Name_____ Date _____

7.1 Extra Practice

In Exercises 1–3, find the sum of the measures of the interior angles of the indicated convex polygon.

1. octagon

2. 15-gon

3. 24-gon

In Exercises 4–6, the sum of the measures of the interior angles of a convex polygon is given. Classify the polygon by the number of sides.

4. 900°

5. 1620°

6. 2880°

In Exercises 7–10, find the value of x.

7.

8.

9.

10.

11. A pentagon has three interior angles that are congruent and two other interior angles that are supplementary to each other. Find the measure of each of the three congruent angles.

12. You are designing an amusement park ride with cars that spin in a circle around a center axis. The cars are located at the vertices of a regular polygon. The sum of the measures of the interior angles of the polygon is 6120°. If each car can hold four people, what is the maximum number of people who can be on the ride at one time?
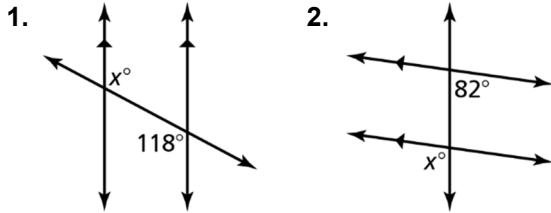
Name _____ Date _____

In Exercises 1 and 2, find the value of x.

1.

2.

3. Which is greater, $m\angle 1$ or $m\angle 2$? Explain your reasoning.
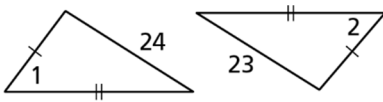

4. Describe the possible lengths of the third side of a triangle with side lengths of 14 feet and 6 feet.

5. Write an equation of the line that passes through $(8, -5)$ and is perpendicular to $y = -4x + 3$.

6. Determine whether the polygon has line symmetry. If so, draw the line(s) of symmetry and describe any reflections that map the figure onto itself.
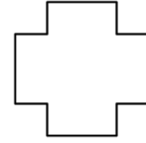
7. $\overline{MN}$ is a midsegment of $\triangle PQR$. Find the value of x.
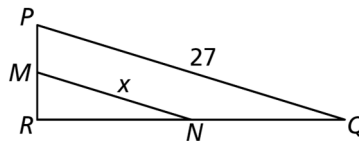
8. The sum of the measures of the interior angles of a convex polygon is $2340°$. Classify the polygon by the number of sides.

9. Factor $x^2 - 5x - 66$.

10. Find the measure of the exterior angle.
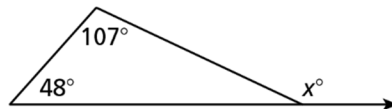
7.1 Self-Assessment

Use the scale to rate your understanding of the learning target and the success criteria.

| 1 | I do not understand. | 2 | I can do it with help. | 3 | I can do it on my own. | 4 | I can teach someone else. |

	Rating	Date
7.1 Angles of Polygons		
Learning Target: Find angle measures of polygons.	1 2 3 4	
I can find the sum of the interior angle measures of a polygon.	1 2 3 4	
I can find interior angle measures of polygons.	1 2 3 4	
I can find exterior angle measures of polygons.	1 2 3 4	

Name_____ Date_____

7.2 Extra Practice

In Exercises 1–3, find the value of each variable in the parallelogram.

1.

$4x$
$x + 18$
$3x - 2$
y

2.

$4x - 3$
$(4x - 37)°$
$\dfrac{y}{5}$
$49°$

3.

$5y - 16$
$4x - 2$
$2x + 10$
$3y$
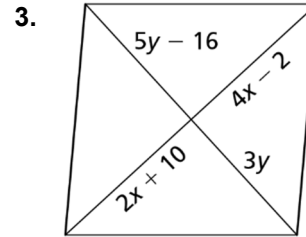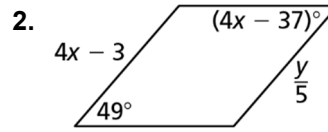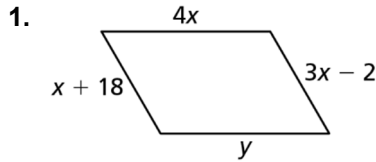
In Exercises 4–11, find the indicated measure in ▱ MNOP. Explain your reasoning.

4. PO

5. OQ

6. NO

7. PQ

M　　24　　N
14　　20.7　　68°
26
Q
59°
P　　　O
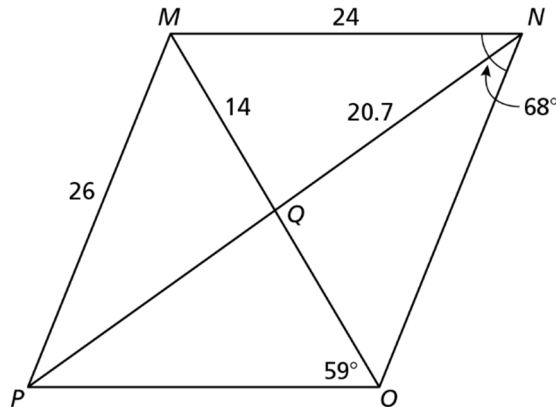
8. $m\angle PMN$

9. $m\angle NOP$

10. $m\angle OPM$

11. $m\angle NMO$

12. Write a two-column proof.
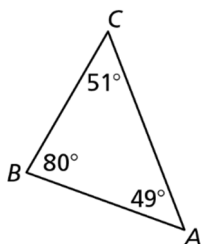
Given: *PQRS* is a parallelogram.

Prove: $\triangle PQT \cong \triangle RST$

Q　　　R
T
P　　　S
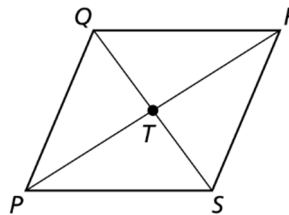
13. Three vertices of ▱*WXYZ* are $W(-3, 4)$, $Y(5, 3)$, and $Z(3, 6)$. Find the coordinates of vertex X. Then find the coordinates of the intersection of the diagonals of ▱*WXYZ*.

7.2 Review & Refresh

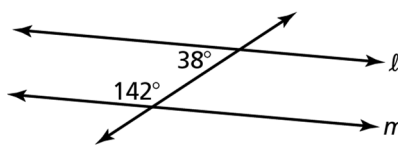**1.** List the sides of $\triangle ABC$ in order from shortest to longest.

In Exercises 2–4, find the indicated measure in $\square QRST$. Explain your reasoning.

2. QR

3. $\angle S$

4. $\angle T$

5. Find the value of x.

6. The coordinates of a point and its image after a reflection are shown. What is the line of reflection?

$$(-2, -9) \rightarrow (9, 2)$$

7. Decide whether there is enough information to prove that $\ell \parallel m$. If so, state the theorem you can use.
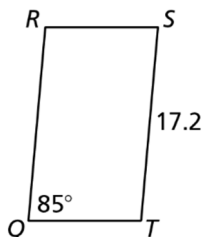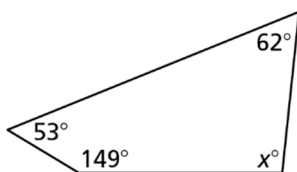
8. The hiking trail from A to B is shorter than the trail from C to D. The trail from A to D is the same length as the trail from C to B. What can you conclude about $\angle ADB$ and $\angle CBD$? Explain your reasoning.
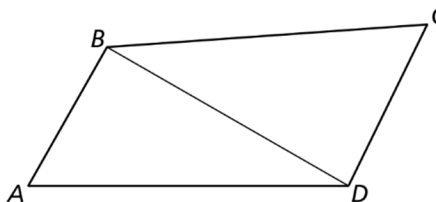
7.2 Self-Assessment

**Use the scale to rate your understanding of the learning target and the success criteria.**

1 I do not understand.	2 I can do it with help.	3 I can do it on my own.	4 I can teach someone else.

|	Rating	Date
7.2 Properties of Parallelograms		
Learning Target: Prove and use properties of parallelograms.	1 2 3 4	
I can prove properties of parallelograms.	1 2 3 4	
I can use properties of parallelograms.	1 2 3 4	
I can solve problems involving parallelograms in the coordinate plane.	1 2 3 4	

Name_____ Date _____

7.3 Extra Practice

In Exercises 1–3, state which theorem you can use to show that the quadrilateral is a parallelogram.

1.

2. 61° 119° 119° 61°

3.
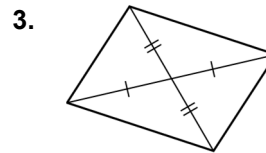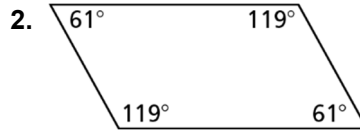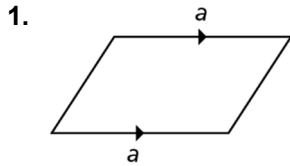
In Exercises 4–6, find the values of *x* and *y* that make the quadrilateral a parallelogram.

4. $(3x - 20)°$ $(x + 40)°$ $(4y)°$

5. 70 $5x + 16$ $6x - 1$ $4y + 2$

6. $y + 8$ $4x - 3$ $3x + 1$ $5y$
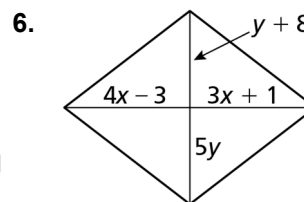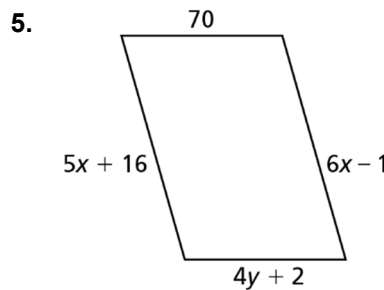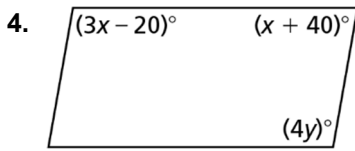
In Exercises 7 and 8, graph the quadrilateral with the given vertices in a coordinate plane. Then show that the quadrilateral is a parallelogram.

7. $J(-1, 2)$, $K(0, 4)$, $L(5, 4)$, $M(4, 2)$

8. $A(-2, -3)$, $B(1, -4)$, $C(6, 0)$, $D(3, 1)$

9. In the diagram of the handrail for a staircase, $m\angle CAB = 145°$ and $\overline{AB} \cong \overline{CD}$.

   a. Explain how to show that $ABDC$ is a parallelogram.

   b. Describe how to prove that $CDFE$ is a parallelogram.

   c. Can you prove that $EFHG$ is a parallelogram? Explain.

   d. Find $m\angle ACD$, $m\angle DCE$, $m\angle CEF$, and $m\angle EFD$.
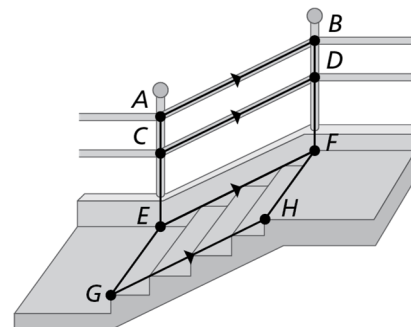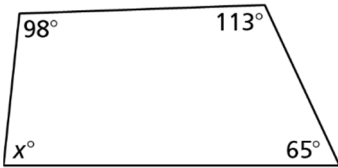
7.3   Review & Refresh

1. Solve the equation $4 - 2y = 5 - 6x$ for y. Justify each step.

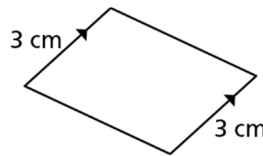**2.** Find the value of x.

98°   113°

$x°$ 65°

3. Find the distance between $X(-1, 5)$ and $Y(12, 2)$.

4. Three vertices of $\square ABCD$ are $A(-1, -4)$, $B(1, -1)$, and $C(-4, 1)$. Find the coordinates of the remaining vertex.

5. Graph $\triangle DEF$ with vertices $D(-1, 2)$, $E(1, 0)$, and $F(0, -1)$ and its image after a dilation with a scale factor of 2.

6. State which theorem you can use to show that the quadrilateral is a parallelogram.

3 cm

3 cm

7. Place a rectangle with a length of 3ℓ units and a width of ℓ units in the coordinate plane. Find the length of the diagonal.

7.3   Self-Assessment

Use the scale to rate your understanding of the learning target and the success criteria.

| **1** I do not understand. | **2** I can do it with help. | **3** I can do it on my own. | **4** I can teach someone else. |

	Rating	Date
7.3 Proving That a Quadrilateral Is a Parallelogram		
Learning Target: Prove that a quadrilateral is a parallelogram.	1 2 3 4	
I can identify features of a parallelogram.	1 2 3 4	
I can prove that a quadrilateral is a parallelogram.	1 2 3 4	
I can find missing lengths that make a quadrilateral a parallelogram.	1 2 3 4	
I can show that a quadrilateral in the coordinate plane is a parallelogram.	1 2 3 4	

## **7.4** Extra Practice

1. For any rhombus *MNOP*, decide whether the statement $\overline{MO} \cong \overline{NP}$ is *always* or *sometimes* true. Draw a diagram and explain your reasoning.

2. For any rectangle *PQRS*, decide whether the statement $\angle PQS \cong \angle RSQ$ is *always* or *sometimes* true. Draw a diagram and explain your reasoning.
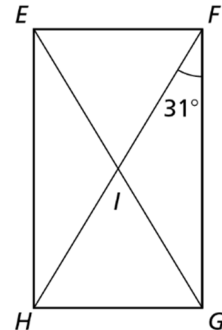
In Exercises 3–5, the diagonals of rhombus *ABCD* intersect at *E*. Given that *m∠BCA* = 44°, *AB* = 9, and *AE* = 7, find the indicated measure.
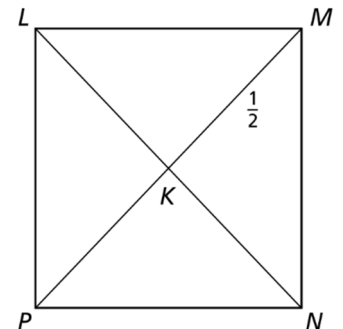
3. *BC*

4. *AC*

5. *m∠ADC*
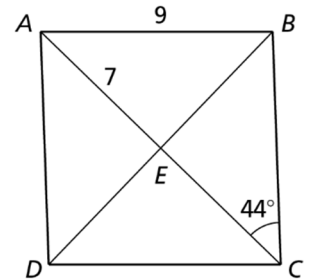
In Exercises 6–8, the diagonals of rectangle *EFGH* intersect at *I*. Given that *m∠HFG* = 31° and *EG* = 17, find the indicated measure.

6. *m∠FHG*

7. *HF*

8. *m∠EFH*

In Exercises 9–11, the diagonals of square *LMNP* intersect at *K*. Given that *MK* = $\frac{1}{2}$, find the indicated measure.

9. *PK*

10. *m∠PKN*

11. *m∠MNK*

In Exercises 12 and 13, decide whether ▱*JKLM* is a rectangle, a rhombus, or a square. Give all names that apply. Explain your reasoning.

12. $J(3, 2)$, $K(1, 1)$, $L(-1, 2)$, $M(1, 3)$

13. $J(-2, 5)$, $K(0, 7)$, $L(3, 4)$, $M(1, 2)$

7.4 Review & Refresh

In Exercises 1 and 2, use the graphs of _f_ and _g_ to describe the transformation from the graph of _f_ to the graph of _g_.

1. $f(x) = 11x - 3$, $g(x) = f(x + 5)$

2. $f(x) = 15 - 8x$, $g(x) = f(3x)$

3. Rewrite the definition as a biconditional statement.

   Definition A *midsegment* of a triangle is a segment that connects the midpoints of two sides of the triangle.

In Exercises 4 and 5, solve the inequality. Graph the solution, if possible.

4. $|4m + 1| - 5 \le -2$ 5. $9(t + 1) < 3(t + 9)$

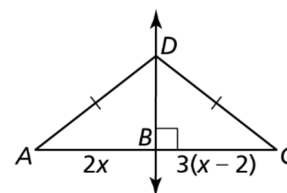6. Find the values of x and y in the parallelogram.

7. Find the measure of each interior angle and each exterior angle of a regular 30-gon.

8. Find the perimeter and area of $\triangle XYZ$ with vertices $X(5, 1)$, $Y(-1, 1)$, and $Z(3, 2)$.

9. Decide whether you can use the given information $\angle D \cong \angle Q$, $\angle F \cong \angle S$, and $\overline{EF} \cong \overline{RS}$ to prove that $\triangle DEF \cong \triangle QRS$. Explain your reasoning.

10. Find the length of $\overline{AB}$. Explain your reasoning.

7.4 Self-Assessment

Use the scale to rate your understanding of the learning target and the success criteria.

1 I do not understand.	2 I can do it with help.	3 I can do it on my own.	4 I can teach someone else.

|	Rating	Date
7.4 Properties of Special Parallelograms		
Learning Target: Explain the properties of special parallelograms.	1 2 3 4	
I can identify special quadrilaterals.	1 2 3 4	
I can explain how special parallelograms are related.	1 2 3 4	
I can find missing measures of special parallelograms.	1 2 3 4	
I can identify special parallelograms in a coordinate plane.	1 2 3 4	

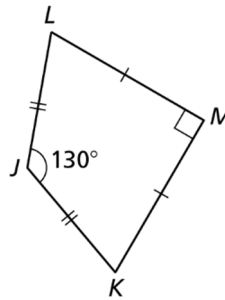Name_____   Date_____

7.5 **Extra Practice**

1. Show that the quadrilateral with vertices $Q(0, 3)$, $R(0, 6)$, $S(-6, 0)$ and $T(-3, 0)$ is a trapezoid. Decide whether it is isosceles. Then find the length of its midsegment.
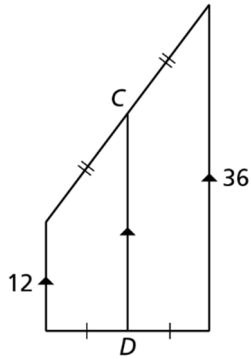
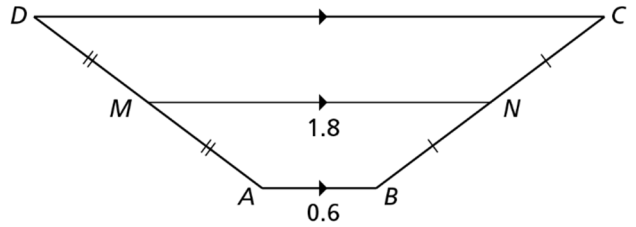**In Exercises 2 and 3, find $m\angle K$ and $m\angle L$.**
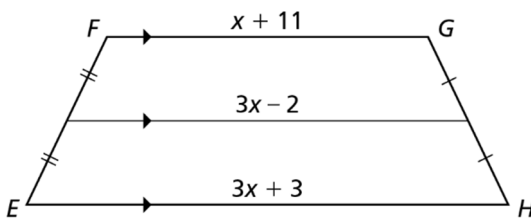
2.
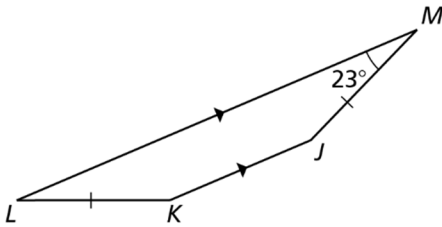
3.

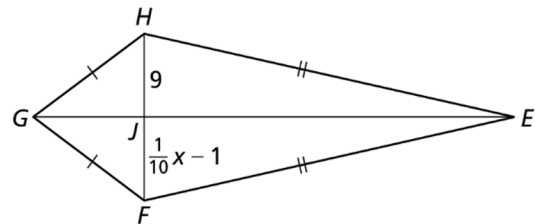**In Exercises 4 and 5, find CD.**

4.

5.

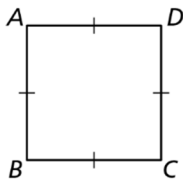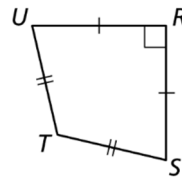**In Exercises 6 and 7, find the value of x.**

6.

7.

In Exercises 8 and 9, give the most specific name for the quadrilateral. Explain your reasoning.
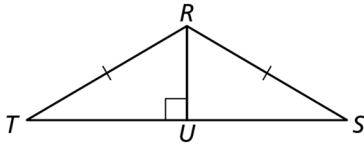
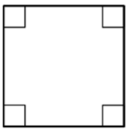8.

9.

Name _____ Date _____

7.5 Review & Refresh

1. Decide whether enough information is given to prove that $\triangle RUT$ and $\triangle RUS$ are congruent using the HL Congruence Theorem.
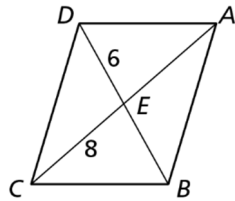
2. Find the distance from $(6, -1)$ to the line $y = x + 7$.

3. Classify the quadrilateral.

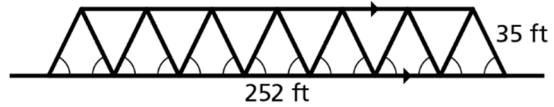4. Find DB in $\square ABCD$. Explain your reasoning.

5. State which theorem you can use to show that the quadrilateral is a parallelogram.

6. Graph $\overline{EF}$ with endpoints $E(2, 7)$ and $F(1, 4)$ and its image after a reflection in the y-axis, followed by a translation 3 units down.

7. Find the perimeter of the outer frame of the bridge.

7.5 Self-Assessment

Use the scale to rate your understanding of the learning target and the success criteria.

| 1 | I do not understand. | 2 | I can do it with help. | 3 | I can do it on my own. | 4 | I can teach someone else. |

	Rating	Date
7.5 Properties of Trapezoids and Kites		
Learning Target: Use properties of trapezoids and kites to find measures.	1 2 3 4	
I can identify trapezoids and kites.	1 2 3 4	
I can use properties of trapezoids and kites to solve problems.	1 2 3 4	
I can find the length of the midsegment of a trapezoid.	1 2 3 4	
I can explain the hierarchy of quadrilaterals.	1 2 3 4	

Name_____ Date _____

Chapter Self-Assessment

Use the scale to rate your understanding of the learning target and the success criteria.

| 1 | I do not understand. | 2 | I can do it with help. | 3 | I can do it on my own. | 4 | I can teach someone else. |

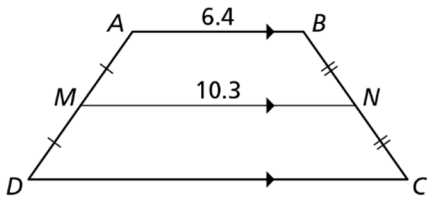|	Rating	Date
Chapter 7 Quadrilaterals and Other Polygons		
Learning Target: Understand quadrilaterals and other polygons.	1 2 3 4	
I can find angles of polygons.	1 2 3 4	
I can describe properties of parallelograms.	1 2 3 4	
I can use properties of parallelograms.	1 2 3 4	
I can identify special quadrilaterals.	1 2 3 4	
7.1 Angles of Polygons		
Learning Target: Find angle measures of polygons.	1 2 3 4	
I can find the sum of the interior angle measures of a polygon.	1 2 3 4	
I can find interior angle measures of polygons.	1 2 3 4	
I can find exterior angle measures of polygons.	1 2 3 4	
7.2 Properties of Parallelograms		
Learning Target: Prove and use properties of parallelograms.	1 2 3 4	
I can prove properties of parallelograms.	1 2 3 4	
I can use properties of parallelograms.	1 2 3 4	
I can solve problems involving parallelograms in the coordinate plane.	1 2 3 4	
7.3 Proving That a Quadrilateral Is a Parallelogram		
Learning Target: Prove that a quadrilateral is a parallelogram.	1 2 3 4	
I can identify features of a parallelogram.	1 2 3 4	
I can prove that a quadrilateral is a parallelogram.	1 2 3 4	
I can find missing lengths that make a quadrilateral a parallelogram.	1 2 3 4	
I can show that a quadrilateral in the coordinate plane is a parallelogram.	1 2 3 4	

Chapter 7

Chapter Self-Assessment (continued)

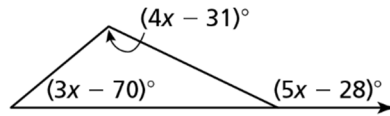|	Rating	Date
7.4 Properties of Special Parallelograms		
Learning Target: Explain the properties of special parallelograms.	1 2 3 4	
I can identify special quadrilaterals.	1 2 3 4	
I can explain how special parallelograms are related.	1 2 3 4	
I can find missing measures of special parallelograms.	1 2 3 4	
I can identify special parallelograms in a coordinate plane.	1 2 3 4	
7.5 Properties of Trapezoids and Kites		
Learning Target: Use properties of trapezoids and kites to find measures.	1 2 3 4	
I can identify trapezoids and kites.	1 2 3 4	
I can use properties of trapezoids and kites to solve problems.	1 2 3 4	
I can find the length of the midsegment of a trapezoid.	1 2 3 4	
I can explain the hierarchy of quadrilaterals.	1 2 3 4	

Chapter 7 **Test Prep**

1. What is *CD*?

```
        A    6.4    B
       ⟋            ⟍
      ⟋               ⟍
   M ⟋   10.3 →        ⟍ N
    ⟋                    ⟍
   ⟋                       ⟍
  D ─────────── → ─────────── C
```

2. What is the measure of the exterior angle?

```
          (4x − 31)°
            ⟋⟍
          ⟋    ⟍
        ⟋        ⟍
   (3x − 70)°  (5x − 28)°  →
```

degrees

3. What is the value of *x*?

Ⓐ 6.25

Ⓑ 10

Ⓒ 22.5

Ⓓ 45

```
  ┌─────── (6x − 15)°
  │  ⟍
  │    ⟍
  │      ⟍
  └──┘      
```

4. What is *m∠LMN*?

Ⓐ 60°

Ⓑ 90°

Ⓒ 120°

Ⓓ 150°

```
              M
             ╱│╲
            ╱ │ ╲
        L ╱   │  ╲
          ╲   │   30° N
           ╲  │   ╱
            ╲ │  ╱
              P
```
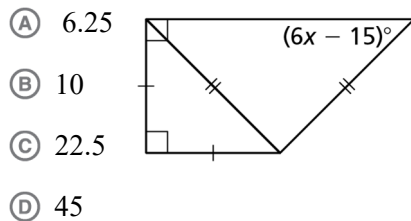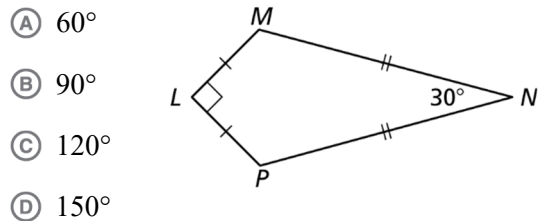
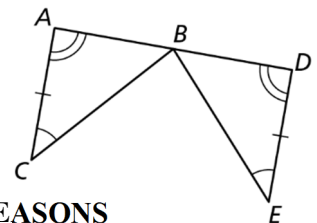**5.** Which reason corresponds with the third statement in the proof, " *∠ABC ≅ ∠DBE*? "

Ⓐ Corresponding parts of congruent triangles are congruent.

Ⓑ Definition of congruent angles

Ⓒ Vertical Angles Congruence Theorem

Ⓓ Definition of angle bisector

Given $\overline{AC} \cong \overline{DE}$, $\angle C \cong \angle E$, $\angle A \cong \angle D$

Prove $\angle ABC \cong \angle DBE$

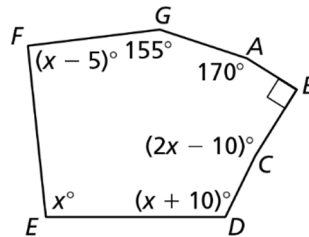| STATEMENTS	REASONS
1. $\overline{AC} \cong \overline{DE}$, $\angle C \cong \angle E$, $\angle A \cong \angle D$	1. Given
2. $\triangle ABC \cong \triangle DBE$	2. ASA Congruence Theorem
3. $\angle ABC \cong \angle DBE$	3.

6. Which of the following statements is false?

    (A) A square is a rhombus.

    (B) A square is a parallelogram.

    (C) A rectangle is a parallelogram.

    (D) A parallelogram is a rhombus.

7. What is $m\angle F$?

    (A) 89°

    (B) 91°

    (C) 96°

    (D) 161°

8. Three vertices of a parallelogram are $(-3, 1)$, $(-1, 4)$, and $(5, 1)$. Which of the following can be the fourth vertex of the parallelogram? Select all that apply.
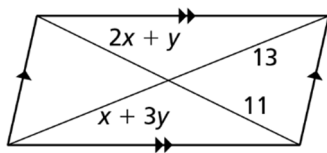
    (A) $(5, -1)$

    (B) $(-1, -2)$

    (C) $(3, -2)$

    (D) $(3, 4)$

    (E) $(-9, 4)$

    (F) $(7, 4)$

9. Which of the following angle measures are possible exterior angle measures for regular polygons? Select all that apply.

    (A) 8°

    (B) 12°

    (C) 54°

    (D) 108°

    (E) 120°

    (F) 162°

10. What is the value of x?

    (A) 3

    (B) 4

    (C) 6

    (D) 8

11. What is the 152nd term of the sequence A, G, T, C, A, G, T, C, A, G, T, C, …?

    (A) A

    (B) G

    (C) T

    (D) C

12. $\triangle JKL$ has vertices $J(-4, 5)$, $K(2, 3)$, and $L(0, 1)$. What is the perimeter of its midsegment triangle?

_____

Chapter 7 **Test Prep** (continued)

13. What is the most specific name for the quadrilateral with vertices (6, 8), (5, 6), (9, 7), and (10, 9)?

Ⓐ parallelogram

Ⓑ rhombus

Ⓒ rectangle

Ⓓ square

14. Which of the following would not provide enough information to prove that the quadrilateral is a parallelogram?

Ⓐ $\overline{DE} \cong \overline{FG}, \overline{EF} \cong \overline{GD}$

Ⓑ $\overline{EF} \cong \overline{GD}, \overline{EF} \parallel \overline{GD}$

Ⓒ $\overline{DE} \parallel \overline{FG}, \overline{EF} \parallel \overline{GD}$

Ⓓ $\overline{EF} \cong \overline{GD}, \overline{DE} \parallel \overline{FG}$

15. What can you conclude from the diagram?

Ⓐ $EH = GH$

Ⓑ $EH < GH$

Ⓒ $EH > GH$

Ⓓ No conclusion can be made.

16. What is the distance between the point (3, 2) and its image after the composition?

Translation: $(x, y) \rightarrow (x + 7, y - 1)$
Translation: $(x, y) \rightarrow (x - 2, y + 13)$
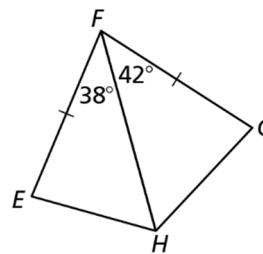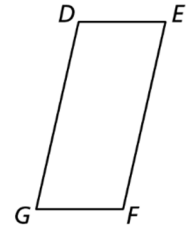
units

17. $\triangle ABC$ has vertices $A(-5, 8)$, $B(7, 8)$, and $C(7, 3)$. What is the difference of the perimeter of the image of $\triangle ABC$ and the perimeter of $\triangle ABC$ after the similarity transformation?

Reflection: in the y-axis
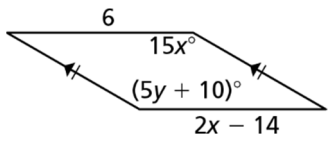**Dilation:** $(x, y) \rightarrow (3x, 3y)$

units

Chapter 7 **Test Prep** (continued)

18. What are the coordinates of the orthocenter of the triangle with vertices $W(2, 7)$, $X(3, 4)$, and $Y(6, 7)$?
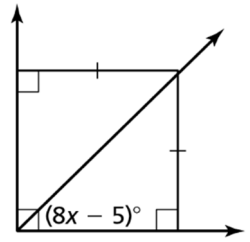
_____
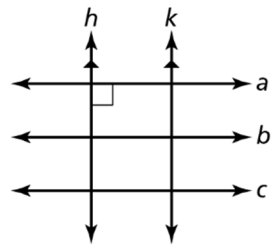
19. What is the value of y?

Ⓐ 4

Ⓑ 10

Ⓒ 28

Ⓓ 30

6

$15x°$

$(5y + 10)°$

$2x - 14$

20. What is the value of x?

Ⓐ 6.25

Ⓑ 10.625

Ⓒ 11.875

Ⓓ 45

$(8x - 5)°$

21. What can you conclude from the diagram?

Ⓐ $a \perp k$

Ⓑ $c \perp h$

Ⓒ $a \parallel b$

Ⓓ $a \parallel c$

h　k

a

b

c

22. What is the value of y?

Ⓐ 27

Ⓑ 42

Ⓒ 75

Ⓓ 105

$75°$

$(2y + 21)°$
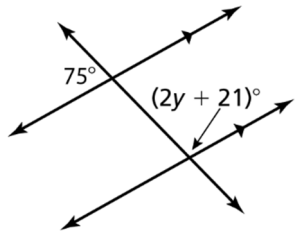
23. What rotations map the polygon onto itself? Select all that apply.

Ⓐ 30°

Ⓑ 60°

Ⓒ 90°

Ⓓ 120°

Ⓔ 180°

Ⓕ The polygon does not have rotational symmetry.
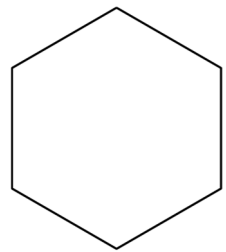
24. Which congruence statement is correct?

Ⓐ $\triangle ABC \cong \triangle MNP$

Ⓑ $\triangle ACB \cong \triangle MPN$

Ⓒ $\triangle CAB \cong \triangle NMP$

Ⓓ $\triangle BCA \cong \triangle PMN$

A　C　P

B　M　N