Name _____ Date _____

LESSON 2.6

Study Guide

For use with pages 112–119

GOAL **Write proofs using geometric theorems.**

Vocabulary

A **proof** is a logical argument that shows a statement is true.

A **two-column proof** has numbered statements and corresponding reasons that show an argument in a logical order.

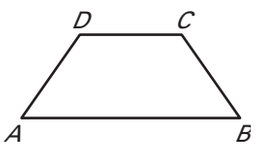
A **theorem** is a statement that can be proven.

Theorem 2.1 Congruence of Segments: Segment congruence is reflexive, symmetric, and transitive.

Theorem 2.2 Congruence of Angles: Angle congruence is reflexive, symmetric, and transitive.

EXAMPLE 1 Write a two-column proof

Write a two-column proof for the following situation.



GIVEN: $AD = 8, BC = 8, \overline{BC} \cong \overline{CD}$

PROVE: $\overline{AD} \cong \overline{CD}$

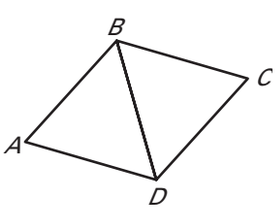
Statements	Reasons
1. $AD = 8$ $BC = 8$	**1.** Given
2. $AD = BC$	**2.** Transitive Property of Equality
3. $\overline{AD} \cong \overline{BC}$	**3.** Definition of congruent segments
4. $\overline{BC} \cong \overline{CD}$	**4.** Given
5. $\overline{AD} \cong \overline{CD}$	**5.** Transitive Property of Equality

Exercise for Example 1

1. Write a two-column proof for the following situation.

GIVEN: $AD = 12, AB = 12, \overline{BC} \cong \overline{CD}, \overline{AD} \cong \overline{CD}$

PROVE: $\overline{BC} \cong \overline{BA}$



Name _____ Date _____

LESSON 2.6

Study Guide *continued*

For use with pages 112–119

EXAMPLE 2 Name the property shown

Name the property illustrated by the statement.

a. If $\overline{XY} \cong \overline{WZ}$ and $\overline{WZ} \cong \overline{PQ}$, then $\overline{XY} \cong \overline{PQ}$.

b. If $\angle M \cong \angle N$, then $\angle N \cong \angle M$.

Solution

a. Transitive Property of Segment Congruence

b. Symmetric Property of Angle Congruence

Exercises for Example 2

Name the property illustrated by the statement.

2. $\angle R \cong \angle R$

3. If $\overline{XY} \cong \overline{PQ}$, then $\overline{PQ} \cong \overline{XY}$.

4. $\overline{XY} \cong \overline{XY}$

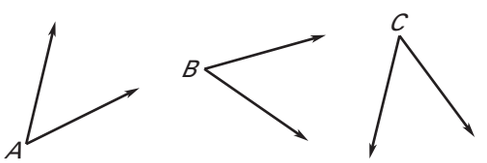
5. If $\angle X \cong \angle Y$ and $\angle Y \cong \angle Z$, then $\angle X \cong \angle Z$.

EXAMPLE 3 Transitive Property of Congruence

Prove the Transitive Property of Angle Congruence.

GIVEN: $\angle A \cong \angle B$, $\angle B \cong \angle C$

PROVE: $\angle A \cong \angle C$



Statements	Reasons
1. $\angle A \cong \angle B$, $\angle B \cong \angle C$	**1.** Given
2. $m\angle A = m\angle B$	**2.** Definition of congruent angles
3. $m\angle B = m\angle C$	**3.** Definition of congruent angles
4. $m\angle A = m\angle C$	**4.** Transitive Property of Equality
5. $\angle A \cong \angle C$	**5.** Definition of congruent angles

Exercise for Example 3

6. Prove the Transitive Property of Segment Congruence.

GIVEN: $\overline{AB} \cong \overline{BC}$, $\overline{BC} \cong \overline{CD}$

PROVE: $\overline{AB} \cong \overline{CD}$

LESSON 2.6