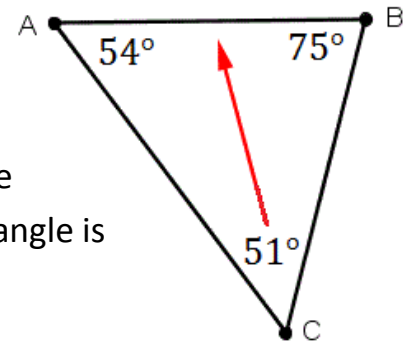


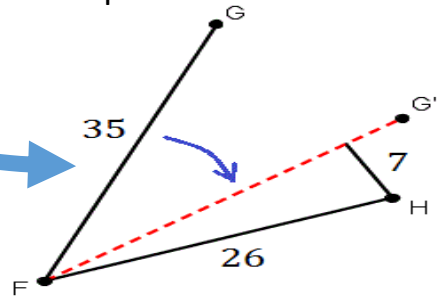
Triangle Inequality Theorem and Side-Angle Relations in Triangle

1. shortest side is always opposite the smallest interior angle
2. The longest side is always opposite the largest interior angle
3. The triangle inequality theorem states that any side of a triangle is Always shorter than the sum of the other two sides.



Inequalities and Relationships within a Triangle

A lot of information can be derived from even the simplest characteristics of triangles. In this section, we will learn about the inequalities and relationships within a triangle that reveal information about triangle sides and angles. First, let's take a look at two significant inequalities that characterize triangles.



Inequalities of a Triangle

Recollection that an inequality is a mathematical expression

About the relative size or order of two objects.

In geometry, we see the use of inequalities when

We speak about the length of a triangle's sides, or the measure of a

Triangle's angles.

Triangle Inequality Theorem

Exploring the Triangle Inequality Theorem

Notice a and b are the two shorter sides and c is the longest side.

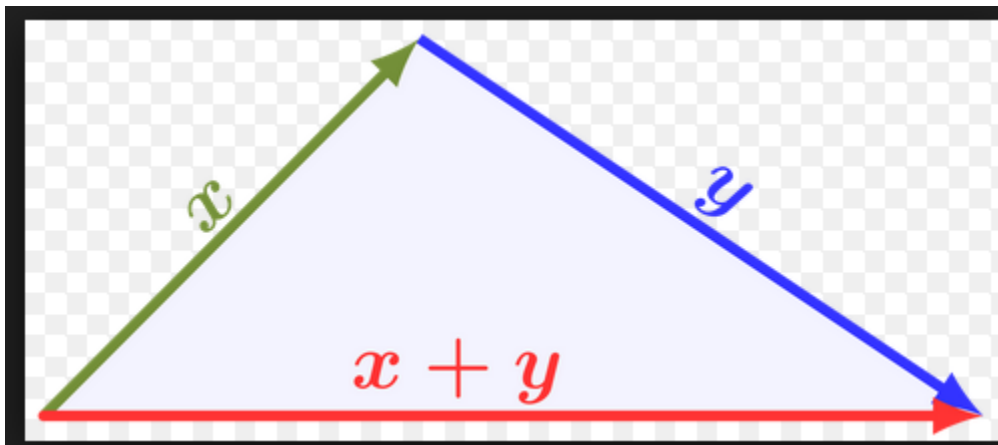
$a + b > c$

$a + b < c$

The Geometry Coach - TriangleInequal

Triangle Inequality Theorem

The definition will be the theorem that the absolute value of the sum of two quantities is less than or equal to the sum of the absolute values of the quantities.

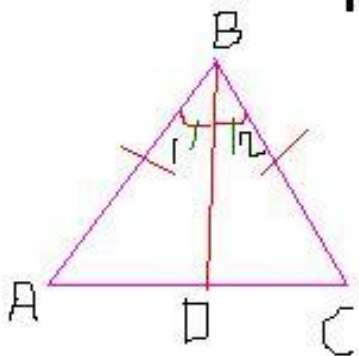


statement

reason

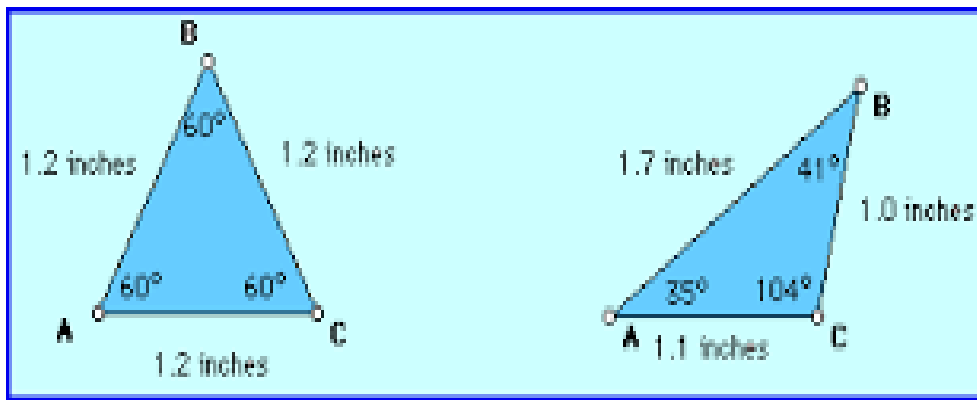
1. $\overline{AB} \cong \overline{AC}$
2. \overline{BD} bisects $\angle B$
3. $\angle 1 \cong \angle 2$
4. $\overline{BD} \cong \overline{BD}$
5. $\triangle ABD \cong \triangle CBD$
6. $\angle A \cong \angle C$

1. given
2. given
3. def. of angle bisector
4. reflexive prop.
5. SAS postulate
6. cpctc



given- $\overline{AB} \cong \overline{AC}$

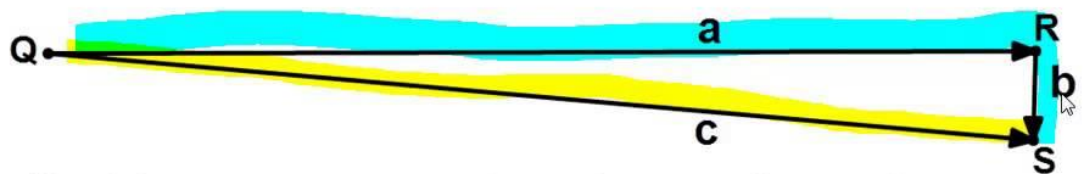
prove- $\angle A \cong \angle C$



Here is a great explanation



Triangle Inequality Theorem



- If you walked from Q to R to S, how long is the path?
Length = $a + b$
- If you walked from Q directly to S, how long is the path?
Length = c
- Given the choice, which path would you walk and why?
I would walk from Q directly to S because it will be shorter.
- Write an inequality based on this knowledge.

$$c < a + b$$