What You Will Learn

- Write two-column proofs.
- Name and prove properties of congruence.

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1. Six steps of a two-column proof are shown. Copy and complete the proof.

Given T is the midpoint of $\overline{SU}$.

Prove $x = 5$

$7x = 3x+2$

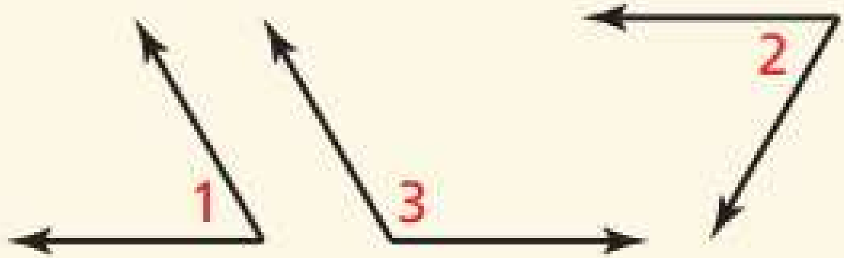
STATEMENTS	REASONS
1. T is the midpoint of $\overline{SU}$.	1. given
2. $\overline{ST} \cong \overline{TU}$	2. Definition of midpoint
3. $ST = TU$	3. Definition of congruent segments def. $\cong$
4. $7x = 3x + 20$	4. Substitution POE
5. $4y = 20$	5. Subtraction Property of Equality
6. $x = 5$	6. Division POE

Write a two-column proof.

Given $\angle 1$ is supplementary to $\angle 3$

$\angle 2$ is supplementary to $\angle 3$

Prove $\angle 1 \cong \angle 2$



$\angle 1$ is supplementary to $\angle 3$	given
$m\angle 1 + m\angle 3 = 180^\circ$	def. of supp. $\angle$s
$\angle 2$ is supp. to $\angle 3$	given
$m\angle 2 + m\angle 3 = 180^\circ$	def. of supp $\angle$s
$180^\circ = m\angle 2 + m\angle 3$	Symmetric POE
$m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	transitive POE
$-m\angle 3 \qquad -m\angle 3$	subtraction POE
$m\angle 1 = m\angle 2$	simplify
$\angle 1 \cong \angle 2$	def. of $\cong$

Theorem 2.1 Properties of Segment Congruence

Segment congruence is reflexive, symmetric, and transitive.

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

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 $\overline{AB} \cong \overline{EF}$.

Proofs Ex. 11, p. 103; Example 3, p. 101; Chapter Review 2.5 Example, p. 118

Theorem 2.2 Properties of Angle Congruence

Angle congruence is reflexive, symmetric, and transitive.

Reflexive For any angle A, $\angle A \cong \angle A$.

Symmetric If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.

Transitive If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

Proofs Ex. 25, p. 118; 2.5 Concept Summary, p. 102; Ex. 12, p. 103

Name the property that the statement illustrates.

a. $\angle A \cong \angle A$

Reflexive POC

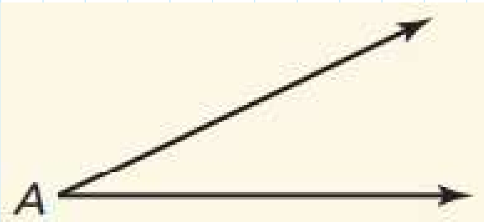
b. If $\overline{PQ} \cong \overline{JG}$ and $\overline{JG} \cong \overline{XY}$, then $\overline{PQ} \cong \overline{XY}$.

Transitive POC

Write a two-column proof for the Reflexive Property of Angle Congruence.

Given $\angle A$

Prove $\angle A \cong \angle A$

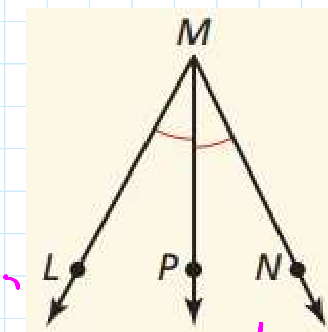


$\angle A$	given
$m\angle A = m\angle A$	reflexive POE
$\angle A \cong \angle A$	def. $\cong$

Write a two-column proof.

Given $\overrightarrow{MP}$ bisects $\angle LMN$.

Prove $2(m\angle LMP) = m\angle LMN$



$\overrightarrow{MP}$ bisects $\angle LMN$	given
$m\angle LMP = m\angle PMN$	def. of Bisector
$m\angle LMP + m\angle PMN = m\angle LMN$	Angle Addition Post.
$m\angle LMP + m\angle LMP = m\angle LMN$	substitution POE
$2(m\angle LMP) = m\angle LMN$	Distributive POE

Practice sec 2.5 **pg. 103: 1-15EO**