.^3$

Answers

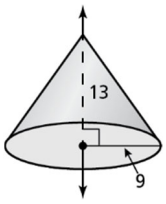
4. about 213.6 cm^3 **5.** 49.152 m^3

6. yes; It is given that $\overline{PS} \cong \overline{RS}$ and $\angle PSQ$ is a right angle. Because $\angle PSQ$ and $\angle RSQ$ form a linear pair, $\angle RSQ$ is a right angle. So, $\angle PSQ \cong \angle RSQ$ by the Right Angle Congruence Theorem. By the Reflexive Property of Segment Congruence, $\overline{QS} \cong \overline{QS}$. So, $\triangle PQS \cong \triangle RQS$ by the SAS Congruence Theorem.

7. $x = 12\sqrt{3}$ **8.** $x = 5\sqrt{2}$

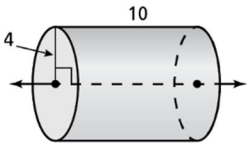
12.7 Extra Practice

1.



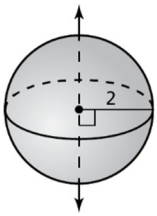
cone with a height of 13 units and a radius of 9 units

2.



cylinder with a height of 10 units and a radius of 4 units

3.



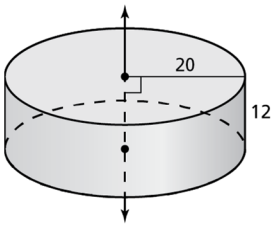
sphere with a radius of 2 units

4.

5.

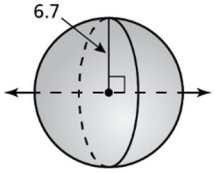
6.

7.



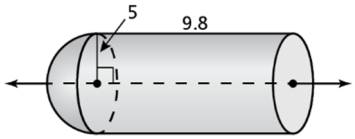
cylinder with a height of 12 units and a radius of 20 units; about 4021.2 $units^2$, about 15,079.6 $units^3$

8.



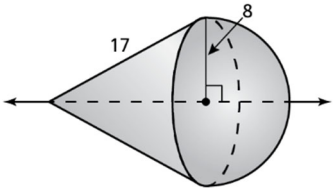
sphere with a radius of 6.7 units; about 564.1 $units^2$, about 1259.8 $units^3$

9.



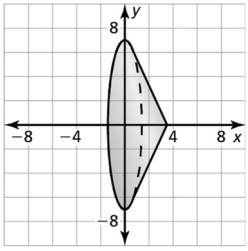
hemisphere with a radius of 5 units and a cylinder with a height of 9.8 units and a radius of 5 units; about 543.5 $units^2$, about 1031.5 $units^3$

10.



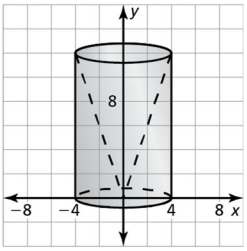
cone with a slant height of 17 units and a radius of 8 units and a hemisphere with a radius of 8 units; about 829.4 $units^2$, about 2077.6 $units^3$

11.



cone with a height of 3.5 units and a radius of 7 units; about 179.6 $units^3$

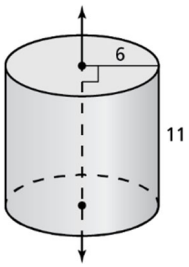
Answers

12. 

cylinder with a cone removed, both with a height of 12 units and a radius of 4 units; about 402.1 units^3

12.7 Review & Refresh

1. about 10 miles

2. 

cylinder with a height of 11 units and a radius of 6 units; about 640.9 units^2, about 1244.1 units^3

3. about 2.4 g

4. $x = \sqrt{119}$; no

5. about 581.1 in.^{2}

6. about 1205.3 ft^3

7. about 1 h and 24 min

8. $x = -\frac{1}{12}(y - 3)^2 - 1$

Chapter 12 Test Prep

1. 57,905.8 mm^3

2. 189,400 people

3. B **4.** A **5.** A, D **6.** D

7. C **8.** C, E, F **9.** B **10.** C

11. A, B **12.** A **13.** B **14.** A

15. rectangle **16.** D **17.** B

18. D **19.** B **20.** B **21.** A

Chapter 13

13.1 Extra Practice

1. 52; 2HH, 2HT, 2TH, 2TT, 3HH, 3HT, 3TH, 3TT, 4HH, 4HT, 4TH, 4TT, 5HH, 5HT, 5TH, 5TT, 6HH, 6HT, 6TH, 6TT, 7HH, 7HT, 7TH, 7TT, 8HH, 8HT, 8TH, 8TT, 9HH, 9HT, 9TH, 9TT, 10HH, 10HT, 10TH, 10TT, JHH, JHT, JTH, JTT, QHH, QHT, QTH, QTT, KHH, KHT, KTH, KTT, AHH, AHT, ATH, ATT

2. 30; B1, B2, B3, B4, B5, B6, G1, G2, G3, G4, G5, G6, R1, R2, R3, R4, R5, R6, Y1, Y2, Y3, Y4, Y5, Y6, P1, P2, P3, P4, P5, P6

3. a. $\frac{91}{100}$, or 91%

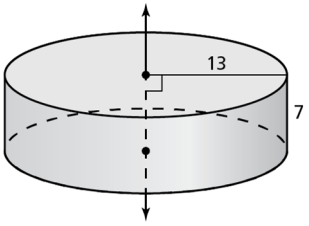
b. $\frac{73}{100}$, or 73%

4. about 0.196, or 19.6%

5. 9

6. 160; $\left(\frac{100}{1500}\right)2400 = 160$

13.1 Review & Refresh

1. 

cylinder with a height of 7 units and a radius of 13 units

2. about 1801.4 kg

3. about 1246.4 cm^2, about 3185.3 cm^3

4. The experimental probability, 45%, is greater than the theoretical probability, 40%.

5. $x = 3$ **6.** $x = 6$

13.2 Extra Practice

1.

		Arrival		
		Tardy	**On Time**	**Total**
Method	**Walk**	22	48	70
	City Bus	50	10	60
	Total	72	58	130

Answers

2.

		Family Size		
		One child	**Two or more children**	**Total**
Response	**Yes**	94	60	154
	No	6	26	32
	Total	100	86	186

186 families were surveyed, 100 families with one child were surveyed, 86 families with 2 or more children were surveyed, 154 families are saving for college, 32 families are not saving for college.

3.

		Frequency of Playing Video Games		
		Every Day	**Not Every Day**	**Total**
Trouble Sleeping	**Yes**	0.153	0.03	0.182
	No	0.754	0.064	0.818
	Total	0.907	0.093	1

Sample answer: The joint relative frequency 0.03 means that about 3% of the people in the survey do not play video games every day and have trouble sleeping. So, the probability that a randomly selected person from the survey who does not play video games every day and has trouble sleeping is 3%.

Sample answer: The marginal relative frequency 0.907 means that about 90.7% of the people in the survey play video games every day. So, the probability that a randomly selected person from the survey plays video games every day is 90.7%.

4. a.

		Family Size	
		One child	**Two or more children**
Response	**Yes**	0.61	0.39
	No	0.186	0.814

Sample answer: The conditional relative frequency 0.39 means that of the families in the survey who have more than one child, about 39% have started saving for college. So, given that a randomly selected family in the survey has one child, the probability they have started saving for college is about 39%.

b.

		Family Size	
		One child	**Two or more children**
Response	**Yes**	0.939	0.699
	No	0.059	0.303

Sample answer: The conditional relative frequency 0.059 means that of the families in the survey who have not started saving for college, about 5.9% have one child. So, given that a randomly selected family in the survey has not started saving for college, the probability they have one child is about 5.9%.

13.2 Review & Refresh

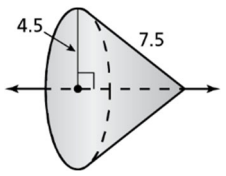
1.

		Gym Attendance	
		Regularly	**Not Regularly**
Sleeps Well	**Yes**	≈ 0.742	≈ 0.586
	No	≈ 0.258	≈ 0.414

Sample answer: The conditional relative frequency 0.258 means that of the people in the survey who go to the gym regularly, about 25.8% do not sleep well. So, given that a randomly selected person in the survey goes to the gym regularly, the probability that the person does not sleep well is about 25.8%.

2. $\frac{3}{4}$, or 75%

3.



cone with a slant height of 7.5 units and a radius of 4.5 units; about 169.6 units^2, about 127.2 units^3

4. 34°

5. $x = 2$, $y = 2$

13.3 Extra Practice

1. 50%

2. a. 25%

b. about 52.6%

3. 25%

Answers

4. a. $\frac{2}{25}$, or 8%

b. $\frac{1}{75}$, or about 1.3%

5. Route A; It has the best probability of getting to work on time.

6. a. 3.6%

b. about 5.8%

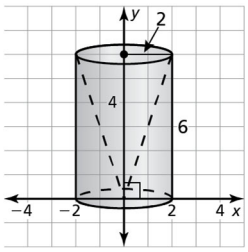
13.3 Review & Refresh

1.

		Takes Advanced Courses		
		Yes	**No**	**Total**
Gender	**Female**	≈ 0.188	≈ 0.333	≈ 0.521
	Male	≈ 0.161	≈ 0.318	≈ 0.479
	Total	≈ 0.349	≈ 0.651	≈ 1

2. about 63.6 cm^2 **3.** $x = 2$

4.



cylinder with a cone removed, both with a height of 6 units and a radius of 2 units; about 50.3 $units^3$

5. a. $\frac{16}{23}$, or about 69.6%

b. $\frac{7}{18}$, or about 38.9%

13.4 Extra Practice

1. not independent **2.** independent

3. not independent **4.** about 3.5%

5. about 25.4%

6. a. about 1.6%

b. about 1.3%

13.4 Review & Refresh

1. $\frac{1}{6}$, or about 16.7% **2.** $y = \frac{1}{12}(x + 2)^2 + 2$

3. $m\angle 1 = 58°$, $m\angle 2 = 64°$, $m\angle 3 = 58°$, $m\angle 4 = 58°$, $m\angle 5 = 64°$

4. $(-1, 0)$ **5.** $\frac{19}{25}$, or 76%

6. about 6.8 units **7.** $x = 6$

8.

		Journal		
		Yes	**No**	**Total**
Gender	**Female**	24	22	46
	Male	25	36	61
	Total	49	58	107

107 people were surveyed, 49 people that use a journal were surveyed, 58 people that don't use a journal were surveyed, 46 females were surveyed, 61 males were surveyed

13.5 Extra Practice

1. 0.85 **2.** $\frac{5}{6}$, or about 0.83

3. $\frac{3}{4}$ **4.** $\frac{5}{8}$ **5.** $\frac{3}{4}$ **6.** $\frac{7}{8}$

7. about 80.7% **8.** $\frac{1}{8}$, or 12.5%

9. 0.62, or 62%

13.5 Review & Refresh

1. $\frac{11}{221}$, or about 5% **2.** $x \approx 6.4$, $y \approx 22.0$

3. 10 days **4.** 0.6 **5.** 0.52 **6.** 115°

7. 116° **8.** 244°

13.6 Extra Practice

1. a. 5040

b. 210

2. a. 3,628,800

b. 720

3. 15,120 **4.** $\frac{1}{30}$, or about 3.3%

5. 10 **6.** 70 **7.** 35 **8.** 200

9. $\frac{407}{512}$

13.6 Review & Refresh

1. not independent **2.** about 11.1%

3. 63% **4.** 6720 **5.** 15

Answers

6. about 9896 ft

7. $CE = 36, DE = 12$

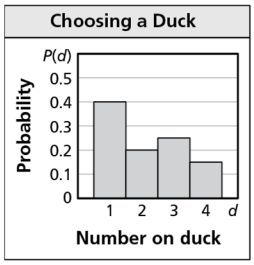
8. 49.5°

9. 8 ft × 8 ft × 40 ft

13.7 Extra Practice

1.

***d* (value)**	1	2	3	4
Outcomes	8	4	5	3
***P*(*d*)**	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{3}{20}$

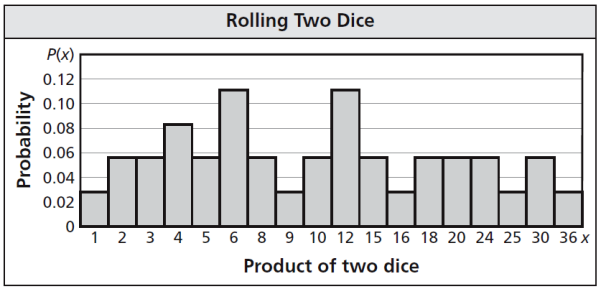


2.

***x* (product)**	1	2	3	4	5	6
Outcomes	1	2	2	3	2	4
***P*(*x*)**	$\frac{1}{36}$	$\frac{1}{18}$	$\frac{1}{18}$	$\frac{1}{12}$	$\frac{1}{18}$	$\frac{1}{9}$

***x* (product)**	8	9	10	12	15	16
Outcomes	2	1	2	4	2	1
***P*(*x*)**	$\frac{1}{18}$	$\frac{1}{36}$	$\frac{1}{18}$	$\frac{1}{9}$	$\frac{1}{18}$	$\frac{1}{36}$

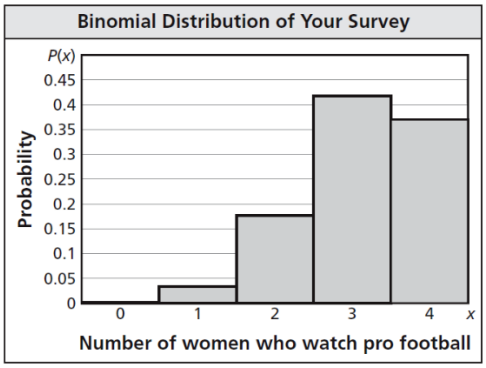
***x* (product)**	18	20	24	25	30	36
Outcomes	2	2	2	1	2	1
***P*(*x*)**	$\frac{1}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$\frac{1}{36}$	$\frac{1}{18}$	$\frac{1}{36}$



3. a. 4

b. 0.6

4. a.



b. 3 women watch professional football

c. about 3.6%

13.7 Review & Refresh

1. 3 **2.** 10 **3.** 15

4. $(1.5, 3.5)$ **5.** $m\angle H \approx 76.1°$

6. $\frac{50}{59}$, or about 84.7%

7. dependent; $P(B \mid A) \approx 0.222$ and $P(B) \approx 0.263$. So, $P(B \mid A) \neq P(B)$. The marker that is drawn first affects the probability of drawing a certain color marker second.

8. $r = 5$

Chapter 13 Test Prep

1. A **2.** B **3.** C

4. C **5.** 72 **6.** B

7. B **8.** $y = \frac{6}{5}x - \frac{3}{5}$ **9.** 79

10. $P(A \mid B) = 0.2$ **11.** D

12. 32,760 **13.** B, E **14.** C

15. A, D **16.** D **17.** B

18. A **19.** B **20.** C

21. D

Post-Course Test

1. A, D **2.** C **3.** C

4. A, C **5.** A, D, E, F **6.** $y = \frac{2}{5}x + \frac{17}{5}$

7. A **8.** 2.16 in.^{2} **9.** 117.92 units^2

10. D **11.** B **12.** B

Answers

13. $\triangle DBE$ **14.** D, E **15.** A

16. D **17.** C **18.** B

19. B **20.** A **21.** 0.989

22. B **23.** D **24.** B

25. A **26.** C **27.** C

28. D **29.** B **30.** $y = \frac{2}{3}x - 5$

31. A **32.** D

33. $x = \frac{1}{16}(y - 2)^2 - 1$ **34.** 4.47 units

35. D **36.** B **37.** 46.0°

38. 21.4 cm **39.** C

40. $(x - 8)^2 + (y - 3)^2 = 34$

41. B **42.** A **43.** B, C, D

44. 40 **45.** 5940°

46. $7 < x < 13$ **47.** B

48. B **49.** C **50.** A

51. C **52.** A, B, D **53.** D

54. 205.0 in.^{2} **55.** 32 units **56.** C

57. B