Name_____ Date _____

3.2 Parallel Lines and Transversals

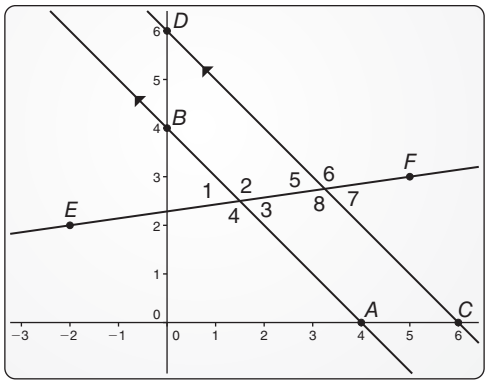
For use with Exploration 3.2

Essential Question When two parallel lines are cut by a transversal, which of the resulting pairs of angles are congruent?

1 EXPLORATION: Exploring Parallel Lines

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

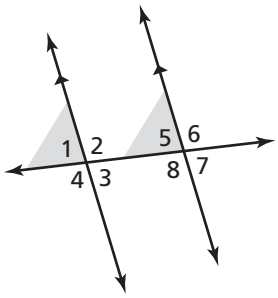
Work with a partner.
Use dynamic geometry software to draw two parallel lines. Draw a third line that intersects both parallel lines. Find the measures of the eight angles that are formed. What can you conclude?



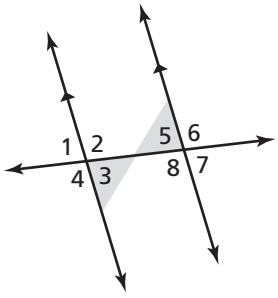
2 EXPLORATION: Writing Conjectures

Work with a partner. Use the results of Exploration 1 to write conjectures about the following pairs of angles formed by two parallel lines and a transversal.

a. corresponding angles

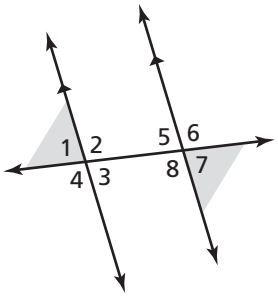


b. alternate interior angles

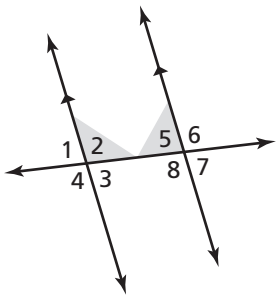


2 EXPLORATION: Writing Conjectures (continued)

c. alternate exterior angles



d. consecutive interior angles



Communicate Your Answer

3. When two parallel lines are cut by a transversal, which of the resulting pairs of angles are congruent?

4. In Exploration 2, $m\angle 1 = 80°$. Find the other angle measures.

Name_____ Date _____

3.2 Notetaking with Vocabulary

For use after Lesson 3.2

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

corresponding angles

parallel lines

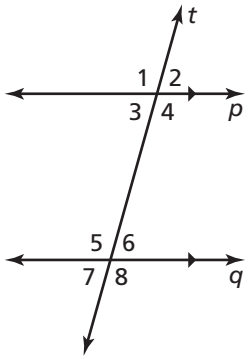
supplementary angles

vertical angles

Theorems

Theorem 3.1 Corresponding Angles Theorem

If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.



Examples In the diagram, $\angle 2 \cong \angle 6$ and $\angle 3 \cong \angle 7$.

Theorem 3.2 Alternate Interior Angles Theorem

If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent.

Examples In the diagram, $\angle 3 \cong \angle 6$ and $\angle 4 \cong \angle 5$.

Theorem 3.3 Alternate Exterior Angles Theorem

If two parallel lines are cut by a transversal, then the pairs of alternate exterior angles are congruent.

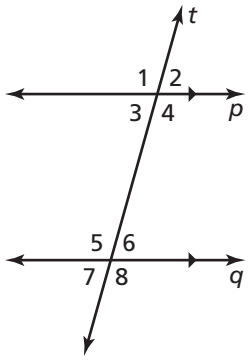
Examples In the diagram, $\angle 1 \cong \angle 8$ and $\angle 2 \cong \angle 7$.

Name _____ Date _____

3.2 Notetaking with Vocabulary (continued)

Theorem 3.4 Consecutive Interior Angles Theorem

If two parallel lines are cut by a transversal, then the pairs of consecutive interior angles are supplementary.



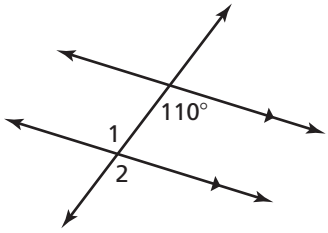
Examples In the diagram, $\angle 3$ and $\angle 5$ are supplementary, and $\angle 4$ and $\angle 6$ are supplementary.

Notes:

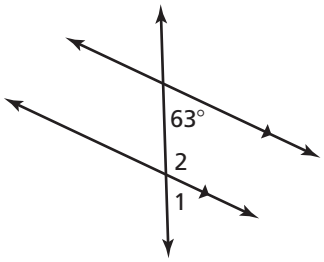
Extra Practice

In Exercises 1–4, find $m\angle 1$ and $m\angle 2$. Tell which theorem you use in each case.

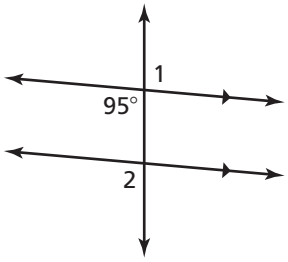
1.



2.



3.



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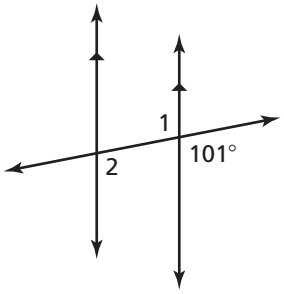
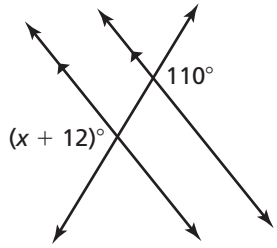
3.2 Notetaking with Vocabulary (continued)

4.

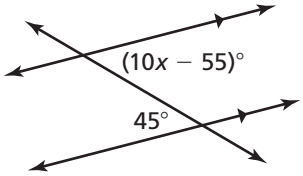


In Exercises 5–8, find the value of *x*. Show your steps.

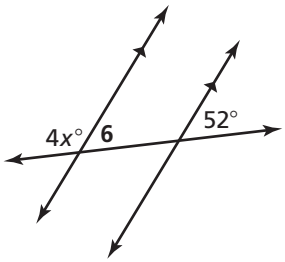
5.



6.



7.



8.