

Geometry CP
2.7 Proving Segment Relationships

*A Theorem must be proven

Two-column proof:

1. Numbered Statements
2. Reasons that show the logical order of an argument

Property	Segments
Reflexive	$AB = AB$
Symmetric	If $AB = CD$, then $CD = AB$.
Transitive	If $AB = \underline{CD}$ and $\underline{CD} = EF$, then $AB = EF$.

1. Prove the symmetric property of segment congruence.

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

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



Statements	Reasons
1. $\overline{PQ} \cong \overline{XY}$	1. Given
2. $PQ = XY$	2. Def of congruent statements
3. $XY = PQ$	3. Symmetric Prop of <u>Equality</u>
4. $\overline{XY} \cong \overline{PQ}$	4. Def of congruent statements

*why you can say statement

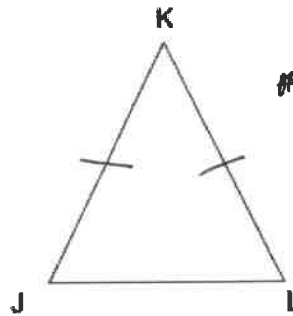
2.7 Proving Segment Relationships

2. Given:

- ① $LK = 5$
- ② $JK = 5$
- ③ $\overline{JK} \cong \overline{JL}$

Prove:

$\overline{LK} \cong \overline{JL}$



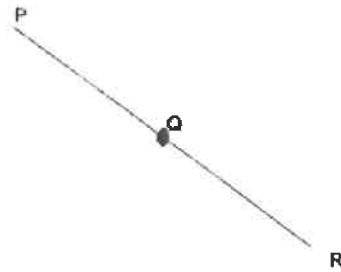
**drawn on diagram*

Statements	Reasons
1) $LK = 5$	1) Given
2) $JK = 5$	2) Given
3) $LK = JK$	3) Transitive Prop of Eq
4) $\overline{LK} \cong \underline{\overline{JK}}$	4) Def of congruent
5) $\underline{\overline{JK}} \cong \overline{JL}$	5) Given
6) $\overline{LK} \cong \overline{JL}$	6) Transitive Prop of Eq

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3.

Given: Q is the midpoint of \overline{PR}
 Prove: $PQ = \frac{1}{2}PR$ and $QR = \frac{1}{2}PR$



Statements	Reasons
1) Q is the midpoint of \overline{PR}	1) Given
2) $PQ = \boxed{QR}$	2) Def of midpoint
3) $PQ + \boxed{QR} = PR$	3) Segment Addition Postulate
4) $PQ + PQ = PR$	4) Substitution Prop of Eq
5) $2PQ = PR$	5) simplify / combine like terms / Distributive Prop
6) $PQ = \frac{1}{2}PR$	6) Division Prop of Equality
7) $QR = \frac{1}{2}PR$	7) Substition Prop of Equality

