

Topic 4-4: Geometric Proof

The Reflexive, Symmetric, and Transitive Properties of Equality have corresponding properties of congruence for Geometry.

<u>Properties:</u>	<u>Examples:</u>
Reflexive Property of Congruence (Reflex. Prop. of \cong)	$\overline{EF} \cong \overline{EF}$
Symmetric Property of Congruence (Symm. Prop. of \cong)	If $\angle 1 \cong \angle 2$, then $\angle 2 \cong \angle 1$.
Transitive Property of Congruence (Trans. Prop. of \cong)	If $\overline{PQ} \cong \overline{RS}$ and $\overline{RS} \cong \overline{TU}$, then $\overline{PQ} \cong \overline{TU}$.

Identify the property that justifies each statement.

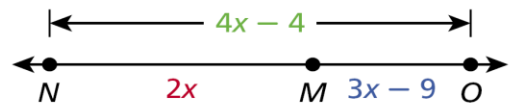
A. $\angle QRS \cong \angle QRS$

B. $m\angle 1 = m\angle 2$ so $m\angle 2 = m\angle 1$

C. $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, so $\overline{AB} \cong \overline{EF}$.

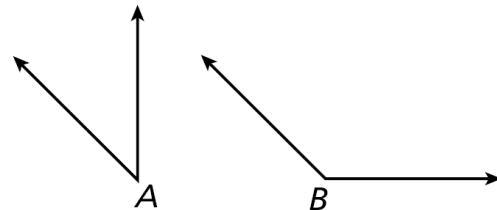
D. $32^\circ = 32^\circ$

Write and solve an equation for x . Justify each step.



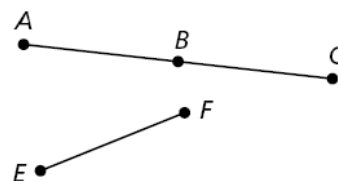
Write and solve an equation for x .	Justify (explain) each step

Write a justification for each step,
given that $\angle A$ and $\angle B$ are supplementary and $m\angle A = 45^\circ$.



Statements	Reasons
1. $\angle A$ and $\angle B$ are supplementary.	
2. $m\angle A = 45^\circ$	
3. $m\angle A + m\angle B = 180^\circ$	
4. $45^\circ + m\angle B = 180^\circ$	
5. $m\angle B = 135^\circ$	

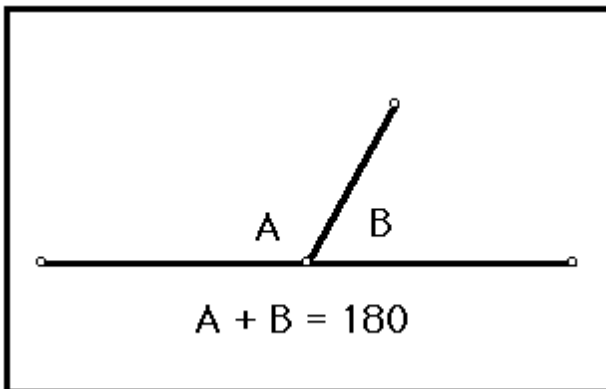
Write a justification for each step,
given that B is the midpoint of \overline{AC}
and $\overline{AB} \cong \overline{EF}$.



Statements	Reasons
1. B is the midpoint of \overline{AC} .	
2. $\overline{AB} \cong \overline{BC}$	
3. $\overline{AB} \cong \overline{EF}$	
4. $\overline{BC} \cong \overline{EF}$	

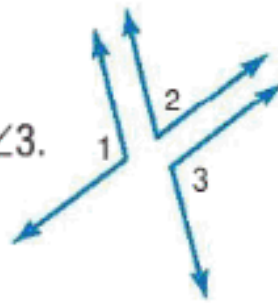
A **theorem** is any statement that you can prove. The Theorems below are ones that have been proven, so we can use them as reasons in later proofs.

1. Linear Pair Theorem: If two angles form a linear pair, then they are supplementary.

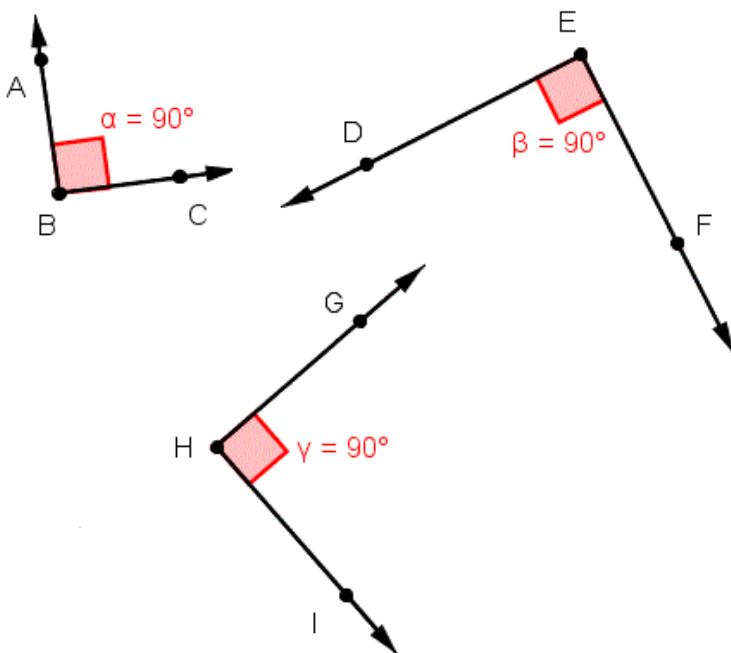


2. Congruent Supplements Theorem: If two angles are supplementary to the same angle, then the two angles are congruent.

If $m\angle 1 + m\angle 2 = 180$ and
 $m\angle 2 + m\angle 3 = 180$, then $\angle 1 \cong \angle 3$.



3. Right Angle Congruence Theorem: All right angles are congruent.



A scrambled proof is just that. The reasons are scrambled below and you must use your knowledge of order and logic to place the reasons in the correct blanks according to the statements given. Let's do one together.

Given: $\angle A$ and $\angle B$ are complementary and $\angle A \cong \angle C$.

Prove: $\angle C$ and $\angle B$ are complementary.

Statements	Reasons
1. $\angle A$ and $\angle B$ are complementary.	1.
2. $\angle A \cong \angle C$	2.
3. $m\angle A + m\angle B = 90^\circ$	3.
4. $m\angle A = m\angle C$	4.
5. $m\angle C + m\angle B = 90^\circ$	5.
6. $\angle C$ and $\angle B$ are complementary.	6.

Reasons
1. Def. of \cong angles
2. Subst. Prop. of =
3. Given
4. Def. of comp. angles
5. Def. of comp. angles
6. Given