

2.5 / 2-6 Notes: Geometric Proof

In a proof, it is important to justify each statements with a corresponding reason (justification) that proves the argument in logical order.

The Statements of the proof are in the left column, and the matching reason for each step are written in the right column.

* **Postulate** - statement that accepted without proof.

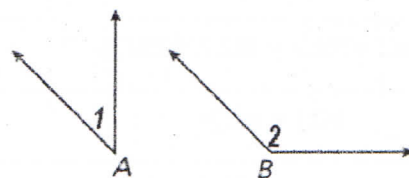
You can use symbols and abbreviations, but they must be clear enough so that anyone who reads your proof will understand them.

* **Theorem** - statement that has been proven.

Example 1: Write a justification for each step.

Given: $\angle A$ and $\angle B$ are supplementary and $m\angle A = 45^\circ$.

Prove: $m\angle B = 135^\circ$

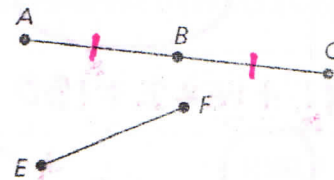


Statements	Reasons
1. $\angle A$ and $\angle B$ are supplementary, $m\angle A = 45^\circ$	1. Given
2. $m\angle A + m\angle B = 180^\circ$	2. DEF OF supplementary angles
3. $45^\circ + m\angle B = 180^\circ$	3. SUBSTITUTION prop
4. $m\angle B = 135^\circ$	4. SUBTRACTION POE

Example 2: Write a justification for each step.

Given: B is the midpoint of AC and $\overline{AB} \cong \overline{EF}$

Prove: $\overline{BC} \cong \overline{EF}$

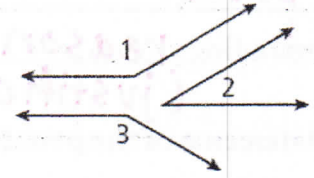


Statements	Reasons
1. B is the midpoint of AC .	1. Given
2. $\overline{AB} \cong \overline{BC}$	2. DEF OF MIDPOINT
3. $\overline{AB} \cong \overline{EF}$	3. GIVEN
4. $\overline{BC} \cong \overline{EF}$	4. TRANSITIVE POC

Example 3: Fill in the blanks to complete the two-column proof.

Given: $\angle 1$ and $\angle 2$ are supplementary, and
 $\angle 2$ and $\angle 3$ are supplementary.

Prove: $\angle 1 \cong \angle 3$



Statements	Reasons
$\angle 1$ and $\angle 2$ are supplementary, and $\angle 2$ and $\angle 3$ are supplementary.	1. Given
$m\angle 1 + m\angle 2 = 180$, $m\angle 2 + m\angle 3 = 180$	2. DEF OF SUPP \angle 'S
$m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	3. TRANSITIVE / SUBSTITUTION
$m\angle 1 = m\angle 3$	4. SUBTRACTION POE
$\angle 1 \cong \angle 3$	5. Definition of $\cong \angle$'s

Example 5: Fill in the blanks to complete the two-column proof.

Given: $\angle 1$ and $\angle 2$ are supplementary, and
 $\angle 1 \cong \angle 3$

Prove: $\angle 3$ and $\angle 2$ are supplementary.



Statements	Reasons
1. $\angle 1$ and $\angle 2$ are supplementary, and $\angle 1 \cong \angle 3$	1. Given
2. $m\angle 1 + m\angle 2 = 180$	2. DEF OF SUPP \angle 'S
3. $m\angle 1 = m\angle 3$	3. DEF OF \cong
4. $m\angle 3 + m\angle 2 = 180^\circ$	4. SUBSTITUTION
5. $\angle 3$ and $\angle 2$ are supplementary	5. DEF OF SUPP \angle 'S