4.6 Prove Triangles Congruent by ASA and AAS

G.CO.10 Prove theorems about triangles.

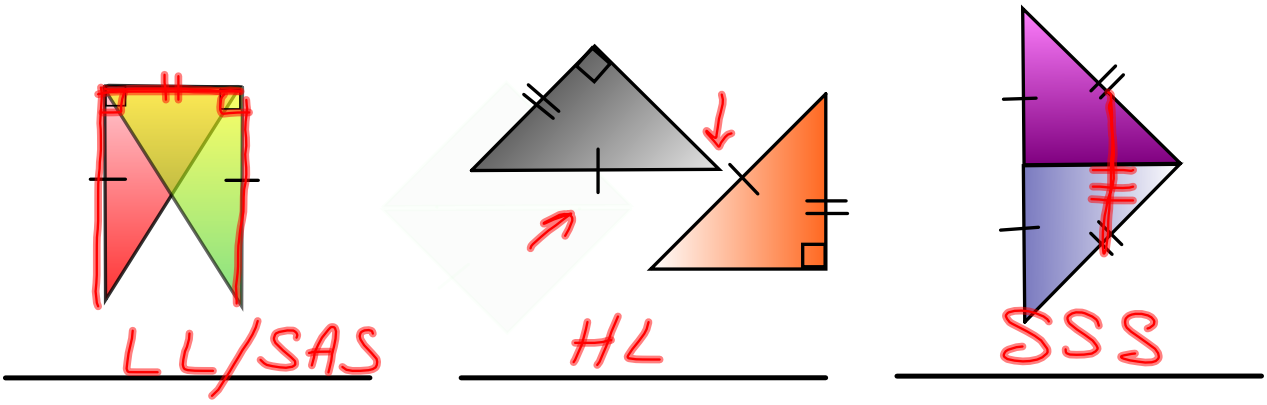
Before You used the SSS, SAS, and HL congruence methods.

Now You will use two more methods to prove congruences.

Why? So you can recognize congruent triangles in bikes, as in Exs. 23-24.

Recall:

State the Congruence Postulate/Theorem that proves that the triangles are congruent.

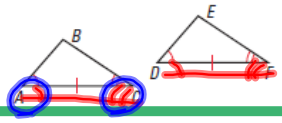


THEOREMS *For Your Notebook*

POSTULATE 21 Angle-Side-Angle (ASA) Congruence Postulate

If two angles and the included side of one triangle are congruent to two angles and the included side of a second triangle, then the two triangles are congruent.

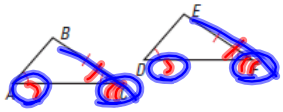
If Angle $\angle A \cong \angle D$,
Side $\overline{AC} \cong \overline{DF}$, and
Angle $\angle C \cong \angle F$,
then $\triangle ABC \cong \triangle DEF$.



THEOREM 4.6 Angle-Angle-Side (AAS) Congruence Theorem

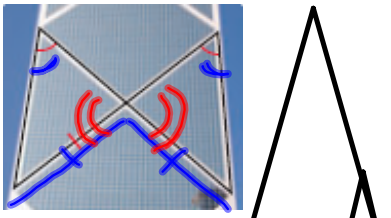
If two angles and a non-included side of one triangle are congruent to two angles and the corresponding non-included side of a second triangle, then the two triangles are congruent.

If Angle $\angle A \cong \angle D$,
Angle $\angle C \cong \angle F$, and
Side $\overline{BC} \cong \overline{EF}$,
then $\triangle ABC \cong \triangle DEF$.



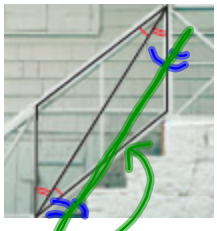
Identify Congruent Triangles

Can the triangles be proven congruent with the information given in the diagram? If so, state the postulate or theorem you would use.



AAS

AAA NOT!

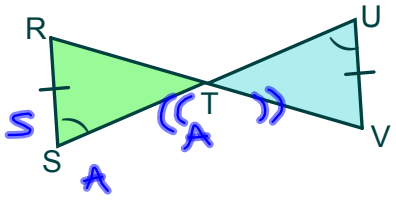


ASA

What postulate or theorem can you use to prove that

$\Delta RST \cong \Delta VUT$?

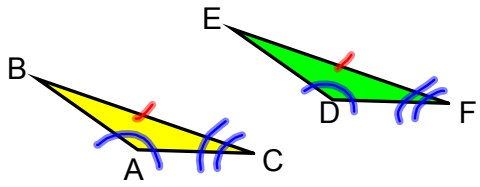
AAS



Prove the AAS Congruence Theorem

Given: $\angle A \cong \angle D, \angle C \cong \angle F,$
$\overline{BC} \cong \overline{EF}$

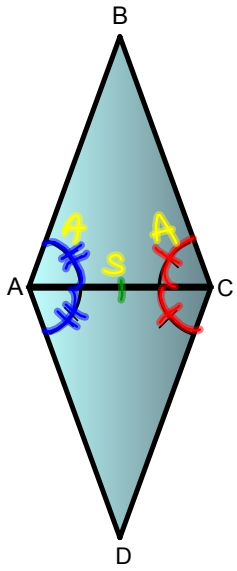
Prove: $\Delta ABC \cong \Delta DEF$



Statement	Reason
$\angle A \cong \angle D, \angle C \cong \angle F,$	Given
$\overline{BC} \cong \overline{EF}$	Given
$\Delta ABC \cong \Delta DEF$	AAS

Given: $\angle ACB \cong \angle ACD$
$\angle CAB \cong \angle CAD$

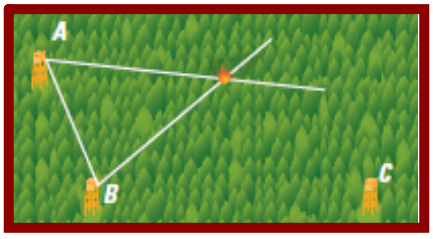
Prove: $\Delta ABC \cong \Delta ADC$



Statement	Reason
$\angle ACB \cong \angle ACD$	Given
$\angle CAB \cong \angle CAD$	Given
$\overline{AC} \cong \overline{AC}$	Reflexive
$\Delta ABC \cong \Delta ADC$	ASA

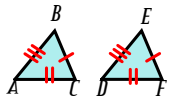
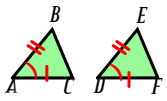
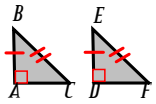
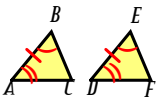
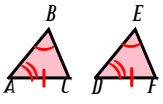
FIRE TOWERS The forestry service uses fire tower lookouts to watch for forest fires. When the lookouts spot a fire, they measure the angle of their view and radio a dispatcher. The dispatcher then uses the angles to locate the fire.

How many lookouts are needed to locate a fire?



Triangle Congruence Postulates and Theorems

5 METHODS

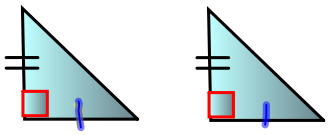
SSS	SAS	HL (right △ only)	ASA	AAS
				
All three sides are congruent.	Two sides and the included angle are congruent.	The hypotenuse and one of the legs are congruent.	Two angles and the included side are congruent.	Two angles and a (non-included) side are congruent.

RIGHT TRIANGLES In the lesson ***Prove Triangles Congruent*** by **SAS** and **HL**, you learned the ***Hypotenuse-Leg Theorem*** for right triangles. Write a paragraph proof for the following theorems about right triangles.

Leg-Leg (LL) Theorem: If the legs of two right triangles are congruent, then the triangles are congruent.

LL

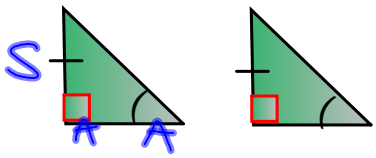
AKA: SAS



Angle-Leg (AL) Theorem: If an angle and a leg of a right triangle are congruent to an angle and a leg of a second right triangle, then the triangles are congruent.

AKA: LA

AAS



Hypotenuse-Angle (HA) Theorem: If an angle and the hypotenuse of a right triangle are congruent to an angle and the hypotenuse of a second right triangle, then the triangles are congruent.

AH

AAS