

Geometry

6.5 Indirect Proof and Inequalities in One Triangle

Indirect Reasoning

- You are taking a multiple-choice test.
- You don't know the correct answer.
- You eliminate the answers you know are incorrect.
- The answer that is left is the correct answer.

You can use the same type of logic to prove geometric things.

Indirect Proof

- Proving things by making an _____ and showing that the _____ leads to a _____.
- Essentially it is proof by _____ all the other _____.

Steps for writing indirect proofs

1. _____ what you are trying to _____. Temporarily, assume the _____ is _____ and that the _____ is _____.
2. Show that this leads to a _____ of the _____ or some other _____.
3. Point out that the _____ must be _____, so the _____ must be _____.

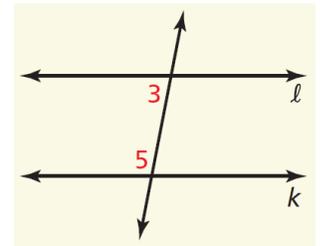
Suppose you wanted to prove the statement "If $x + y \neq 14$ and $y = 5$, then $x \neq 9$." What temporary assumption could you make to prove the conclusion indirectly?

How does that assumption lead to a contradiction?

Write an indirect proof that if two lines are *not* parallel, then consecutive interior angles are *not* supplementary.

Given Line ℓ is not parallel to line k .

Prove $\angle 3$ and $\angle 5$ are not supplementary.



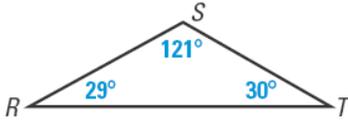
Big Angle Opposite Big Side Theorem

If one _____ of a triangle is _____ than another _____, then the _____ the _____ side is _____ than the angle opposite the shorter side.

Big Side Opposite Big Angle Theorem

If one _____ of a triangle is _____ than another _____, then the _____ opposite the _____ angle is _____ than the side opposite the smaller angle.

List the sides in order from shortest to longest.

**Triangle Inequality Theorem**

The _____ of two _____ of a triangle is _____ than the _____ of the _____ side.
 $AB + BC > AC$; $AB + AC > BC$; $BC + AC > AB$

A triangle has one side of 11 inches and another of 15 inches. Describe the possible lengths of the third side.

Assignment: 328 #2, 4, 6, 8, 12, 14, 16, 18, 20, 22, 24, 26, 28, 32, 40, 47, 49, 52, 53, 55 = 20 total