Packet #6

Name________________________________ Date__________

7.1 Notetaking with Vocabulary
For use after Lesson 7.1

In your own words, write the meaning of each vocabulary term.

diagonal

equilateral polygon

equiangular polygon

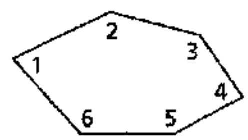
regular polygon

Theorems

Theorem 7.1 Polygon Interior Angles Theorem

The sum of the measures of the interior angles of a convex n-gon is $(n-2) \bullet 180°$.

$$m\angle 1 + m\angle 2 + \cdots + m\angle n = (n-2) \bullet 180°$$



$n = 6$

Notes:

#6

Name ______________________________ Date ________

Corollary 7.1 Corollary to the Polygon Interior Angles Theorem

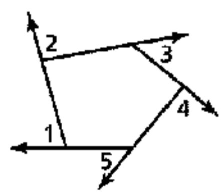
The sum of the measures of the interior angles of a quadrilateral is 360°.

Notes:

Theorem 7.2 Polygon Exterior Angles Theorem

The sum of the measures of the exterior angles of a convex polygon, one angle at each vertex, is 360°.

$$m\angle 1 + m\angle 2 + \cdots + m\angle n = 360°$$



$n = 5$

Notes:

#6

Name____ Date __________

Extra Practice

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

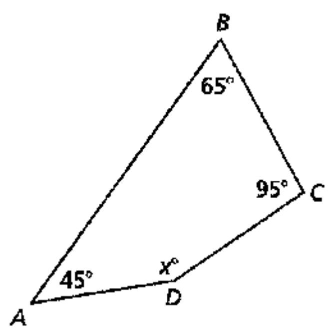
1. octagon **2.** 15-gon **3.** 24-gon

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.

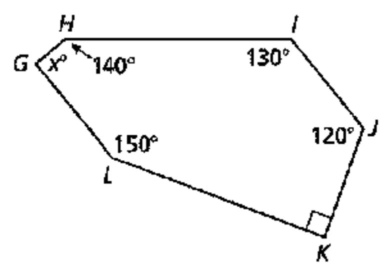
4. 900° **5.** 1620° **6.** 2880°

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

7.



8.



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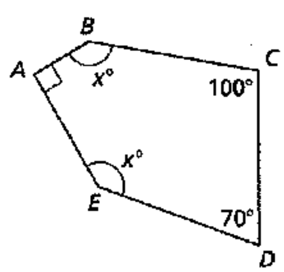
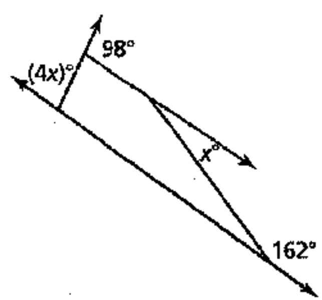


10.



Packet # 7

Name ______________________________ Date ________

7.2 Notetaking with Vocabulary
For use after Lesson 7.2

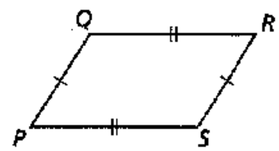
In your own words, write the meaning of each vocabulary term.

parallelogram

Theorems

Theorem 7.3 Parallelogram Opposite Sides Theorem

If a quadrilateral is a parallelogram, then its opposite sides are congruent.

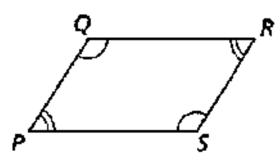


If *PQRS* is a parallelogram, then $\overline{PQ} \cong \overline{RS}$ and $\overline{QR} \cong \overline{SP}$.

Notes:

Theorem 7.4 Parallelogram Opposite Angles Theorem

If a quadrilateral is a parallelogram, then its opposite angles are congruent.



If *PQRS* is a parallelogram, then $\angle P \cong \angle R$ and $\angle Q \cong \angle S$.

Notes:

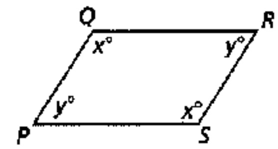
#7

Name______________________________ Date__________

7.2 Notetaking with Vocabulary (continued)

Theorem 7.5 Parallelogram Consecutive Angles Theorem

If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.

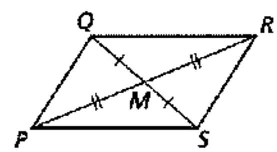


If *PQRS* is a parallelogram, then $x° + y° = 180°$.

Notes:

Theorem 7.6 Parallelogram Diagonals Theorem

If a quadrilateral is a parallelogram, then its diagonals bisect each other.



If *PQRS* is a parallelogram, then $\overline{QM} \cong \overline{SM}$ and $\overline{PM} \cong \overline{RM}$.

Notes:

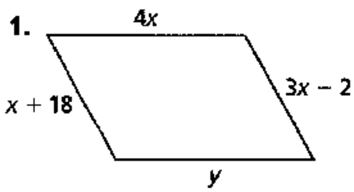
#7

Name ____________________ Date ________

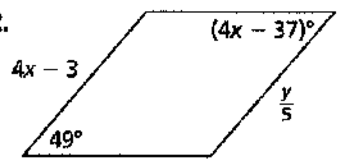
Extra Practice

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

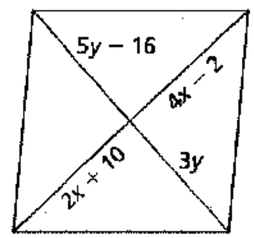
1.



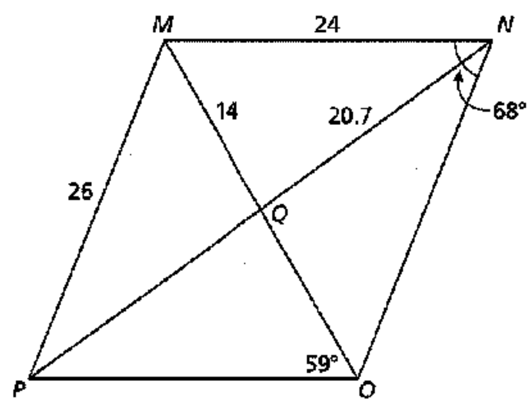
2.



3.



In Exercises 4–11, find the indicated measure in ▱*MNOP*. Explain your reasoning.



4. *PO*

5. *OQ*

6. *NO*

7. *PQ*

8. $m\angle PMN$

9. $m\angle NOP$

10. $m\angle OPM$

11. $m\angle NMO$

Packet #8

Name________________________________ Date__________

7.3 Notetaking with Vocabulary

For use after Lesson 7.3

In your own words, write the meaning of each vocabulary term.

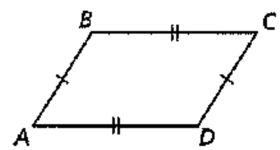
diagonal

parallelogram

Theorems

Theorem 7.7 Parallelogram Opposite Sides Converse

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

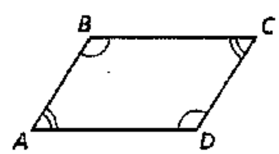


If $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$, then *ABCD* is a parallelogram.

Notes:

Theorem 7.8 Parallelogram Opposite Angles Converse

If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

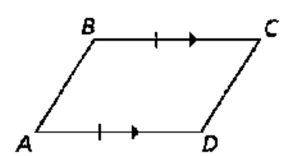


If $\angle A \cong \angle C$ and $\angle B \cong \angle D$, then *ABCD* is a parallelogram.

Notes:

Theorem 7.9 Opposite Sides Parallel and Congruent Theorem

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



If $\overline{BC} \parallel \overline{AD}$ and $\overline{BC} \cong \overline{AD}$, then *ABCD* is a parallelogram.

Notes:

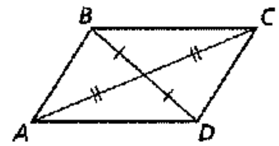
#8

Name ______________________________ Date __________

Theorem 7.10 Parallelogram Diagonals Converse

If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.

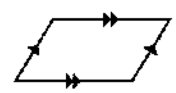
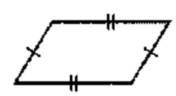
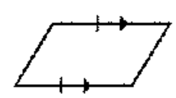
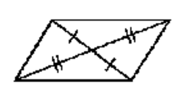
If $\overline{BD}$ and $\overline{AC}$ bisect each other, then $ABCD$ is a parallelogram.



Notes:

Core Concepts

Ways to Prove a Quadrilateral Is a Parallelogram

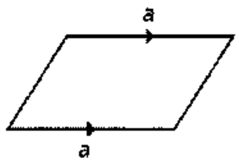
1. Show that both pairs of opposite sides are parallel. *(Definition)*	
2. Show that both pairs of opposite sides are congruent. *(Parallelogram Opposite Sides Converse)*	
3. Show that both pairs of opposite angles are congruent. *(Parallelogram Opposite Angles Converse)*	
4. Show that one pair of opposite sides are congruent and parallel. *(Opposite Sides Parallel and Congruent Theorem)*	
5. Show that the diagonals bisect each other. *(Parallelogram Diagonals Converse)*	

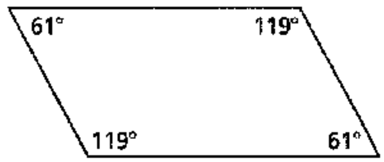
#8

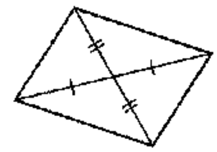
7.3 Notetaking with Vocabulary (continued)

Extra Practice

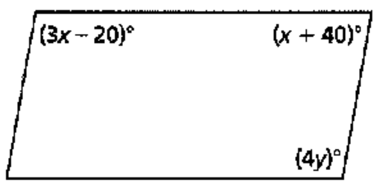
In Exercises 1–3, state which theorem you can use to show that the quadrilateral is a parallelogram.

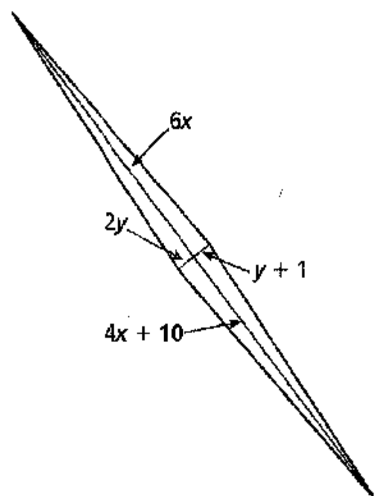
1.


2.


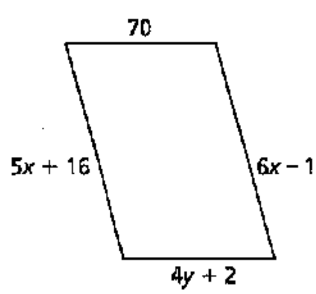
3.


In Exercises 4–7, find the values of *x* and *y* that make the quadrilateral a parallelogram.

4.


5.


6.


7.


Packet #9

Name ____________________ Date ________

7.4 Notetaking with Vocabulary

For use after Lesson 7.4

In your own words, write the meaning of each vocabulary term.

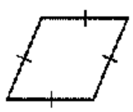
rhombus

rectangle

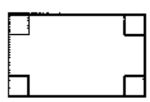
square

Core Concepts

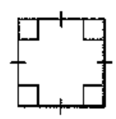
Rhombuses, Rectangles, and Squares



A **rhombus** is a parallelogram with four congruent sides.



A **rectangle** is a parallelogram with four right angles.



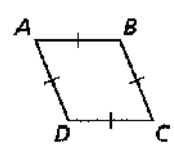
A **square** is a parallelogram with four congruent sides and four right angles.

Notes:

Corollary 7.2 Rhombus Corollary

A quadrilateral is a rhombus if and only if it has four congruent sides.

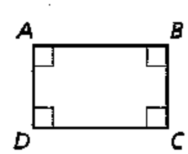
$ABCD$ is a rhombus if and only if $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{AD}$.



Corollary 7.3 Rectangle Corollary

A quadrilateral is a rectangle if and only if it has four right angles.

$ABCD$ is a rectangle if and only if $\angle A$, $\angle B$, $\angle C$, and $\angle D$ are right angles.



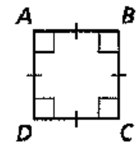
#9

Name________________________ Date__________

7.4 Notetaking with Vocabulary (continued)

Corollary 7.4 Square Corollary

A quadrilateral is a square if and only if it is a rhombus and a rectangle.

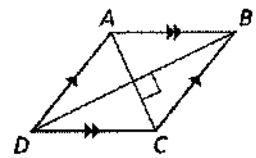


$ABCD$ is a square if and only if $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{AD}$ and $\angle A$, $\angle B$, $\angle C$, and $\angle D$ are right angles.

Notes:

Theorem 7.11 Rhombus Diagonals Theorem

A parallelogram is a rhombus if and only if its diagonals are perpendicular.

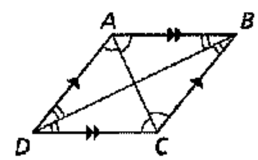


$\square ABCD$ is a rhombus if and only if $\overline{AC} \perp \overline{BD}$.

Notes:

Theorem 7.12 Rhombus Opposite Angles Theorem

A parallelogram is a rhombus if and only if each diagonal bisects a pair of opposite angles.

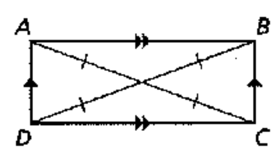


$\square ABCD$ is a rhombus if and only if $\overline{AC}$ bisects $\angle BCD$ and $\angle BAD$, and $\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$.

Notes:

Theorem 7.13 Rectangle Diagonals Theorem

A parallelogram is a rectangle if and only if its diagonals are congruent.



$\square ABCD$ is a rectangle if and only if $\overline{AC} \cong \overline{BD}$.

Notes:

#9

Name ______________________________ Date ________

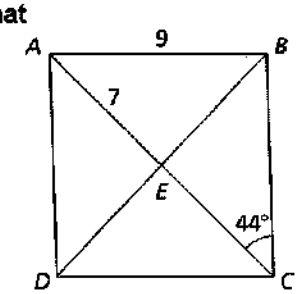
7.4 **Notetaking with Vocabulary (continued)**

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.

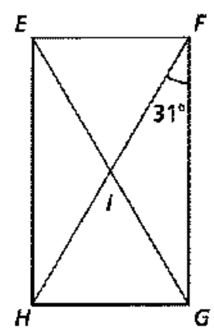
2. For any rectangle *PQRS*, decide whether the statement $\angle PQS \cong \angle RSQ$ is *always* or *sometimes* true. Draw a diagram and explain your reasoning.

In Exercises 3–5, the diagonals of rhombus *ABCD* intersect at *E*. Given that $m\angle BCA = 44°$, $AB = 9$, and $AE = 7$, find the indicated measure.



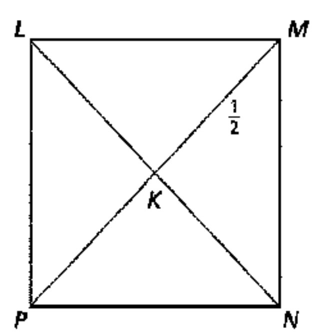
3. BC 4. AC 5. $m\angle ADC$

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



6. $m\angle FHG$ 7. HF 8. $m\angle EFH$

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. $m\angle PKN$ 11. $m\angle MNK$

Packet #10

Name____ Date__________

7.5 Notetaking with Vocabulary
For use after Lesson 7.5

In your own words, write the meaning of each vocabulary term.

trapezoid

bases

base angles

legs

isosceles trapezoid

midsegment of a trapezoid

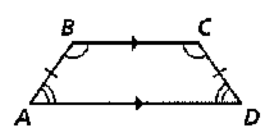
kite

Theorems

Theorem 7.14 Isosceles Trapezoid Base Angles Theorem

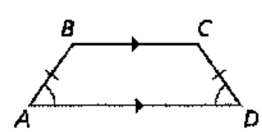
If a trapezoid is isosceles, then each pair of base angles is congruent.

If trapezoid *ABCD* is isosceles, then $\angle A \cong \angle D$ and $\angle B \cong \angle C$.



Theorem 7.15 Isosceles Trapezoid Base Angles Converse

If a trapezoid has a pair of congruent base angles, then it is an isosceles trapezoid.



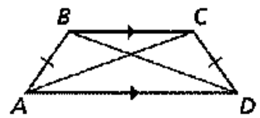
If $\angle A \cong \angle D$ (or if $\angle B \cong \angle C$), then trapezoid *ABCD* is isosceles.

#10

Name ______________________________ Date ________

Theorem 7.16 Isosceles Trapezoid Diagonals Theorem

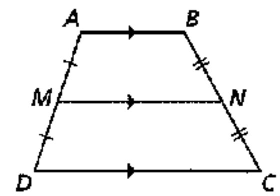
A trapezoid is isosceles if and only if its diagonals are congruent.



Trapezoid $ABCD$ is isosceles if and only if $\overline{AC} \cong \overline{BD}$.

Theorem 7.17 Trapezoid Midsegment Theorem

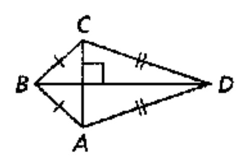
The midsegment of a trapezoid is parallel to each base, and its length is one-half the sum of the lengths of the bases.



If $\overline{MN}$ is the midsegment of trapezoid $ABCD$, then $\overline{MN} \parallel \overline{AB}$, $\overline{MN} \parallel \overline{DC}$, and $MN = \frac{1}{2}(AB + CD)$.

Theorem 7.18 Kite Diagonals Theorem

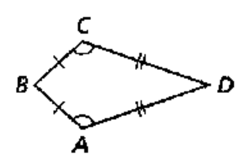
If a quadrilateral is a kite, then its diagonals are perpendicular.



If quadrilateral $ABCD$ is a kite, then $\overline{AC} \perp \overline{BD}$.

Theorem 7.19 Kite Opposite Angles Theorem

If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.



If quadrilateral $ABCD$ is a kite and $\overline{BC} \cong \overline{BA}$, then $\angle A \cong \angle C$ and $\angle B \not\cong \angle D$.

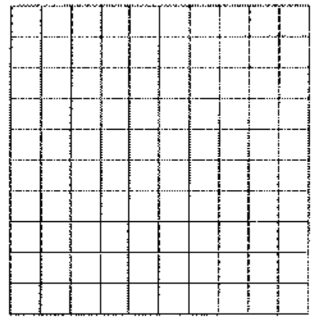
Notes:

#10

Name____ Date__________

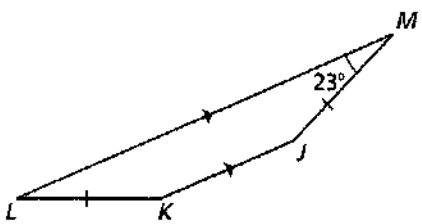
Extra Practice

1. Show that the quadrilateral with vertices at $Q(0, 3), R(0, 6), S(-6, 0)$, and $T(-3, 0)$ is a trapezoid. Decide whether the trapezoid is isosceles. Then find the length of the midsegment of the trapezoid.

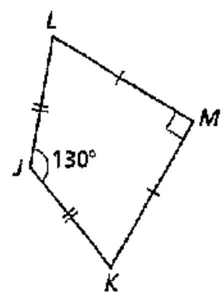


In Exercises 2 and 3, find $m\angle K$ and $m\angle L$.

2.

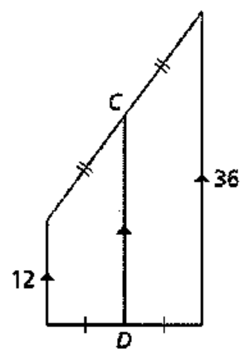


3.

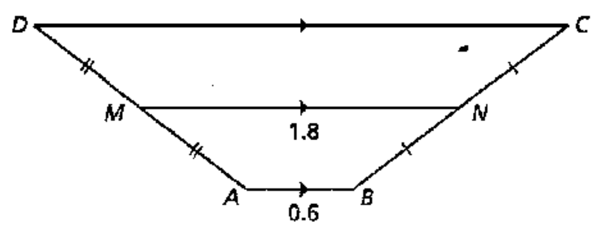


In Exercises 4 and 5, find *CD*.

4.

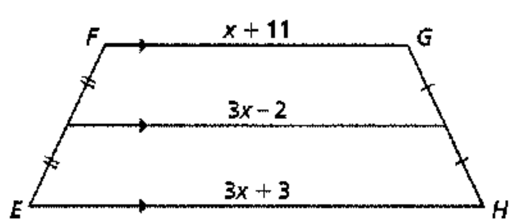


5.



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

6.



7.