Name _____ Date _____

7.2 Properties of Parallelograms

For use with Exploration 7.2

Essential Question What are the properties of parallelograms?

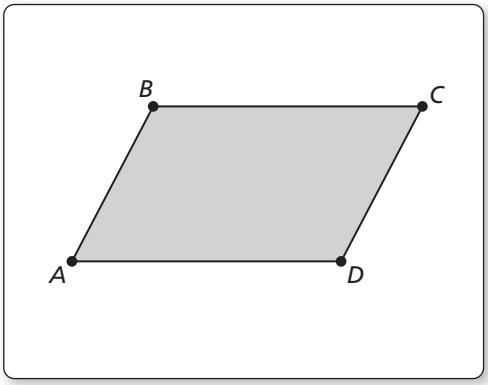
1 EXPLORATION: Discovering Properties of Parallelograms

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software.

a. Construct any parallelogram and label it *ABCD*. Explain your process.

Sample



b. Find the angle measures of the parallelogram. What do you observe?

c. Find the side lengths of the parallelogram. What do you observe?

d. Repeat parts (a)–(c) for several other parallelograms. Use your results to write conjectures about the angle measures and side lengths of a parallelogram.

7.2 Properties of Parallelograms (continued)

2 EXPLORATION: Discovering a Property of Parallelograms

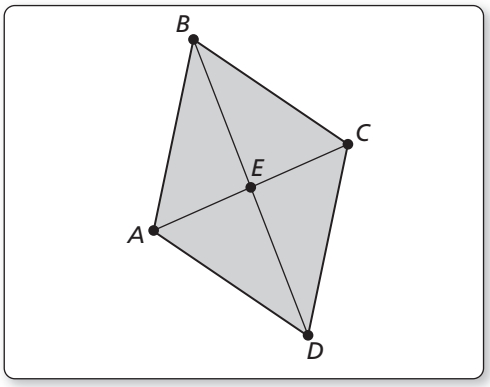
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software.

a. Construct any parallelogram and label it *ABCD*.

b. Draw the two diagonals of the parallelogram. Label the point of intersection *E*.

Sample



c. Find the segment lengths *AE, BE, CE,* and *DE*. What do you observe?

d. Repeat parts (a)–(c) for several other parallelograms. Use your results to write a conjecture about the diagonals of a parallelogram.

Communicate Your Answer

3. What are the properties of parallelograms?

Name _____ Date _____

7.2 Notetaking with Vocabulary

For use after Lesson 7.2

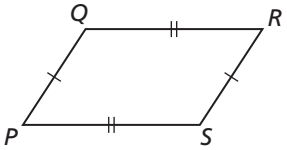
In your own words, write the meaning of each vocabulary term.

parallelogram

Theorems

Theorem 7.3 Parallelogram Opposite Sides Theorem

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

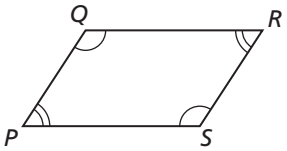


If $PQRS$ is a parallelogram, then $\overline{PQ} \cong \overline{RS}$ and $\overline{QR} \cong \overline{SP}$.

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 $\angle Q \cong \angle S$.

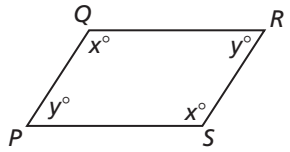
Notes:

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.

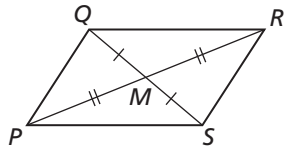


If $PQRS$ is a parallelogram, then $x° + y° = 180°$.

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:

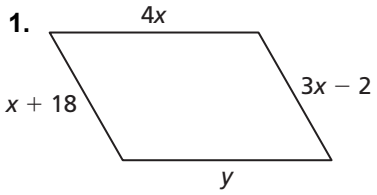
Name _____ Date _____

7.2 Notetaking with Vocabulary (continued)

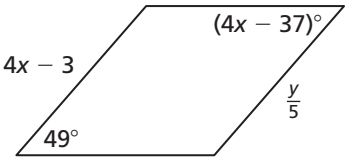
Extra Practice

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

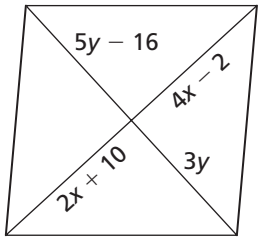
1.



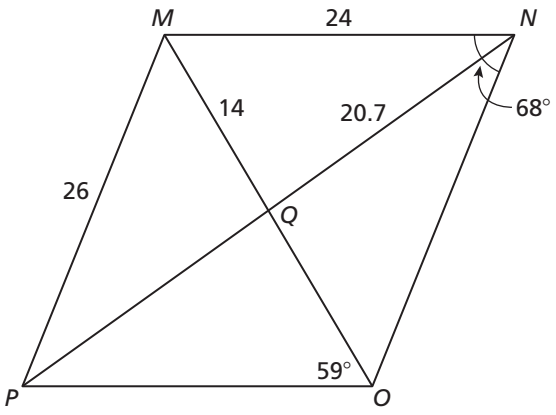
2.



3.



In Exercises 4–11, find the indicated measure in $\square MNOP$. Explain your reasoning.



4. PO

5. OQ

6. NO

7. PQ

8. $m\angle PMN$

9. $m\angle NOP$

10. $m\angle OPM$

11. $m\angle NMO$