LESSON
2-6

Reteach

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.

Hypothesis

Deductive Reasoning
- Definitions
- Properties
- Postulates
- Theorems

Conclusion

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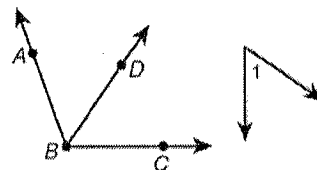
Given: $\overrightarrow{BD}$ is the angle bisector of $\angle ABC$, and $\angle ABD \cong \angle 1$.

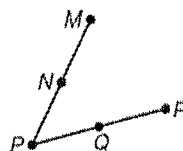**Prove:** $\angle DBC \cong \angle 1$

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. _____

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Geometric Proof continued

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

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

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

Given: ∠4 and ∠5 are supplementary and ∠5 and ∠6 are supplementary.
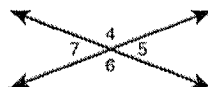
Prove: ∠4 ≅ ∠6

Proof:

Statements	Reasons
1. ∠4 and ∠5 are supplementary.	1. Given
2. ∠5 and ∠6 are supplementary.	2. Given
3. m∠4 + m∠5 = 180°	3.
4. m∠5 + m∠6 = 180°	4.
5. m∠4 + m∠5 = m∠5 + m∠6	5.
6. m∠4 = m∠6	6.
7. ∠4 ≅ ∠6	7.

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

2. **Given:** ∠1 and ∠2 are right angles.

   Prove: ∠1 ≅ ∠2

   Proof:
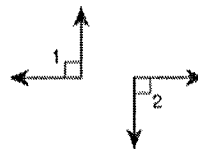
Statements	Reasons
1. a. _____	1. Given
2. m∠1 = 90°	2. b. _____
3. c. _____	3. Definition of right angle
4. m∠1 = m∠2	4. d. _____
5. e. _____	5. Definition of congruent angles

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