

Proving Statements about Segments

Properties of Segment Congruence

Reflexive - For any segment AB , $\overline{AB} \cong \overline{AB}$.

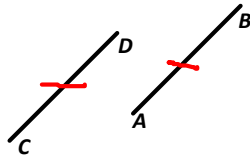
Symmetric - If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$.

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

1. For the following proof, name the property that justifies each statement.

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

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



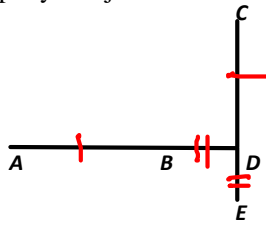
<u>Statement</u>	<u>Reason</u>
1. $\overline{AB} \cong \overline{CD}$	1) GIVEN
2. $\overline{AB} \cong \overline{CD}$	2) Def. of Congruent Segments
3. $\overline{CD} \cong \overline{AB}$	3) Symmetric Prop of Equality
4. $\overline{CD} \cong \overline{AB}$	4) Definition of Congruent Segments

2. For the following proof, name the property that justifies each statement.

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

$\overline{BD} \cong \overline{DE}$

Prove: $\overline{AD} \cong \overline{CE}$



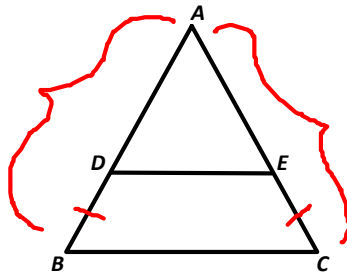
Statement	Reason
1. $\overline{AB} \cong \overline{CD}$ $\overline{BD} \cong \overline{DE}$	1) GIVEN
2. $AB = CD$ $BD = DE$	2) Def. of \cong segments
3. $AD = \overline{AB} + \overline{BD}$ $CE = \overline{CD} + \overline{DE}$	3) Segment Addition Postulate
4. $\overline{AB} + \overline{BD} = \overline{CD} + \overline{DE}$	4) Addition Property of =
5. $AD = CE$	5) Substitution Property of =
6. $\overline{AD} \cong \overline{CE}$	6) Def of \cong segments

3. Write a two-column proof.

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

$\overline{DB} \cong \overline{EC}$

Prove: $\overline{AD} \cong \overline{AE}$ *



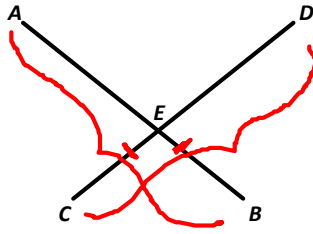
Statement	Reason
1) $\overline{AB} \cong \overline{AC}$ $\overline{DB} \cong \overline{EC}$	1) GIVEN
→ 2) $AB = AC$ → $DB = EC$	2) Def. of \cong Segments
3) $AD + \overline{DB} = AB$ $AE + \overline{EC} = AC$	3) Segment Addition Postulate
4) $AD + \overline{DB} = AE + \overline{EC}$	4) Substitution Prop. of =
5) $AD = AE$	5) Subtraction Prop. of =
6) $\overline{AD} \cong \overline{AE}$	6) Def. of \cong Segments

4. Write a two-column proof.

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

$\overline{EC} \cong \overline{EB}$

Prove: $\overline{AE} \cong \overline{DE}$



Statement	Reason
1) $\overline{AB} \cong \overline{CD}$ $\overline{EC} \cong \overline{EB}$	1) GIVEN
→ 2) $\overline{AB} = \overline{CD}$ $\overline{EC} = \overline{EB}$	2) Def. of \cong segments
3) $\overline{AE} + \overline{EB} = \overline{AB}$ $\overline{DE} + \overline{EC} = \overline{DC}$	3) Segment Addition Postulate
4) $\overline{AE} + \overline{EB} = \overline{DE} + \overline{EC}$	4) Substit. Prop. of =
5) $\overline{AE} = \overline{DE}$	5) Subtraction Prop. of =
6) $\overline{AE} \cong \overline{DE}$	6) Def. of \cong segments