Segments Proofs Reference

Properties of Equality

Addition Property	Substitution Property
Subtraction Property	Reflexive Property
Multiplication Property	Symmetric Property
Division Property	Transitive Property
Distributive Property	

The properties above may only be used with EQUAL signs. The following properties of congruence can be applied to statements with congruence symbols:

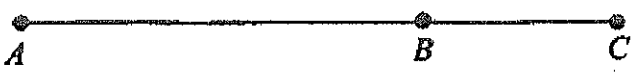
Properties of Congruence

Reflexive Property of Congruence	For any segment AB, $\overline{AB} \cong \overline{AB}$.
Symmetric Property of Congruence	If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$.
Transitive Property of Congruence	If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$.

Definitions

Definition of Congruence	Segments are congruence if and only if they have the same measure If $\overline{AB} \cong \overline{CD}$, then $AB = CD$. If $AB = CD$, then $\overline{AB} \cong \overline{CD}$.
Definition of Midpoint	The midpoint of a segment divides the segment into 2 equal (congruent) parts. If M is the midpoint of AB, then $AM = MB$

Postulates

Segment Addition Postulate	If A, B, and C are collinear points and B is between A and C  then $AB + BC = AC$

Practice!

Justify each of the following statements using a property of equality, property of congruence, definition, or postulate.

1. If $PQ = PQ$, then $\overline{PQ} \cong \overline{PQ}$ — Def. of Congruence
2. If K is between J and L, then $JK + KL = JL$ — Seg. Addition Postulate
3. $\overline{EF} \cong \overline{EF}$ — Reflexive Prop of $\cong$
4. If $RS = TU$, then $RS + XY = TU + XY$ — Addition Property
5. If $AB = DE$, then $DE = AB$ — Symmetric Property
6. If Y is the midpoint of $\overline{XZ}$, then $XY = YZ$ — Def. of Midpoint
7. If $\overline{FG} \cong \overline{HI}$ and $\overline{HI} \cong \overline{JK}$, then $\overline{FG} \cong \overline{JK}$ — Transitive Property
8. If $AB + CD = EF + CD$, then $AB = EF$ — Subtraction Property
9. If $PQ + RS = TV$ and $RS = WX$, then $PQ + WX = TV$ — Substitution Property
10. If $LP = PN$, and L, P, and N are collinear, then P is the midpoint of $\overline{LN}$ — Def. of Midpoint
11. If $\overline{UV} \cong \overline{UV}$, then $UV = UV$ — Def. of Congruence
12. If $CD + DE = CE$, then $CD = CE - DE$ — Subtraction Property

Property Bank:

Properties of Equality:
Addition Property
Subtraction Property
Multiplication Property
Division Property
Distributive Property
Substitution Property
Reflexive Property
Symmetric Property
Transitive Property

Properties of Congruence:
Reflexive Property
Symmetric Property
Transitive Property

Definitions:
Definition of Congruence
Definition of Midpoint

Postulates:
Segment Addition Postulate