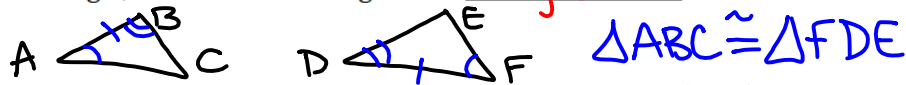


Section 4.5: Prove Triangles Congruent by ASA and AAS

EQ: If one side of a  $\Delta$  is  $\cong$  to a side of another  $\Delta$ , what would you need to know about the  $\Delta$ s to prove they are  $\cong$ ?

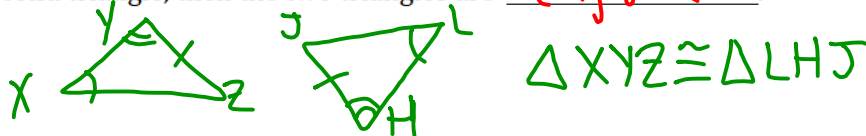
**Postulate 21: Angle-Side-Angle Congruence Postulate (ASA)**

If two angles and the included side of one triangle are congruent to 2 angles and the included side of a second triangle, then the two triangles are congruent.

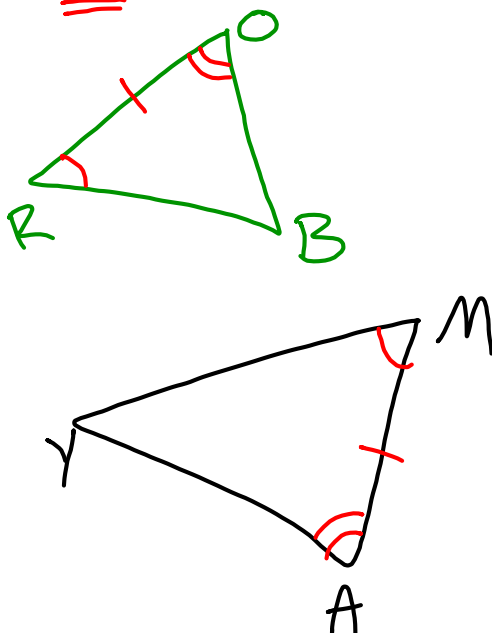


**Theorem 4.6: Angle-Angle-Side Congruence Postulate (AAS)**

If two angles and a non-included side of one triangle are congruent to 2 angles and the corresponding non-included side of a second triangle, then the two triangles are congruent.

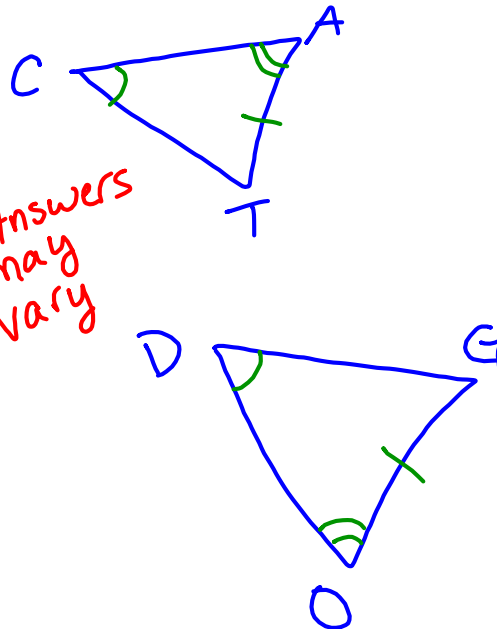


A1. Sketch triangles ROB and MAY that are congruent by ASA Congruence Postulate.

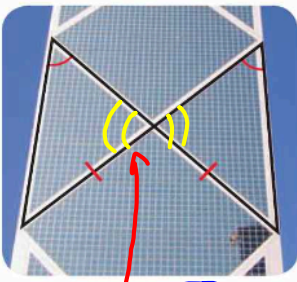



A2. Sketch obtuse  $\Delta CAT$  and  $\Delta DOG$  that are congruent by Theorem 4.6.  $\rightarrow$  AAS

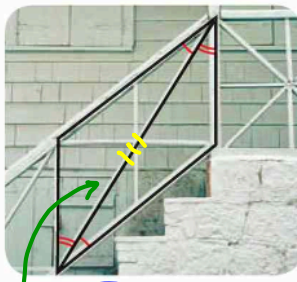
\* Answers may vary



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

a.  **VA** **yes**  
 $AAS \Delta \cong$

b.  **NO**  
 AAA  
 NOT a  $\Delta \cong$   
 Thm.

c.  **yes**  
 Share a side  
 $\cong$  by reflexive  
 $ASA \Delta \cong$

A3. Can you use the given information to determine if  $\Delta JKL \cong \Delta RST$ ?  
 If so, give the reasoning.

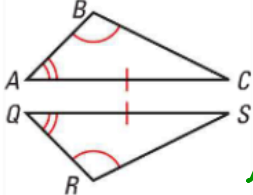
a.  $\angle J \cong \angle R, \angle K \cong \angle S, \angle L \cong \angle T$  **NO**  
 AAA  
 not a  $\Delta$  Thm.

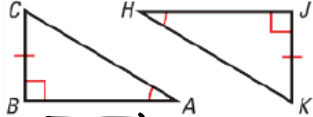
b.  $\overline{JK} \cong \overline{RS}, \angle J \cong \angle R, \angle L \cong \angle T$  **yes**  
 AAS

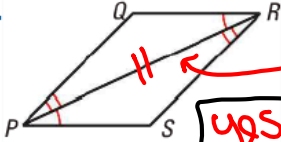
c.  $\overline{LK} \cong \overline{TS}, \angle K \cong \angle S, \angle L \cong \angle T$  **yes**  
 ASA

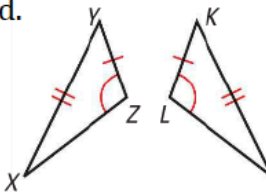
d.  $\overline{LK} \cong \overline{TS}, \angle J \cong \angle R$   
 No, not enough info.  
 need 1 more angle

A4. Decide if there is enough information to prove that the two triangles are congruent. If there is, give a congruence statement for the triangles and the reason(s) for the congruence.

a.  Yes  
 AAS  
 $\triangle ABC \cong \triangle QRS$

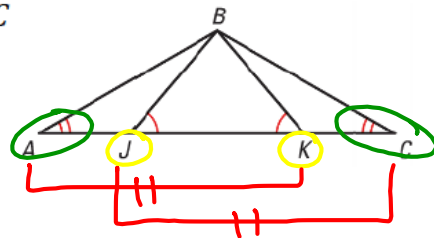
b.  Yes, AAS  
 $\triangle ABC \cong \triangle HJK$

c.  Reflexive  
Yes, ASA  
 $\triangle PRQ \cong \triangle RPS$

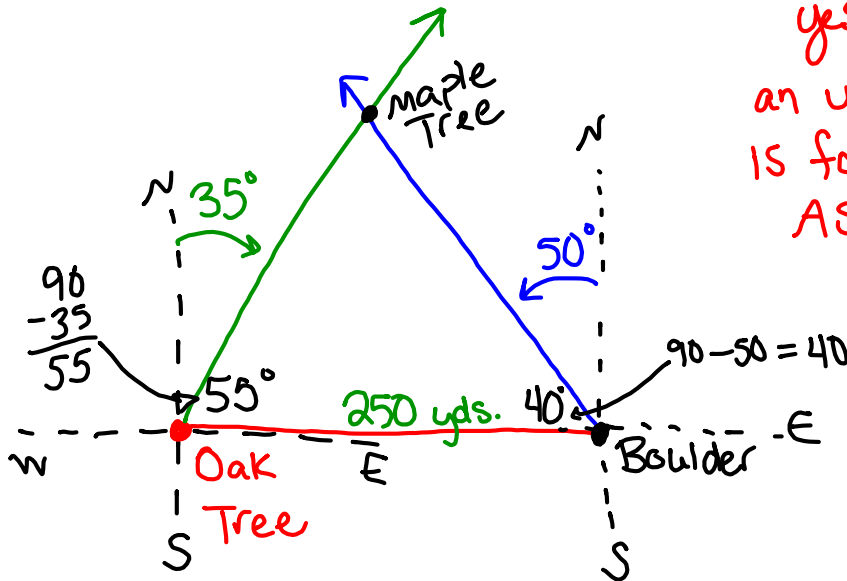
d.  No,  
 SSA not a  $\triangle \cong$  thm.

A5. Given:  $\overline{AK} \cong \overline{CJ}$ ,  $\angle BJK \cong \angle BKJ$ ,  $\angle A \cong \angle C$   
 Prove:  $\triangle ABK \cong \triangle CBJ$

- 1)  $\overline{AK} \cong \overline{CJ}$  Given
- 2)  $\angle BJK \cong \angle BKJ$  Given
- 3)  $\angle A \cong \angle C$  Given
- 4)  $\triangle ABK \cong \triangle CBJ$  ASA  $\triangle \cong$



A6. You are making a map for an orienteering race. Participants start at a large oak tree, find a boulder 250 yards due east of the tree, and then find a maple tree that is 50° west of north of the boulder and 35° east of north of the oak tree. Can you locate the maple tree from these directions everytime? Explain.



yes, because an unique  $\triangle$  is formed by ASA  $\cong$  thm.

### 4.5 Summary:

Given 1  $\cong$  side the  $\angle$ s that include the side must be  $\cong$  to the  $\angle$ s that include the side in the 2nd  $\triangle$ .



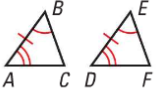
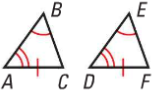
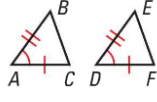
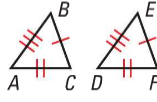
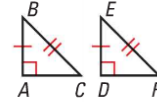
- OR -

(AAS) Given 1  $\cong$  side the  $\angle$ s of the 1<sup>st</sup>  $\triangle$  that do NOT include the side must be  $\cong$  to the  $\angle$ s that do NOT include the side in the 2<sup>nd</sup>  $\triangle$ .



### Triangle Congruence Postulates and Theorems

You have learned five methods for proving that triangles are congruent.

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

### What about SSA and AAA?

Do they exist?

