5.6

Indirect Proofs (Day 1)

Indirect Proofs

Two column proofs, flow-chart proofs, and paragraph proofs are examples of _____ proofs.

Sometimes, it's difficult or almost impossible to prove them directly.

Indirect proofs are proofs of _____.

Basically, you want to "pretend" whatever you are proving isn't true. You then try to prove it like a regular proof. Eventually, if your conclusion defies logic, then the original thing you are proving must be true.

How to Write an Indirect Proof

1) Assume temporarily that the conclusion is not _____.

2) Reason _____ until you reach a _____.

3) Point out the desired conclusion must be true, because the contradiction proves the assumption false.

Example 1

Given: ΔABC is scalene

Prove: $\angle A$, $\angle B$, and $\angle C$ all have different measures.

Assume temporarily that two angles of ΔABC have _____ _____. By the Converse of the Base Angles Theorem, that means the sides opposite to $\angle A$ and $\angle B$ are congruent. That means that the triangle must be _____ .This contradicts the given information that ΔABC is scalene.

The assumption that two angles of ΔABC have the same measure must be false. Therefore, $\angle A$, $\angle B$, and $\angle C$ all have different measures.

Example 2

Given: ΔABC

Prove: ΔABC can have at most one right angle.

Example 3

Given: $7(x + y) = 70$ ***and*** $x \neq 4$**.**

Prove: $y \neq 6$

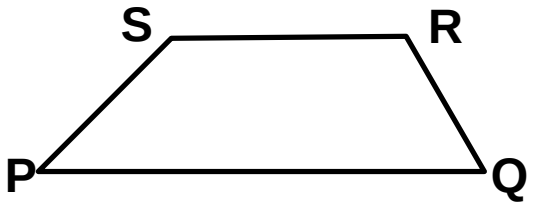
Example 4

Given: n **is an integer and** n^2 **is even.**

Prove: n **is even.**

Example 5

Given: Trapezoid PQRS with bases $\overline{PQ}$ and $\overline{SR}$



Prove: $PQ \neq SR$