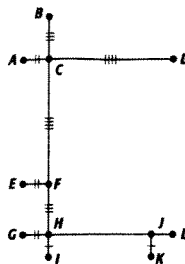## 7-1 Exercises, pp. 346–347

1. Possible answer: Q, R, S
2. Possible answer: $\overline{QS}, \overline{RT}$
3. Possible answer: plane QRS
4. Possible answer: $\overrightarrow{UQ}, \overrightarrow{UT}, \overrightarrow{US}$
5. Possible answer: $\overrightarrow{QU}, \overrightarrow{RU}, \overrightarrow{SU}$
6. $\overrightarrow{BA}$ and $\overrightarrow{BC}$, $\overrightarrow{AE}$ and $\overrightarrow{CE}$, $\overrightarrow{AD}$ and $\overrightarrow{CD}$
7. D, E, F
8. Possible answer: $\overrightarrow{DE}, \overrightarrow{EF}$
9. Possible answer: plane DEF
10. Possible answer: $\overrightarrow{DE}, \overrightarrow{FD}, \overrightarrow{EF}$
11. Possible answer: $\overline{DE}, \overline{EF}, \overline{DF}$
12. $\overline{AF}$ and $\overline{BC}$, $\overline{AE}$ and $\overline{BD}$, $\overline{AB}$ and $\overline{ED}$, $\overline{FE}$ and $\overline{CD}$
13. Plane ABC contains points A, B, and C; lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{BC}$; line segments $\overline{AB}, \overline{AC}$, and $\overline{BC}$; and rays $\overrightarrow{AB}, \overrightarrow{BA}, \overrightarrow{BC}, \overrightarrow{CB}$, and $\overrightarrow{CA}$. Plane ACD contains points A, C, and D; line segments $\overline{AC}, \overline{AD}$, and $\overline{CD}$; and ray $\overrightarrow{CA}$.
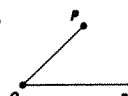

7-1 Exercises, pp. 346–347 (continued)

14. a–b.

c. Possible answer: $\overline{AC} \cong \overline{EF}, \overline{CD} \cong \overline{CF}, \overline{BC} \cong \overline{FH}, \overline{HI} \cong \overline{JK}, \overline{EF} \cong \overline{GH}$
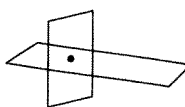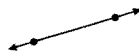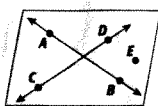
15. a.

b.

c.

16. No; two points cannot be shared by two different line segments. If two line segments share two points in common, then the lines are the same.

7-1 Exercises, pp. 346–347 (continued)

17.

Possible answer: Plane ABC; points A, B, C, D, E; lines $\overleftrightarrow{AB}, \overleftrightarrow{CD}$; and rays $\overrightarrow{AB}, \overrightarrow{BA}, \overrightarrow{CD}, \overrightarrow{DC}$

18. A line is a straight path that extends forever in two directions; a ray is a straight path that extends forever in one direction from an endpoint; and a segment is a straight path from one endpoint to another. It is possible to estimate the length of a segment, because it does not extend forever in any direction.

19. Yes; because a plane extends forever, it is possible that two faces could be on the same plane and still not touch.

20. $\frac{6}{25}$
21. $\frac{7}{100}$
22. $\frac{19}{20}$
23. $\frac{31}{50}$
24. 3.6
25. 4.5
26. 0.04
27. C

7-2 Exercises, pp. 350–351

1. 60°
2. 30°
3. 120°
4. 180°
5. Right angle
6. Acute angle
7. Straight angle
8. ∠MNL and ∠ONP, ∠ONP and ∠PNQ
9. Possible answers: ∠PNQ and ∠MNP, ∠LNM and ∠MNP
10. 80°
11. 70°
12. 130°
13. 120°
14. Obtuse angle
15. Right angle
16. Acute angle
17. ∠BAC and ∠GAF; ∠EAF and ∠GAF
18. Possible answer: ∠BAC and ∠CAE; ∠GAF and ∠GAC
19. Supplementary; 152°
20. Complementary; 24°
21. Supplementary; 46°
22. Straight; right; obtuse
23. a. Right angles
    b. About 39°N, 77°W
24. Complementary angles do not have to be adjacent.
25. Complementary angles are two angles whose sum is 90°. Supplementary angles are two angles whose sum is 180°.

7-2 Exercises, pp. 350–351 (continued)

26. 65°

27. 70%

28. 9%

29. 145%

30. 23.4%

31. 57.1%

32. 133.3%

33. 46.7%

34. B

7-6 Exercises, pp. 376–377

1. Isosceles right

2. Scalene obtuse

3. Isosceles acute

4. 2 isosceles right; 1 isosceles acute; 2 scalene obtuse

5. Scalene right

6. Isosceles obtuse

7. Equilateral acute

8. 1 isosceles right; 1 isosceles acute; 2 scalene right

9. Isosceles

10. Scalene

11. Equilateral

12. Scalene

13. Equilateral

14. Isosceles

15. Acute

16. Obtuse

17. Right

18. Obtuse

19. Right

20. Acute

21. 8 in., isosceles

22. 2 isosceles right triangles

23. Scalene triangle

24. Isosceles triangle

25. D

26. No; the angles in an equilateral triangle are all acute, and a triangle must have one obtuse angle to be classified as an obtuse triangle.

27. $\triangle ABC$ is equilateral; $\triangle BCD$ is isosceles; $\triangle BDE$ is scalene.

7-6 Exercises, pp. 376–377 (continued)

28. 200

29. 384

30. 60

31. 0.56

32. $a = 4$

33. $h = 6$

34. $k = 8$

35. $m = 10$

36. D

7-7 Exercises, pp. 380–381

1. Parallelogram

2. Parallelogram, rectangle

3. Parallelogram, rhombus

4. False; a rhombus may have four right angles or not; if it does not, it is not a square.

5. True; opposite sides are parallel in a rectangle.

6. Kite

7. Parallelogram

8. Trapezoid

9. Parallelogram; rhombus

10. Parallelogram; rhombus; rectangle; square

11. Parallelogram; rectangle

12. True; squares have four right angles.

13. False; some rectangles do not have all sides equal.

14. True; those with four equal sides are squares.

15. False; a square has two sets of parallel sides, but a trapezoid has only one set.

16. Square, rectangle

17. Parallelogram, rectangle, rhombus, square

18. Rhombus, square

19. Parallelogram, rectangle, rhombus, square

20. Trapezoid

21. 1 triangle, 1 pentagon, and 2 trapezoids

7-7 Exercises, pp. 380–381 (continued)

2. Draw lines parallel to the 4 cm and 10 cm sides. Their point of intersection is the remaining vertex.

3. Parallelogram, rhombus, square, rectangle, trapezoid, right triangle

14. Possible answer: How many squares are in the design?
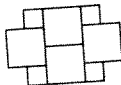
25. The opposite sides of a kite are not parallel, but opposite sides of a parallelogram are parallel. Also, two pairs of adjacent sides of a kite are congruent, while opposite sides of a parallelogram are congruent.

26. Rhombus; $\overline{BC}$ and $\overline{CF}$ are congruent. Since the diagonals of BCFD bisect each other, it must be a parallelogram and $\overline{BD} \cong \overline{CF}$ and $\overline{DF} \cong \overline{BC}$.

27. 16

28. 4

29. 5

30. 1

31. −3

32. −11

33. −5

34. 2

35. A

7-10 Exercises, pp. 394–395
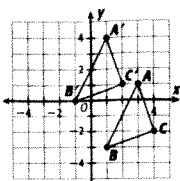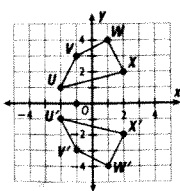
1. Reflection

2. Translation

3.

4.

5.

6. Reflection

7. Rotation
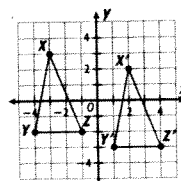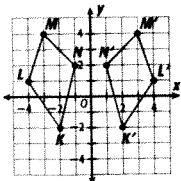
8.
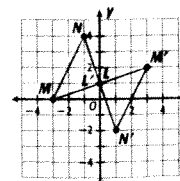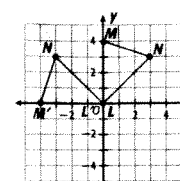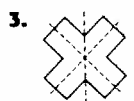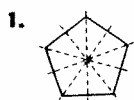
7-10 Exercises, pp. 394–395 (continued)

9.

10.

11. Rotation is shown, but not translation or reflection.

12. a. Possible answer: The two people are the same shape and size, but they are holding different objects, and their skirts are slightly different.

b. A glide reflection can be seen on the cornstalk where the leaves on one side are reflected and translated to the other side of the stalk.

13. Possible answer: The stick figures are a reflection of each other, but they are also a 180° rotation of each other. One is also a translated image of the other.

14. 1, 8

15. No mode
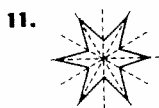
16. $x = 4$

17. $y = 24$

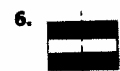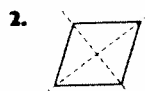18. $m = 34$

19. A

7-11 Exercises, pp. 398–399

1.

2.

3.

4.

5. None

6.

7. 6 times

8. 2 times

9. 3 times

10.

11.

12.

13. None

14.

15.
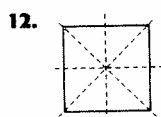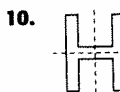
16. 3 times

7-11 Exercises, pp. 398–399 (continued)

17. 8 times

18. 4 times

19. Possible answer:
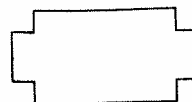
20. Regular nonagon

21. 1 line

22. Yes, because the design was cut along a vertical line; yes, because the same design was cut into both halves

23. a. 4 times
b. None

24. Possible answer: What is the smallest angle of rotational symmetry for the square?

25. In order to have rotational symmetry, a figure must match itself at least once before rotating completely around; otherwise, all figures would have rotational symmetry.

26. Possible answers: BED and MOM

27. $\frac{3}{4}$

28. $\frac{7}{9}$

29. 1

30. $1\frac{2}{3}$

31. $x = 18$

32. $y = 1\frac{1}{8}$

33. $m = \frac{1}{9}$

34. D