

**LESSON**

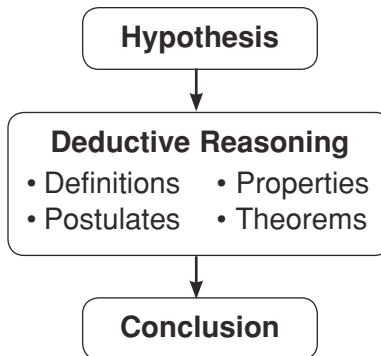
**Review for Mastery**

**2-6 Geometric Proof**

To write a geometric proof, start with the hypothesis of a conditional.

Apply deductive reasoning.

Prove that the conclusion of the conditional is true.



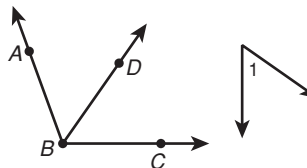
**Conditional:** If  $\overrightarrow{BD}$  is the angle bisector of  $\angle ABC$ , and  $\angle ABD \cong \angle 1$ , then  $\angle DBC \cong \angle 1$ .

**Given:**  $\overrightarrow{BD}$  is the angle bisector of  $\angle ABC$ , and  $\angle ABD \cong \angle 1$ .

**Prove:**  $\angle DBC \cong \angle 1$

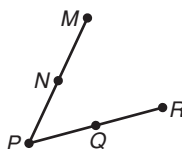
**Proof:**

- |  |                                |
|--|--------------------------------|
| 1. $\overrightarrow{BD}$ is the angle bisector of $\angle ABC$ . | 1. Given                       |
| 2. $\angle ABD \cong \angle DBC$                                 | 2. Def. of $\angle$ bisector   |
| 3. $\angle ABD \cong \angle 1$                                   | 3. Given                       |
| 4. $\angle DBC \cong \angle 1$                                   | 4. Transitive Prop. of $\cong$ |



**1. Given:**  $N$  is the midpoint of  $\overline{MP}$ ,  $Q$  is the midpoint of  $\overline{RP}$ , and  $\overline{PQ} \cong \overline{NM}$ .

**Prove:**  $\overline{PN} \cong \overline{QR}$



Write a justification for each step.

**Proof:**

- |   |          |
|---|----------|
| 1. $N$ is the midpoint of $\overline{MP}$ . | 1. _____ |
| 2. $Q$ is the midpoint of $\overline{RP}$ . | 2. _____ |
| 3. $\overline{PN} \cong \overline{NM}$      | 3. _____ |
| 4. $\overline{PQ} \cong \overline{NM}$      | 4. _____ |
| 5. $\overline{PN} \cong \overline{PQ}$      | 5. _____ |
| 6. $\overline{PQ} \cong \overline{QR}$      | 6. _____ |
| 7. $\overline{PN} \cong \overline{QR}$      | 7. _____ |

**LESSON**

**Review for Mastery**

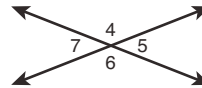
**2-6 Geometric Proof** continued

A **theorem** is any statement that you can prove. You can use **two-column proofs** and deductive reasoning to prove theorems.

<b>Congruent Supplements Theorem</b>	If two angles are supplementary to the same angle (or to two congruent angles), then the two angles are congruent.
<b>Right Angle Congruence Theorem</b>	All right angles are congruent.

Here is a two-column proof of one case of the Congruent Supplements Theorem.

**Given:**  $\angle 4$  and  $\angle 5$  are supplementary and  $\angle 5$  and  $\angle 6$  are supplementary.



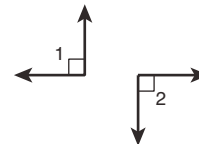
**Prove:**  $\angle 4 \cong \angle 6$

**Proof:**

Statements	Reasons
1. $\angle 4$ and $\angle 5$ are supplementary.	1. Given
2. $\angle 5$ and $\angle 6$ are supplementary.	2. Given
3. $m\angle 4 + m\angle 5 = 180^\circ$	3. Definition of supplementary angles
4. $m\angle 5 + m\angle 6 = 180^\circ$	4. Definition of supplementary angles
5. $m\angle 4 + m\angle 5 = m\angle 5 + m\angle 6$	5. Substitution Property of Equality
6. $m\angle 4 = m\angle 6$	6. Subtraction Property of Equality
7. $\angle 4 \cong \angle 6$	7. Definition of congruent angles

Fill in the blanks to complete the two-column proof of the Right Angle Congruence Theorem.

**2. Given:**  $\angle 1$  and  $\angle 2$  are right angles.



**Prove:**  $\angle 1 \cong \angle 2$

**Proof:**

Statements	Reasons
1. <b>a.</b> _____	1. Given
2. $m\angle 1 = 90^\circ$	2. <b>b.</b> _____
3. <b>c.</b> _____	3. Definition of right angle
4. $m\angle 1 = m\angle 2$	4. <b>d.</b> _____
5. <b>e.</b> _____	5. Definition of congruent angles