Unit 2 Learning Goal

GEO.B.11.IndDedReasoning
Use inductive and deductive reasoning to make conjectures both verbally, algebraically, and geometrically.

Lesson 2-5 Learning Target

- I can complete proofs involving segment theorems

Lesson 2-5 Notes:"Verifying Segment Relationships"

Theorem 2-1

Congruence of segments is **reflexive**, **symmetric**, and **transitive**.

Reflexive Property $\overline{AB} \cong \overline{AB}$

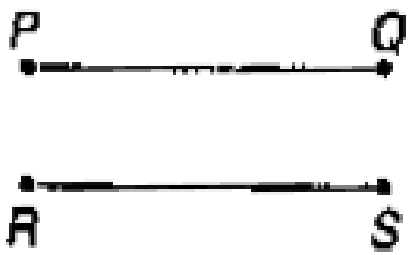
Symmetric Property If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$

Transitive Property If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$

You can use the properties of algebra in geometric proofs. Notice that the symmetric property of equality is used in the proof of Theorem 2–1.

Given: $\overline{PQ} \cong \overline{RS}$

Prove: $\overline{RS} \cong \overline{PQ}$



Proof:

Statements	Reasons
1. $\overline{PQ} \cong \overline{RS}$	1. Given
2. $PQ = RS$	2. Def. of $\cong$
3. $RS = PQ$	3. Symmetric
4. $\overline{RS} \cong \overline{PQ}$	4. Def. of $\cong$

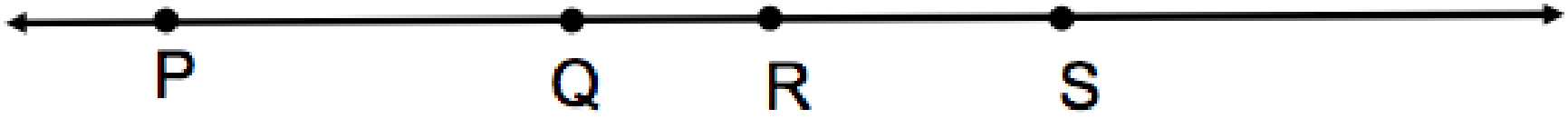
Definition of congruent Segments

Symmetric Property of (=)

Definition of congruent Segments

Given

Justify each step in the proof:



Given: Points P, Q, R, and S are collinear.

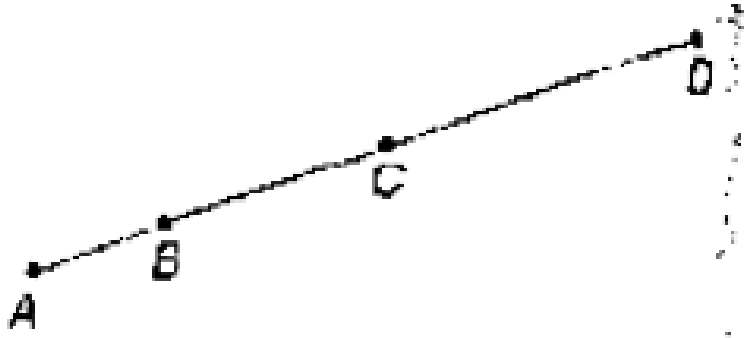
Prove: PQ = PS - QS

Statements	Reasons
1. Points P, Q, R, and S are collinear	(1.) Given
2. PS = PQ + QS	(2.) Segment Addition Postulate
3. PS - QS = PQ	(3.) Subtraction Prop (=)
4. PQ = PS - QS	(4.) Symmetric Prop. (=)

Justify each step in the proof.

Given: $\overline{ABCD}$

Prove: $AD = AB + BC + CD$



Proof:

Statements	Reasons
1. $\overline{ABCD}$	1. ? Given
2. $AD = AB + BD$	2. ? Segment Addition Postulate
3. $BD = BC + CD$	3. ? Segment Addition Postulate
4. $AD = AB + BC + CD$	4. ? Substitution Property of (=)

Prove the following.

Given: $\overline{AB} \cong \overline{XY}$

$\overline{BC} \cong \overline{YZ}$

Prove: $\overline{AC} \cong \overline{XZ}$

Two-Column Proof

Statements	Reasons
1. $\overline{AB} \cong \overline{XY}$, $\overline{BC} \cong \overline{YZ}$	1. Given
2. $AB = XY$, $BC = YZ$	2. Definition of congruent segments
3. $AB + BC = XY + YZ$	3. Addition Property (=)
4. $AB + BC = AC$ $XY + YZ = XZ$	4. Segment Addition Postulate
5. $AC = XZ$	5. Substitution Property (–) twice
6. $\overline{AC} \cong \overline{XZ}$	6. Definition of congruent segments

- Definition of Congruent Segment
- Given
- Subst. Prop of (=)
- Add. Prop. of (=)
- Segment Addition Postulate