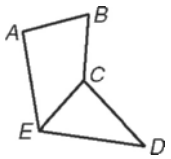
Name _____ Date _____ Class _____

LESSON 6-1

Practice A

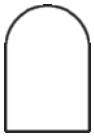
Properties and Attributes of Polygons

Match each vocabulary term on the left with a part of polygon *ABCDE* on the right.



1. a diagonal _____ A. point *D*
2. a side of the polygon _____ B. $\overline{CE}$
3. a vertex of the polygon _____ C. $\overline{CD}$

A polygon is a closed flat figure made of straight segments that do not cross each other. Tell whether each figure is a polygon. If it is a polygon, name it by the number of its sides.

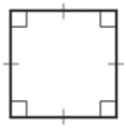
4. 

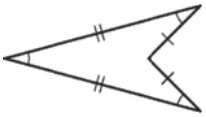
5. 

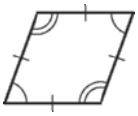
6. 

_____ _____ _____

A regular polygon has all sides congruent and all angles congruent. Tell whether each polygon is regular or irregular. A concave polygon has a pair of sides that make a "cave" in the polygon. Tell whether each polygon is concave or convex.

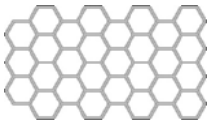
7. 

8. 

9. 

_____ _____ _____

Honeybees store their honey in honeycombs. The honeycomb is made of many small wax compartments that are perfect regular hexagons.



10. Use the Polygon Angle Sum Theorem to find the sum of the interior angle measures of a regular hexagon. _____

11. Find the measure of one interior angle of a regular hexagon. (*Hint:* Divide the answer to Exercise 10 by the number of sides.) _____

12. Use the Polygon Exterior Angle Sum Theorem to find the sum of the exterior angle measures, one exterior angle at each vertex, of a regular hexagon. _____

13. Find the measure of one exterior angle of a regular hexagon. (*Hint:* Divide the answer to Exercise 12 by the number of sides.) _____

Name _____ Date _____ Class _____

LESSON 6-2

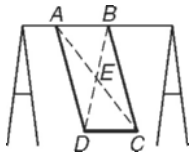
Practice A

Properties of Parallelograms

Fill in the blanks to complete each definition or theorem.

1. If a quadrilateral is a parallelogram, then its consecutive angles are _____.
2. If a quadrilateral is a parallelogram, then its opposite sides are _____.
3. A parallelogram is a quadrilateral with two pairs of _____ sides.
4. If a quadrilateral is a parallelogram, then its diagonals _____ each other.
5. If a quadrilateral is a parallelogram, then its opposite angles are _____.

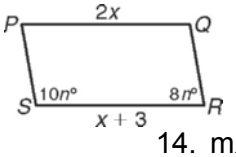
The figure shows a swing blown to one side by a breeze. As long as the seat of the swing is parallel to the top bar, the swing makes a parallelogram. In $\square ABCD$, $DC = 2$ ft, $BE = 4\frac{1}{2}$ ft, and $m\angle BAD = 75°$.



Find each measure.

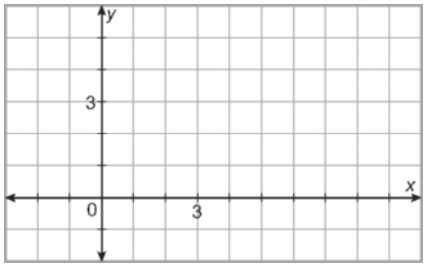
6. *AB* _____
7. *ED* _____
8. *BD* _____
9. m∠*ABC* _____
10. m∠*BCD* _____
11. m∠*ADC* _____

***PQRS* is a parallelogram. Find each measure.**



12. *RS* _____
13. m∠*S* _____
14. m∠*R* _____

Three vertices of $\square GHIJ$ are $G(0, 0)$, $H(2, 3)$, and $J(6, 1)$. Complete Exercises 15–21 to find the coordinates of vertex *I*.



15. Plot vertices *G*, *H*, and *J* on the coordinate plane.
16. Find the rise (difference in the *y*-coordinates) from *G* to *H*._____
17. Find the run (difference in the *x*-coordinates) from *G* to *H*._____
18. Using your answers from Exercises 16 and 17, add the rise to the *y*-coordinate of vertex *J* and add the run to the *x*-coordinate of vertex *J*. These are the coordinates of vertex *I*. (_____, _____)
19. Plot vertex *I*. Connect the points to draw $\square GHIJ$.
20. Check your answer by finding the slopes of $\overline{IH}$ and $\overline{JG}$.

    slope of $\overline{IH}$ = _____ slope of $\overline{JG}$ = _____

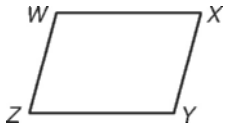
21. Parallel lines have equal slopes. Are the slopes of $\overline{IH}$ and $\overline{JG}$ equal? _____

Name _____ Date _____ Class _____

LESSON 6-3

Practice A

Conditions for Parallelograms



For each definition or theorem, tell what information you would need about the figure to conclude that the figure is a parallelogram. For some exercises, there is more than one correct answer, but give only one example per exercise.

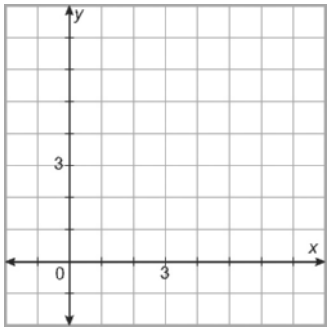
1. If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram. _____
2. If both pairs of opposite sides of a quadrilateral are parallel, then the quadrilateral is a parallelogram. _____
3. If an angle of a quadrilateral is supplementary to both of its consecutive angles, then the quadrilateral is a parallelogram.

   _____
4. If one pair of opposite sides of a quadrilateral are parallel and congruent, then the quadrilateral is a parallelogram.

   _____
5. If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram. (*Hint:* The diagonals of the figure are $\overline{WY}$ and $\overline{XZ}$.)

   _____
6. If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram. _____

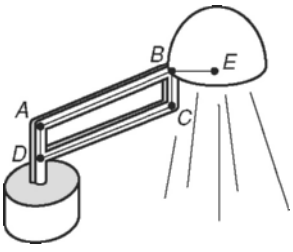
A quadrilateral has vertices *E*(1, 1), *F*(4, 5), *G*(6, 6), *H*(3, 2). Complete Exercises 7–10 to tell whether *EFGH* is a parallelogram.



7. Plot the vertices and draw *EFGH*.
8. Use the Distance Formula: $EF =$ _____ $HG =$ _____
9. Use the Slope Formula: slope of $\overline{EF} =$ _____

   slope of $\overline{HG} =$ _____
10. The answers to Exercises 8 and 9 prove that *EFGH* is a parallelogram. Which one of Exercises 1–6 states the theorem that you used? _____

This desk lamp has a circular base and a movable arm in the shape of a parallelogram. Use the figure to answer Exercises 11–13.



11. $\overline{AD}$ is vertical. Name another side of parallelogram *ABCD* that is also vertical. _____
12. Because $\overline{AD}$ is attached to the base, $\overline{AD}$ stays vertical as the arm is moved. Tell what happens to $\overline{BC}$ as the arm is moved up or down.

    _____

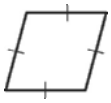
Name _____ Date _____ Class _____

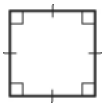
LESSON 6-4

Practice A

Properties of Special Parallelograms

Match each figure with the letter of one of the vocabulary terms. Use each term once.

1. 

2. 

3. 

A. rectangle
B. rhombus
C. square

_____ _____ _____

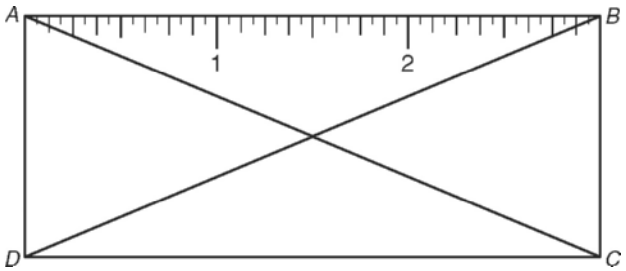
Fill in the blanks to complete each theorem.

4. If a parallelogram is a rhombus, then its diagonals are _____.
5. If a parallelogram is a rectangle, then its diagonals are _____.
6. If a quadrilateral is a rectangle, then it is a _____.
7. If a parallelogram is a rhombus, then each diagonal _____ a pair of opposite angles.
8. If a quadrilateral is a rhombus, then it is a _____.

The part of a ruler shown is a rectangle with $AB = 3$ inches and $BD = 3\frac{1}{4}$ inches.

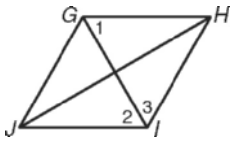
Find each length.

9. $DC =$ _____
10. $AC =$ _____



Use the phrases and theorems from the Word Bank to complete this two-column proof.

11. **Given:** *GHIJ* is a rhombus.
Prove: $\angle 1 \cong \angle 3$



Word Bank:
Alternate Interior ∡ Thm.
GHIJ is a parallelogram.
Trans. Prop. of ≅
$\angle 2 \cong \angle 3$

Statements	Reasons
1. *GHIJ* is a rhombus.	1. Given
2. **a.** _____	2. rhomb. → ▱
3. $\overline{GH} \parallel \overline{JI}$	3. ▱ → opp. sides ∥
4. $\angle 1 \cong \angle 2$	4. **b.** _____
5. **c.** _____	5. rhomb. → each diag. bisects opp. ∡
6. $\angle 1 \cong \angle 3$	6. **d.** _____

Name _____ Date _____ Class _____

LESSON 6-5

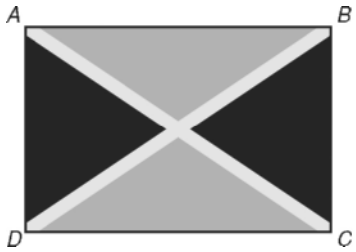
Practice A

Conditions for Special Parallelograms

Fill in the blanks to complete each theorem. (*Hint:* Exercise 3 is not stated as a theorem in the textbook.)

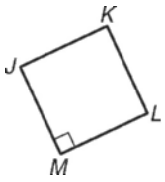
1. If one pair of consecutive sides of a parallelogram are congruent, then the parallelogram is a _____.
2. If the diagonals of a parallelogram are _____, then the parallelogram is a rhombus.
3. If a parallelogram is both a _____ and a _____, then the parallelogram is a square.
4. If the _____ of a parallelogram are congruent, then the parallelogram is a rectangle.
5. If one diagonal of a parallelogram bisects a pair of opposite angles, then the parallelogram is a _____.
6. If one angle of a parallelogram is a right angle, then the parallelogram is a _____.

The Jamaican flag is a quadrilateral with a diagonal gold "X" that divides the flag into two black triangles and two green triangles. In *ABCD*, $\overline{AB} \cong \overline{CD}$ and $\overline{AD} \cong \overline{BC}$. The diagonals, $\overline{AC}$ and $\overline{BD}$, are also congruent. Fill in the blanks in Exercises 7 and 8 to show why the flag is a rectangle.



7. Because both pairs of opposite _____ are congruent, the flag is a parallelogram.
8. Because *ABCD* is a parallelogram and the diagonals are _____, the flag is a rectangle.

Complete Exercises 9–12 to show that the conclusion is valid.



Given: $\overline{JK} \cong \overline{ML}$, $\overline{JM} \cong \overline{KL}$, and $\overline{JK} \cong \overline{KL}$.
$\angle M$ is a right angle.
Conclusion: *JKLM* is a square.

9. Because $\overline{JK} \cong \overline{ML}$ and $\overline{JM} \cong \overline{KL}$, *JKLM* is a _____.
10. Because *JKLM* is a parallelogram and $\angle M$ is a right angle, *JKLM* is a _____.
11. Because *JKLM* is a parallelogram and $\overline{JK} \cong \overline{KL}$, *JKLM* is a _____.
12. Because *JKLM* is a _____ and a _____, *JKLM* is a square.

Name _____ Date _____ Class _____

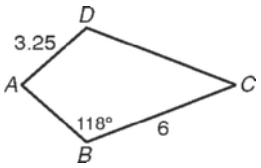
LESSON 6-6

Practice A

Properties of Kites and Trapezoids

Fill in the blanks to complete each theorem or definition.

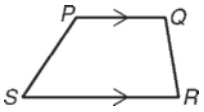
1. If a quadrilateral is a kite, then its _____ are perpendicular.
2. If a quadrilateral is a kite, then exactly one pair of opposite _____ are congruent.
3. A kite is a quadrilateral with exactly two pairs of congruent consecutive _____.



***ABCD* is a kite. Use the figure to find each measure in Exercises 4–6.**

4. m∠*D* _____
5. *AB* _____
6. *CD* _____

A trapezoid is a quadrilateral with exactly one pair of parallel sides. Name the parts of trapezoid *PQRS* asked for in Exercises 7–9.

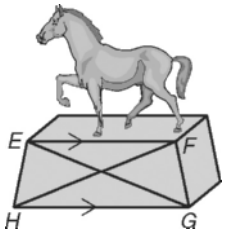


7. both bases _____
8. both legs _____
9. one pair of base angles _____

Fill in the blanks to complete each theorem or definition.

10. A trapezoid is isosceles if and only if its _____ are congruent.
11. If a trapezoid has one pair of congruent base angles, then the trapezoid is _____.
12. If the legs of a trapezoid are _____, then the trapezoid is an isosceles trapezoid.
13. If a quadrilateral is an isosceles trapezoid, then each pair of _____ is congruent.

In an art museum, a statue sits on a pedestal with sides that are isosceles trapezoids. Name the parts of isosceles trapezoid *EFGH* asked for in Exercises 14 and 15.



14. both pairs of congruent angles _____
15. both pairs of congruent segments _____