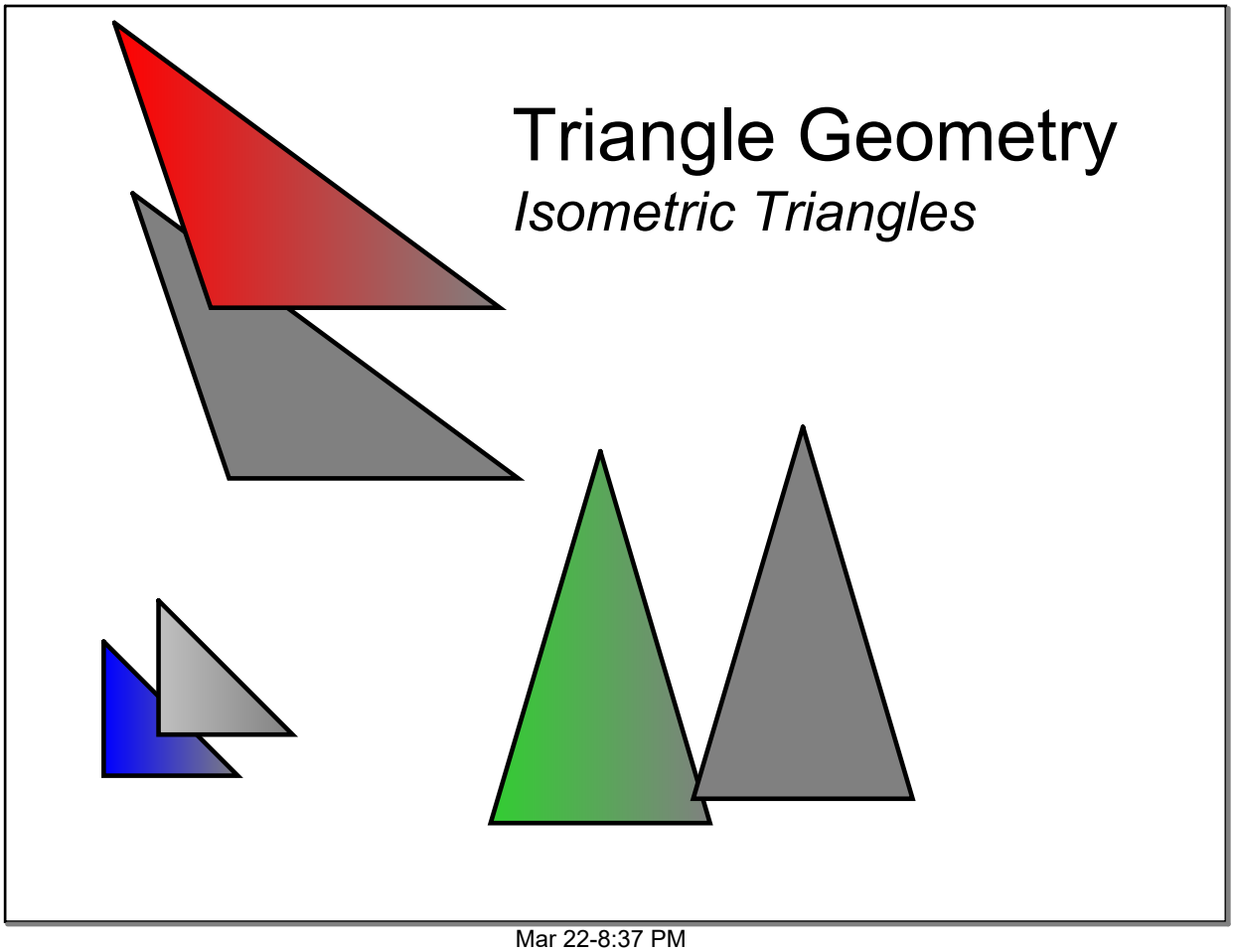


Mar 22-8:37 PM

Triangles that have exactly the **same size and shape** are called **congruent triangles.**

The symbol for congruent is $\cong$.

Two triangles are congruent when:

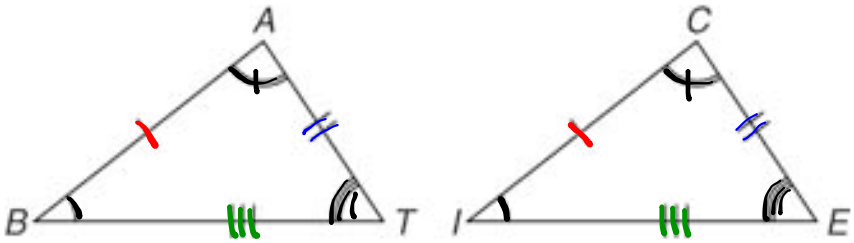
- 3 sides and 3 angles have the same measurements

Mar 22-8:38 PM

Congruent
means the same
thing as
Isometric

Mar 22-8:40 PM

These two triangles are **congruent**



Can you identify the ***corresponding*** sides by letters?

$\overline{AB} = \overline{CI}$ $\overline{BT} = \overline{IE}$ $\overline{AT} = \overline{CE}$

Can you identify the ***corresponding*** angles by letters?

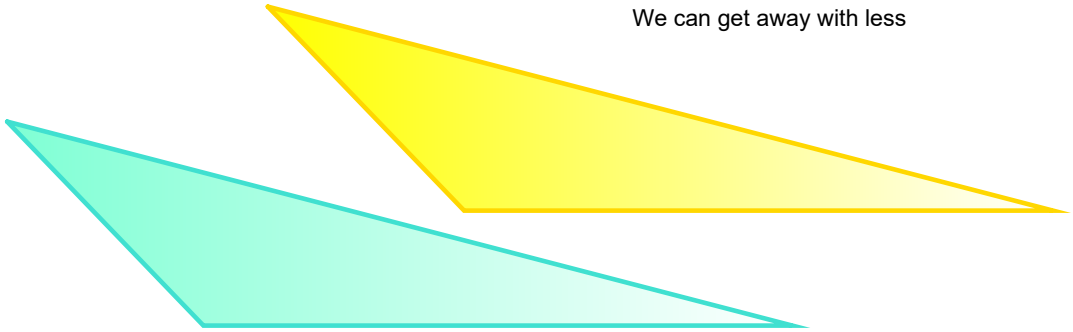
$\angle ABT = \angle CIE$ $\angle BAT = \angle ICE$ $\angle ATB = \angle CEI$

Mar 22-8:42 PM

There are **minimum** conditions for proving that two triangles are congruent.

In other words, it is not necessary to prove that ALL three sides and ALL three angles are congruent **every time** we want to prove that two triangles are congruent.

We can get away with less



Mar 22-8:56 PM

3 ways to prove that triangles are congruent:

1. **SSS** side-side-side
2. **SAS** side-angle-side
3. **ASA** angle-side-angle

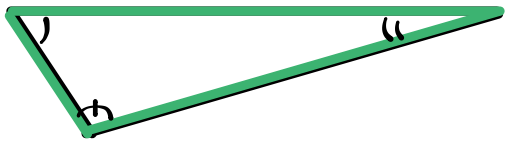
Mar 22-9:35 PM

1. Proving triangles are congruent by **SSS**

side-side-side

Take three black "sticks" and form a triangle with them

Take the same three green "sticks", of the same length as the black sticks, and form a triangle with them that is different from the black one, if possible



Are these two triangles isometric?

Are the corresponding angles in these triangles congruent?

Mar 22-8:59 PM

We do not need to **KNOW** that :

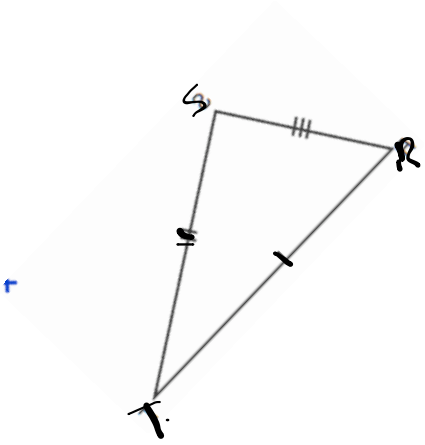
- all 3 corresponding angles and that
- all 3 corresponding sides are congruent to prove that the triangles are congruent....

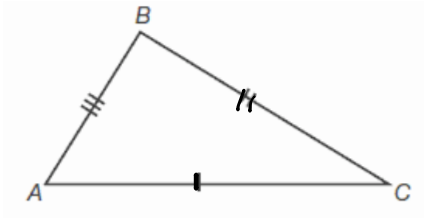
If 3 corresponding SIDES are congruent then the corresponding ANGLES will HAVE to be congruent.

Therefore, **SSS** (side-side-side) is "ENOUGH" or sufficient proof to say that **<u>everything</u>** about the triangles are congruent.

Mar 22-9:11 PM

Prove that the following two triangles are congruent.





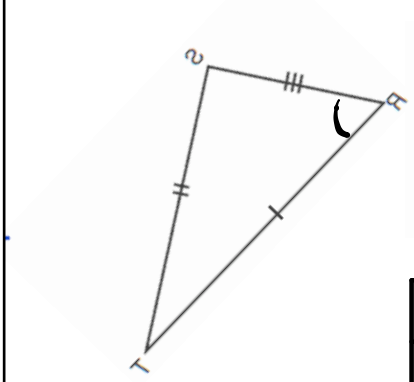
This is how you do a formal proof

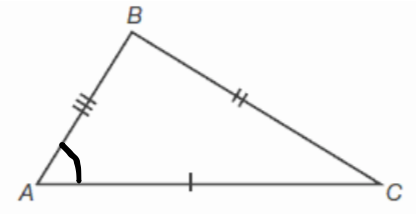
	statement	justification	
1	$\overline{RT} = \overline{AC}$	Given	S
2	$\overline{ST} = \overline{BC}$	Given	S
3	$\overline{SR} = \overline{AB}$	Given	S
4	$\Delta RST \cong \Delta ABC$	SSS	

Mar 22-9:15 PM

Example:

Prove that R A





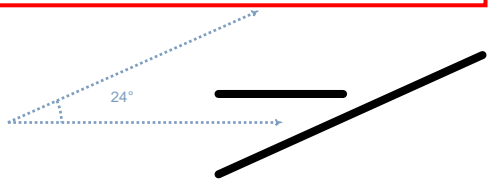
	statement	justification	
1	$\overline{RT} = \overline{AC}$	Given	S
2	$\overline{ST} = \overline{BC}$	Given	S
3	$\overline{SR} = \overline{AB}$	Given	S
4	$\Delta RST \cong \Delta ABC$	SSS	
5	$\angle R \cong \angle A$	Corresponding $\angle$s in Congruent Δs	

Mar 22-9:15 PM

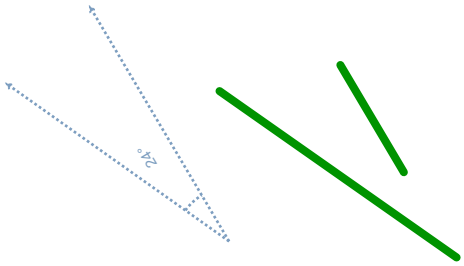
2. Proving triangles are congruent by **SAS**

side-angle-side

Take two black "sticks" and an angle and form a triangle with them--the angle must be **contained** by the two sides



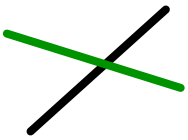
Take the same two green "sticks" and angle and form a triangle with them that is different from the black one, if possible



Are the corresponding angles in these triangles congruent?

Are the corresponding sides in these triangles congruent?

Are these two triangles isometric?



Mar 22-9:39 PM

We do not need to **KNOW** that :

- all 3 corresponding angles and that
- all 3 corresponding sides are congruent to prove that the triangles are congruent....

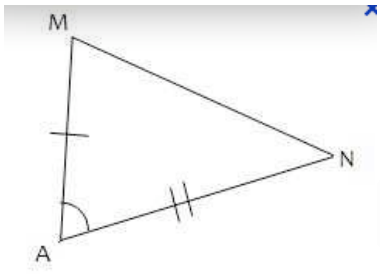
If 2 corresponding SIDES are congruent and the corresponding ANGLE **contained** by these sides are congruent,

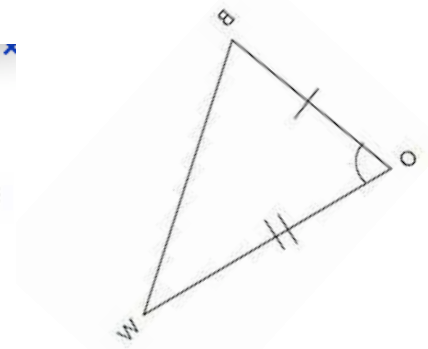
then the third corresponding sides and the other corresponding angles will HAVE to be congruent.

Therefore, **SAS** (side-angle-side) is "ENOUGH" or sufficient proof to say that **<u>everything</u>** about the triangles are congruent.

Mar 22-10:31 PM

Prove that the following two triangles are congruent.



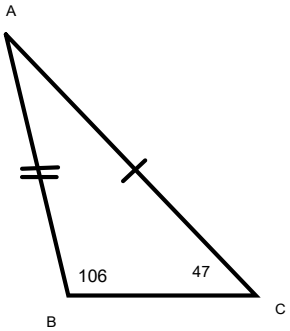


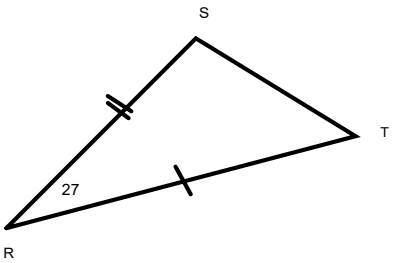
	statement	justification

Mar 23-9:55 AM

Example:

Prove that $\overline{BC} \cong \overline{ST}$



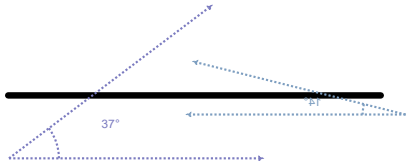


	Statement	Justification

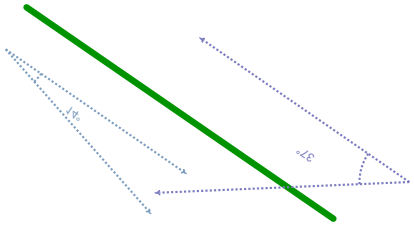
Mar 22-10:44 PM

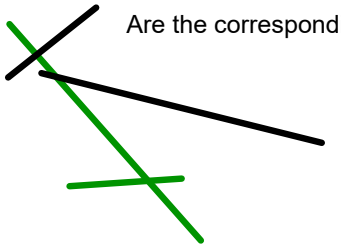
3. Proving triangles are congruent by **ASA**
angle- side-angle

Take one black "stick" and 2 angles and form a triangle with them--the side must be **contained** by the two angles



Take the same green "stick" and 2 angles and form a triangle with them that is different from the black one, if possible





Are the corresponding angles in these triangles congruent?

Mar 22-10:54 PM

We do not need to **KNOW** that :

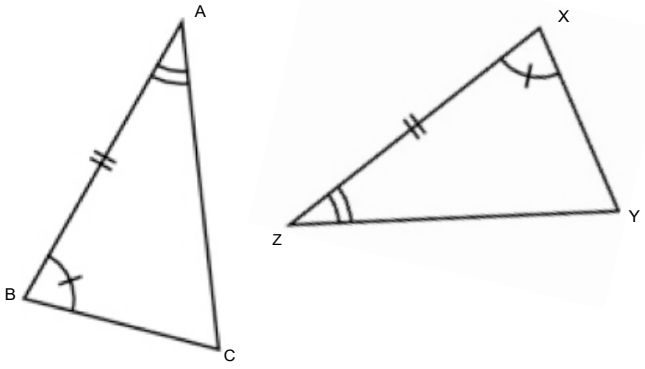
- all 3 corresponding angles and that
- all 3 corresponding sides are congruent to prove that the triangles are congruent....

If 2 corresponding ANGLES are congruent and the corresponding SIDE **contained** by these angles are congruent, then the third corresponding angle and the 2 other corresponding sides will HAVE to be congruent.

Therefore, **ASA** (angles-side-angle) is "ENOUGH" or sufficient proof to say that **everything** about the triangles are congruent.

Mar 22-11:05 PM

Prove that the following two triangles are congruent.

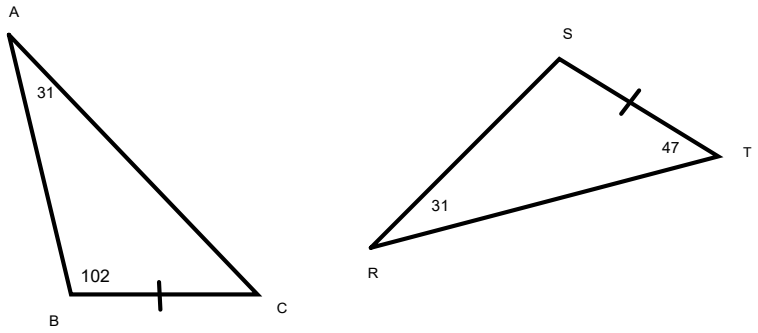


	statement	justification

Mar 22-11:07 PM

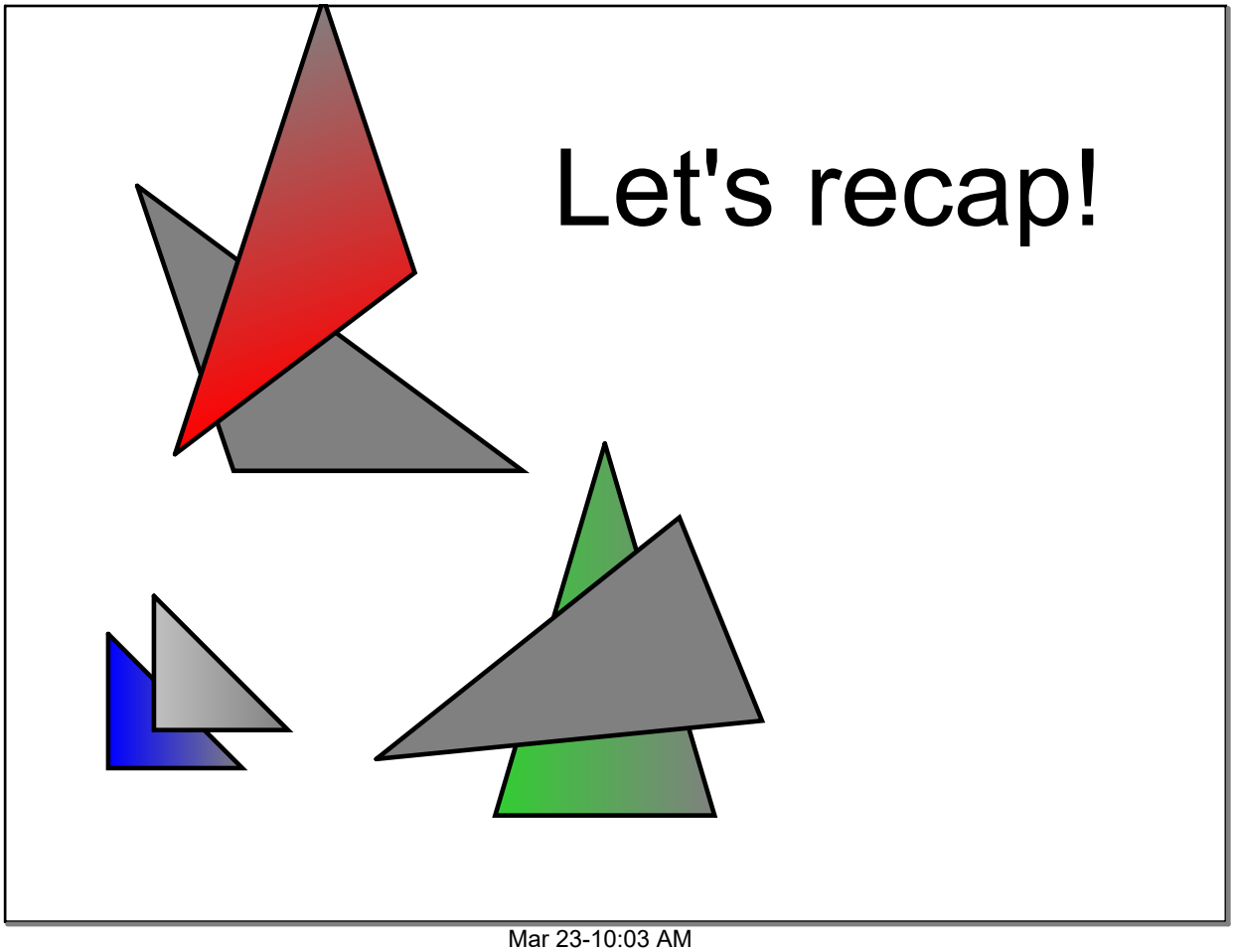
Example:

Prove that $\overline{AB} \quad \overline{SR}$



	Statement	Justification

Mar 22-11:12 PM



Mar 23-10:03 AM

ISOMETRIC TRIANGLES

1. Theorem of Congruence **SAS**:

Two triangles with corresponding congruent angle **contained** between two congruent corresponding sides are isometric.

2. Theorem of Congruence **ASA**:

Two triangles with corresponding congruent side **contained** between two congruent corresponding angles are isometric.

3. Theorem of Congruence **SSS**:

Two triangles with corresponding congruent sides are isometric.

When 2 triangles are proven to be ISOMETRIC, their corresponding elements are ISOMETRIC Property of Congruent Triangles --PCT

Mar 22-4:15 PM

Mar 23-10:05 AM