

Steps for writing an indirect proof (proof by contrapositive):

1. Assume temporarily that the conclusion (prove statement) is not true.
2. Reason logically to a conclusion (supported by a reason) that contradicts the given or a known fact.
3. Point out that the temporary assumption must be false, and the conclusion (prove statement) must be true.

Example 1: (If) Given: $m\angle A + m\angle B \neq 180$
 (Then) Prove: $\angle A$ and $\angle B$ are not supplementary

Proof:

Assume temporarily that $\angle A$ & $\angle B$ are supplementary.
Then $m\angle A + m\angle B = 180$, because Supplementary angles add up to 180° . But this contradicts the given, that $m\angle A + m\angle B \neq 180$.
The temporary assumption that $\angle A$ & $\angle B$ are supplementary must be false, and it follows that $\angle A$ & $\angle B$ are not supplementary.

Example 2: Given: $\triangle CUP$ is acute
Prove: $\angle C$ is not obtuse

Proof:
Assume temporarily that $\angle C$ is obtuse.
Then $\triangle CUP$ is obtuse, because an obtuse triangle has one obtuse angle. But this contradicts the given, then $\triangle CUP$ is acute. The temporary assumption that $\angle C$ is obtuse must be false, & it follows that $\angle C$ is not obtuse.