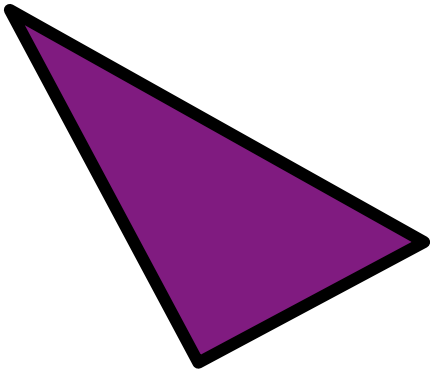
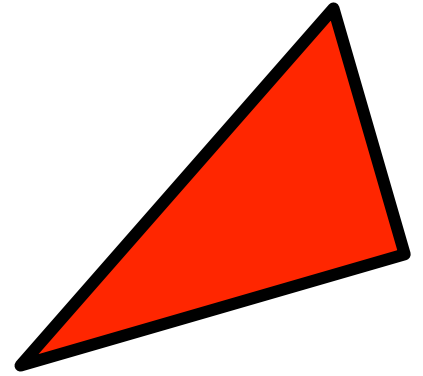
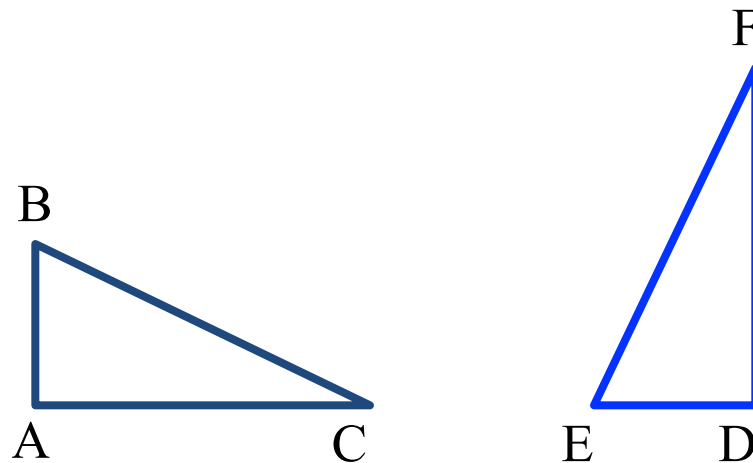


# Proving Triangles Congruent



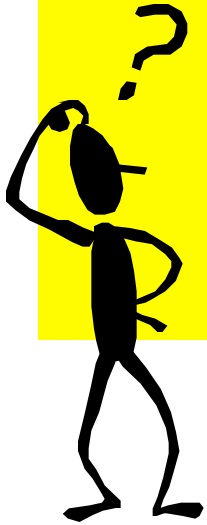
# The Idea of a Congruence

Two geometric figures with exactly the **same size and shape**.



How much do you  
need to know. . .

. . . about two triangles  
to prove that they  
are congruent?



# Corresponding Parts

You learned that if all six pairs of corresponding parts (sides and angles) are congruent, then the triangles are congruent.

1.  $\overline{AB} \cong \overline{DE}$

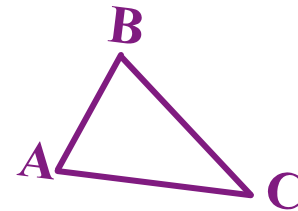
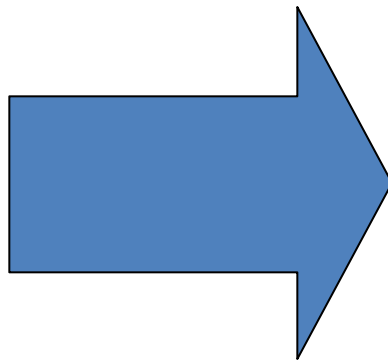
2.  $\overline{BC} \cong \overline{EF}$

3.  $\overline{AC} \cong \overline{DF}$

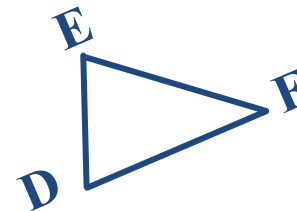
4.  $\angle A \cong \angle D$

5.  $\angle B \cong \angle E$

6.  $\angle C \cong \angle F$



$$\triangle ABC \cong \triangle DEF$$



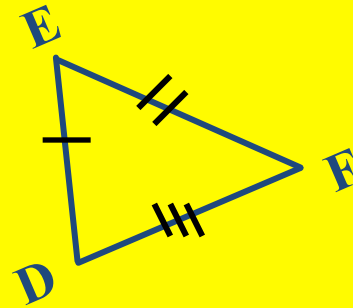
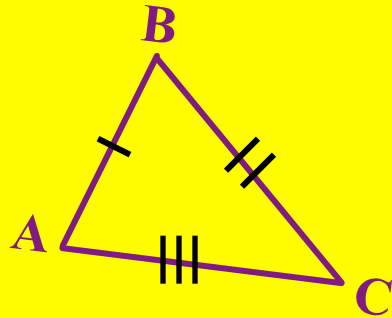
# Do you need *all six* ?

**NO !**



○	
	<b>SSS</b>
	<b>SAS</b>
○	<b>ASA</b>
	<b>AAS</b>
○	

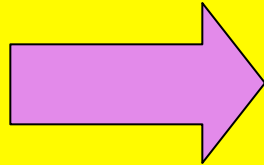
# Side-Side-Side (SSS)



1.  $\overline{AB} \cong \overline{DE}$

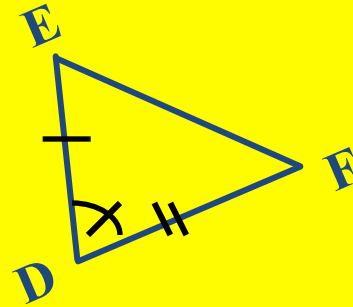
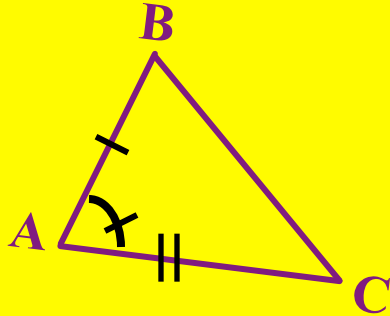
2.  $\overline{BC} \cong \overline{EF}$

3.  $\overline{AC} \cong \overline{DF}$



$\triangle ABC \cong \triangle DEF$

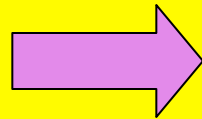
# Side-Angle-Side (SAS)



1.  $\overline{AB} \cong \overline{DE}$

2.  $\angle A \cong \angle D$

3.  $\overline{AC} \cong \overline{DF}$

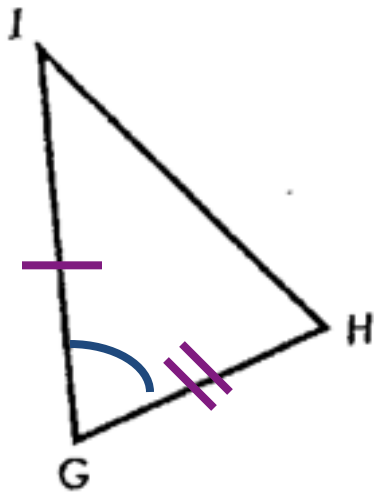


$\triangle ABC \cong \triangle DEF$

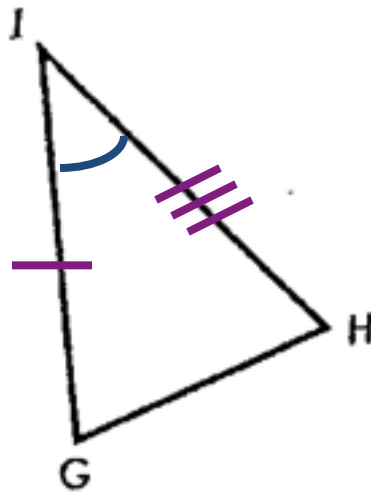
included  
angle

# Included Angle

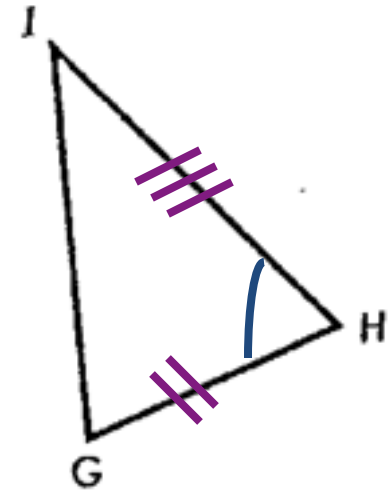
The angle between two sides



$\angle G$



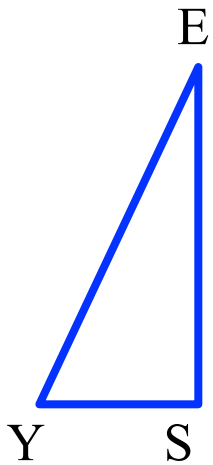
$\angle I$



$\angle H$



# Included Angle



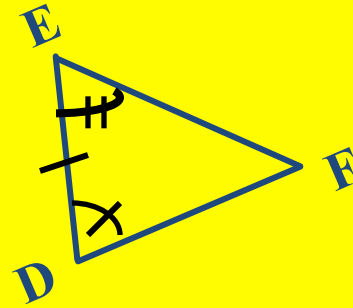
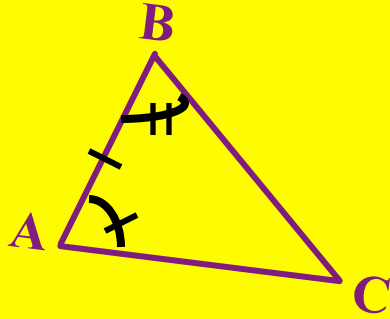
Name the included angle:

$\overline{YE}$  and  $\overline{ES}$   $\angle E$

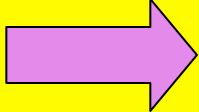
$\overline{ES}$  and  $\overline{YS}$   $\angle S$

$\overline{YS}$  and  $\overline{YE}$   $\angle Y$

# Angle-Side-Angle (ASA)



1.  $\angle A \cong \angle D$

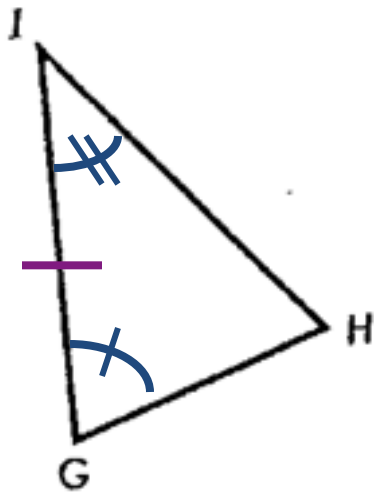
2.  $\overline{AB} \cong \overline{DE}$    $\triangle ABC \cong \triangle DEF$

3.  $\angle B \cong \angle E$

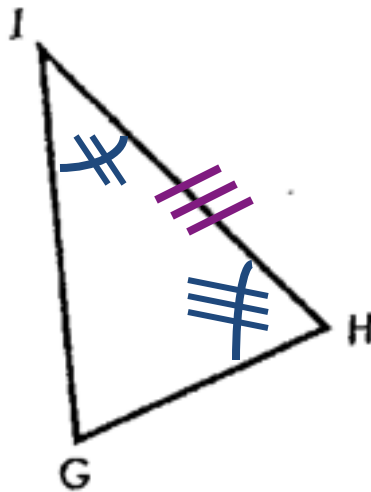
included  
side

# Included Side

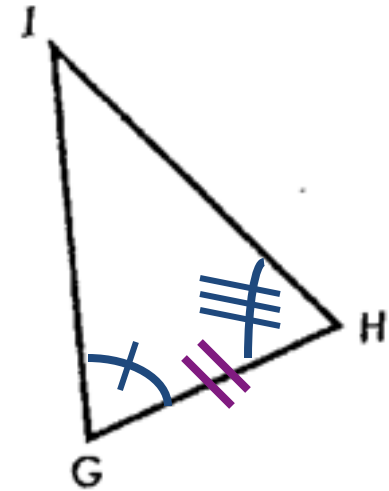
The side **between** two angles



GI

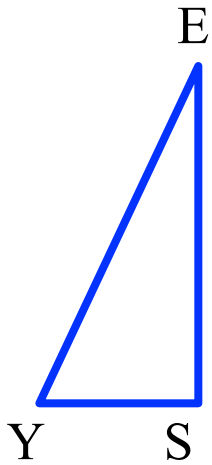


HI



GH

# Included Side



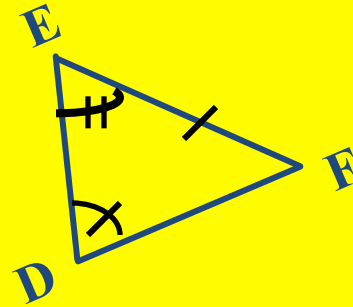
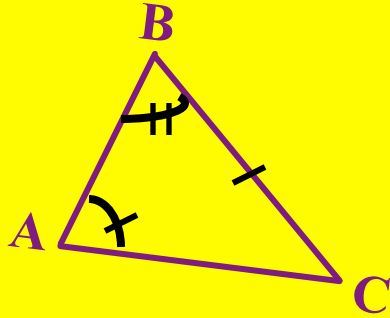
Name the included side:

$\angle Y$  and  $\angle E$        $\overline{YE}$

$\angle E$  and  $\angle S$        $\overline{ES}$

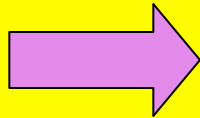
$\angle S$  and  $\angle Y$        $\overline{SY}$

# Angle-Angle-Side (AAS)



1.  $\angle A \cong \angle D$

2.  $\angle B \cong \angle E$



$\triangle ABC \cong \triangle DEF$

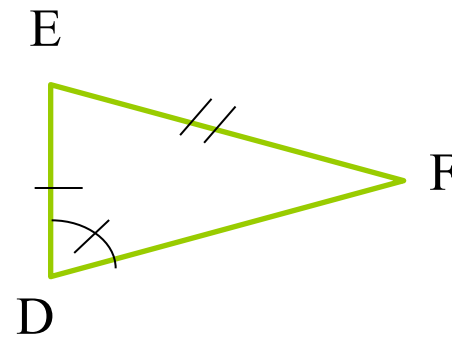
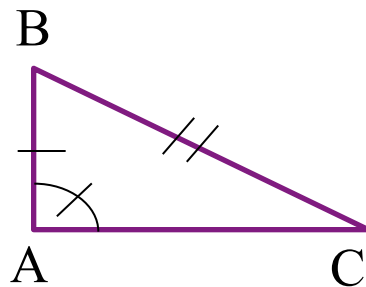
3.  $\overline{BC} \cong \overline{EF}$

Non-included  
side

# Warning: No SSA Postulate



**There is no such  
thing as an SSA  
postulate!**

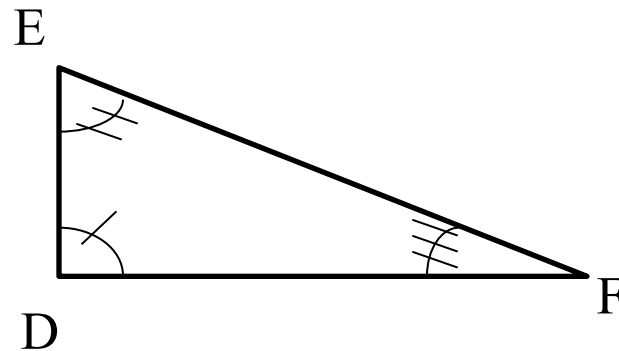
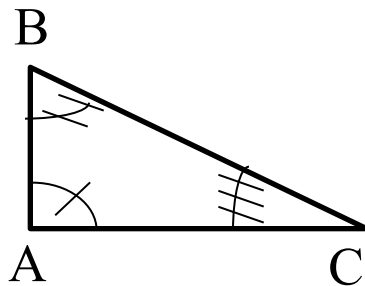


**NOT CONGRUENT**

# Warning: No AAA Postulate



There is no such thing as an AAA postulate!



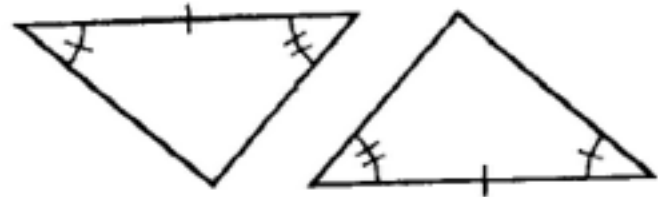
**NOT CONGRUENT**

# Name That Postulate

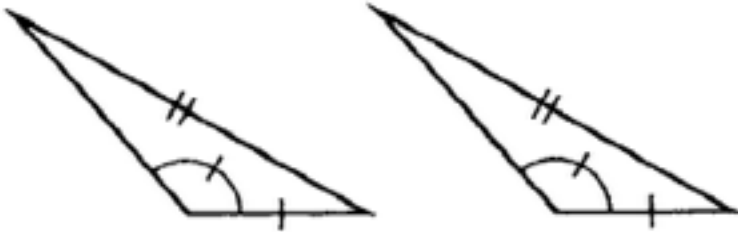
(when possible)



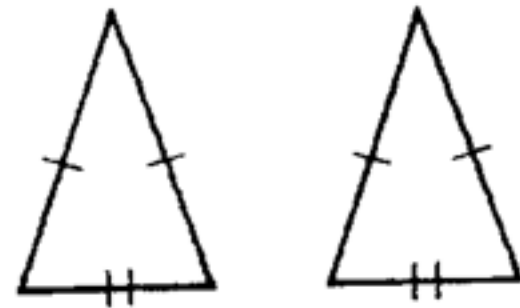
**SAS**



**ASA**



~~**SSA**~~

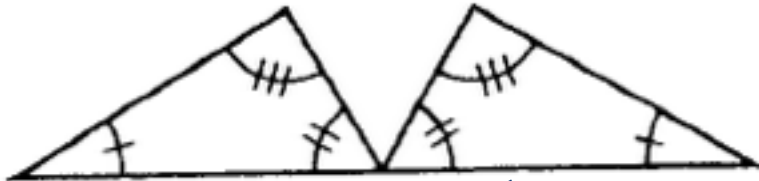


**SSS**

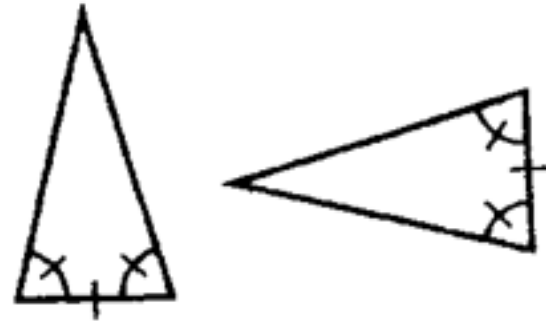


# Name That Postulate

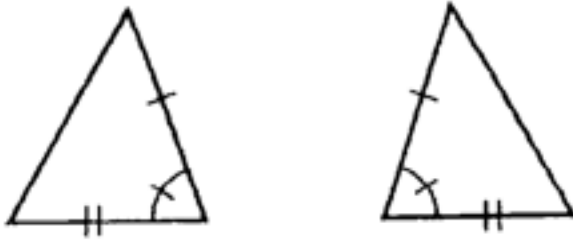
(when possible)



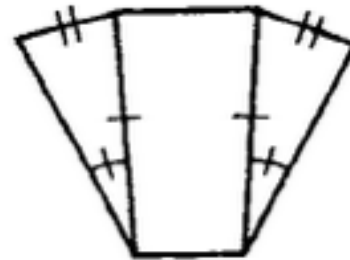
~~AAA~~



ASA

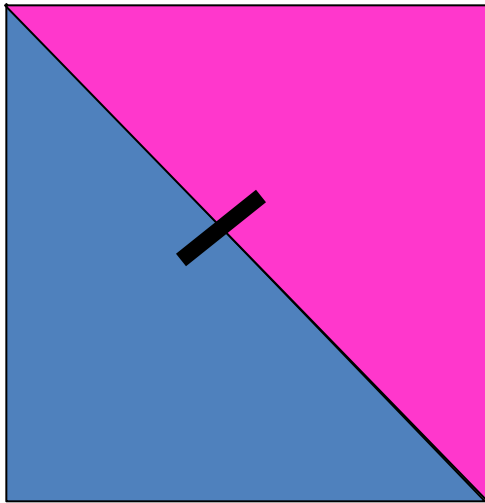


SAS

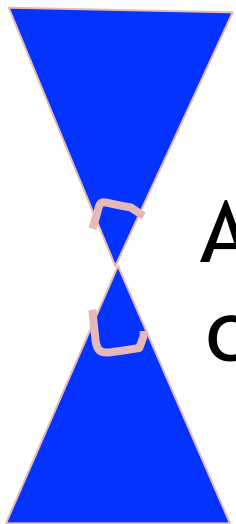


~~SSA~~

Things you can mark on a triangle when they aren't marked.

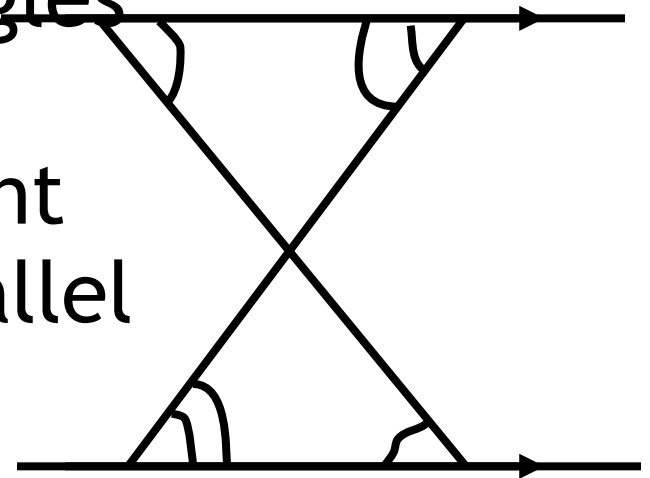


Overlapping sides are congruent in each triangle by the REFLEXIVE property



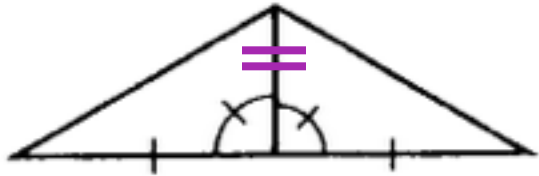
Vertical Angles are congruent

Alt Int Angles are congruent given parallel lines



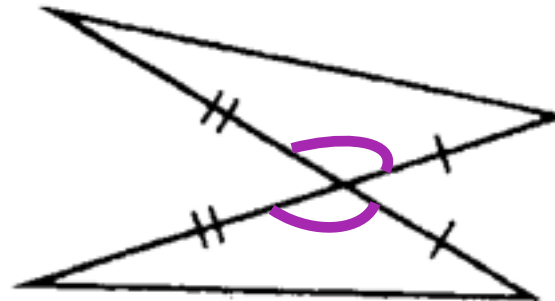
# Name That Postulate

(when possible)



Reflexive  
Property

**SAS**



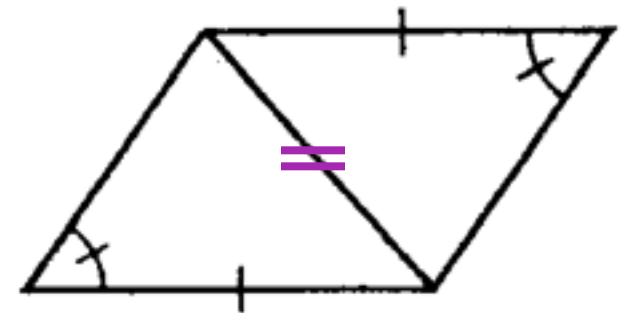
Vertical  
Angles

**SAS**



Vertical  
Angles

**SAS**

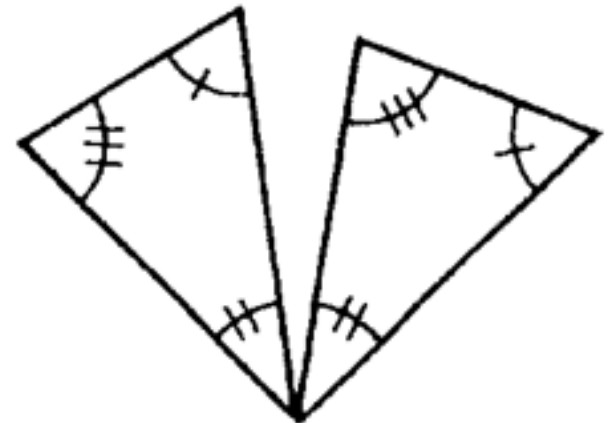
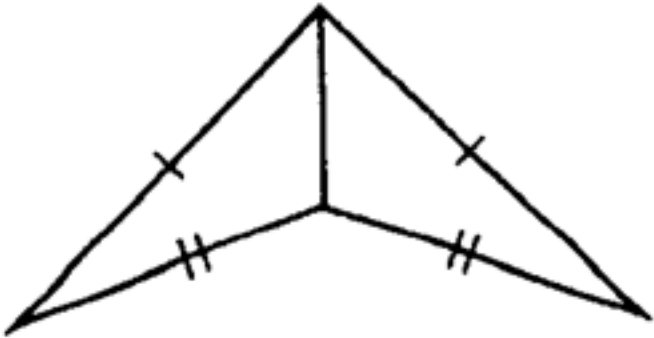


Reflexive  
Property

~~**SSA**~~

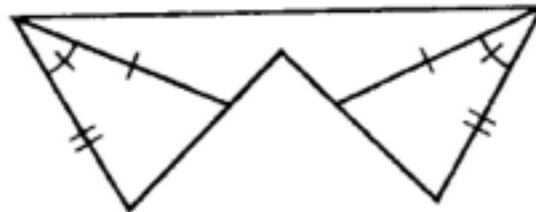
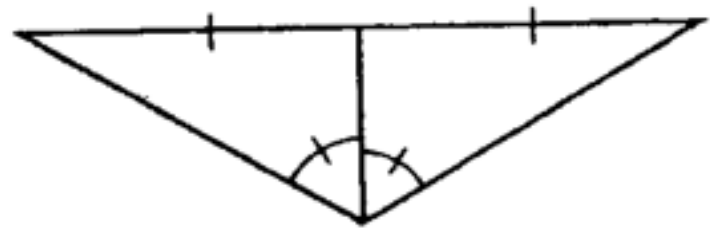
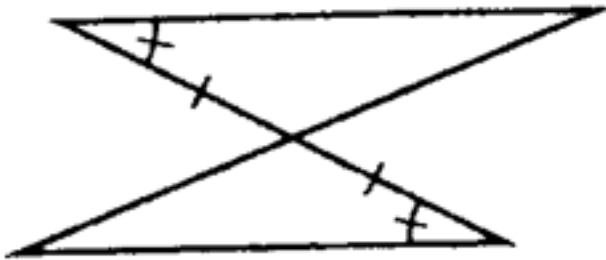
# HW: Name That Postulate

(when possible)



# HW: Name That Postulate

(when possible)



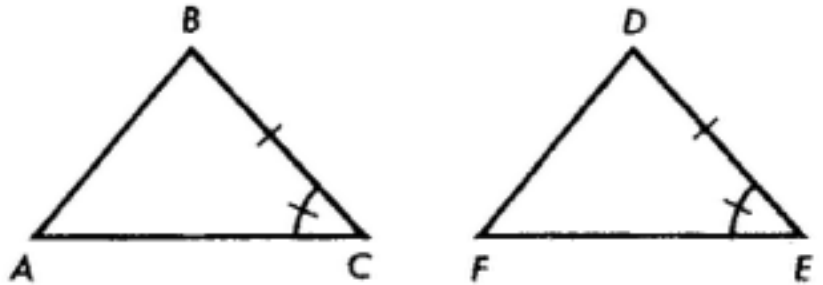
# Let's Practice

Indicate the additional information needed to enable us to apply the specified congruence postulate.

For ASA:  $\angle B \cong \angle D$

For SAS:  $\overline{AC} \cong \overline{FE}$

For AAS:  $\angle A \cong \angle F$



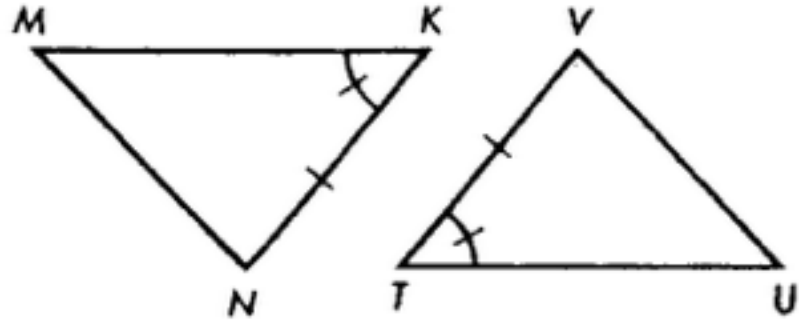
# HW

Indicate the additional information needed to enable us to apply the specified congruence postulate.

**For ASA:**

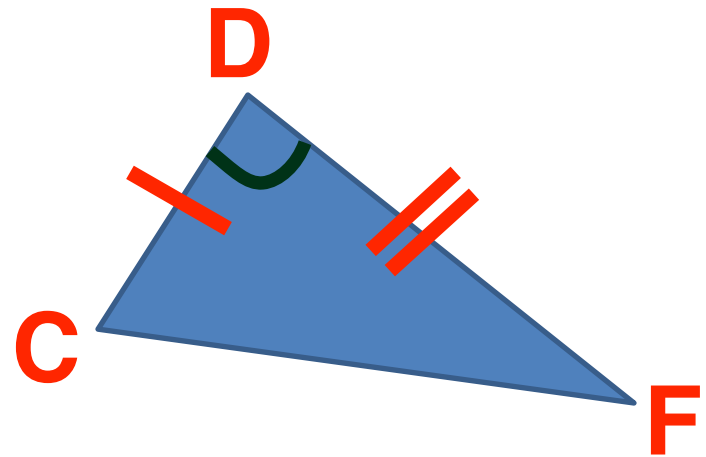
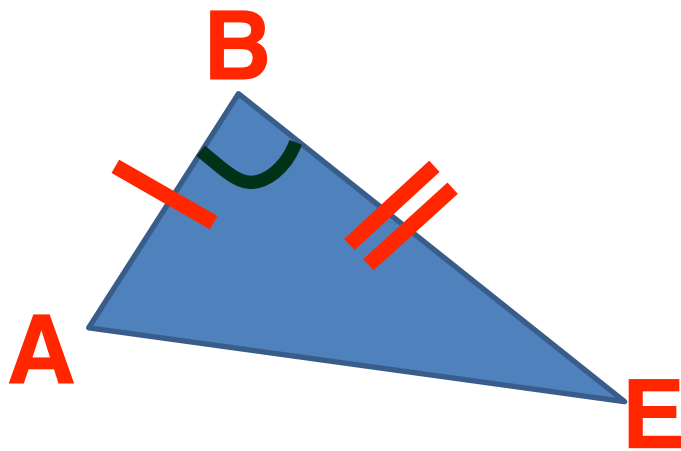
**For SAS:**

**For AAS:**



Write a congruence statement for each pair of triangles represented.

$$\overline{AB} \cong \overline{CD}, \overline{EB} \cong \overline{FD}, \angle B \cong \angle D$$

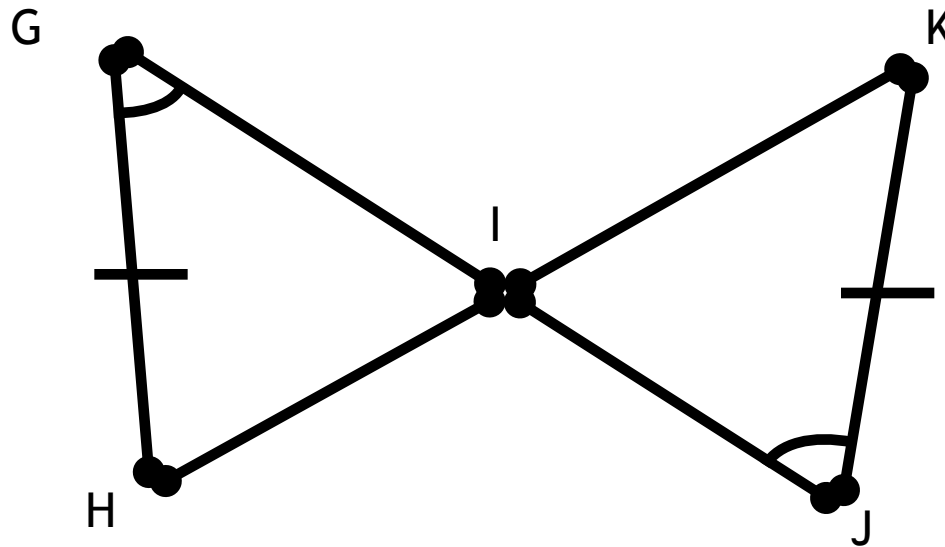


$$\triangle ABE \cong \triangle CDF$$



Determine if whether each pair of triangles is congruent by SSS, SAS, ASA, or AAS. If it is not possible to prove that they are congruent, write *not possible*.

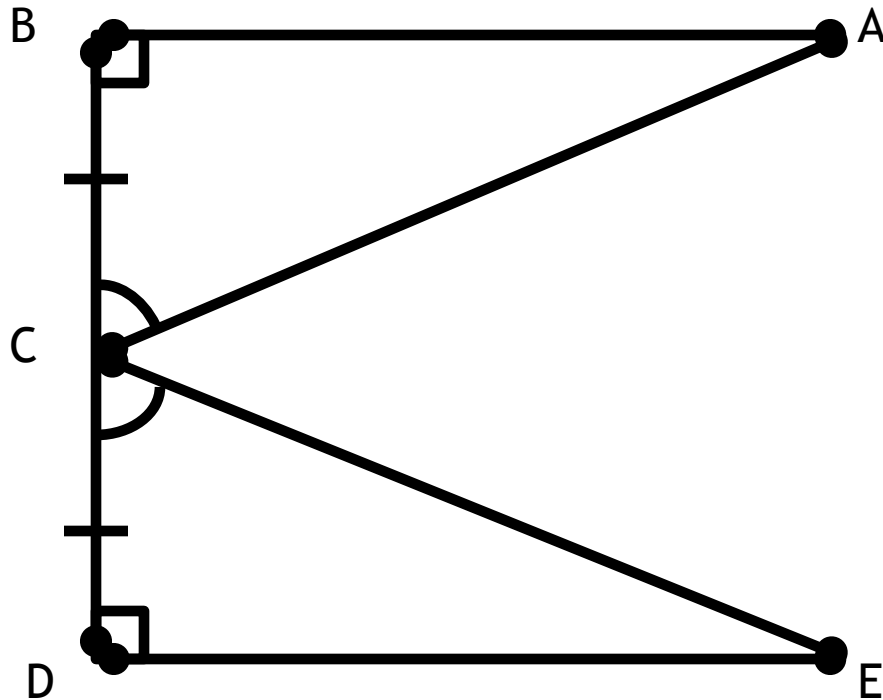
Ex 4



$\triangle GIH \cong \triangle JIK$  by AAS

Determine if whether each pair of triangles is congruent by SSS, SAS, ASA, or AAS. If it is not possible to prove that they are congruent, write *not possible*.

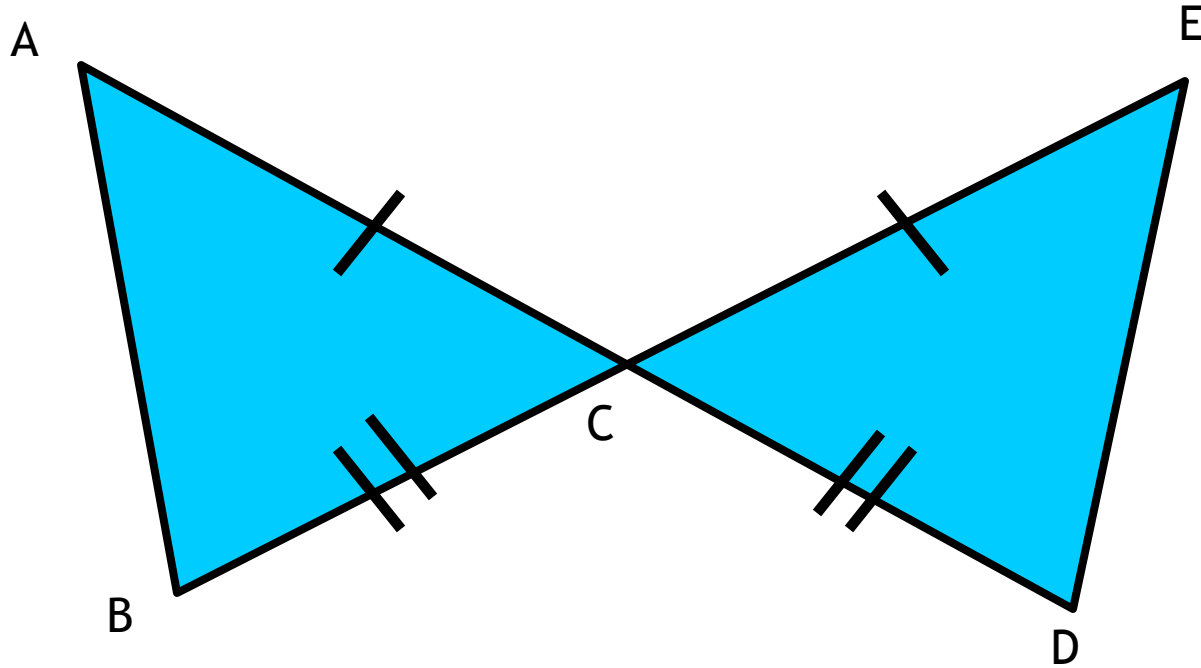
Ex 5



$\triangle ABC \cong \triangle EDC$  by ASA

Determine if whether each pair of triangles is congruent by SSS, SAS, ASA, or AAS. If it is not possible to prove that they are congruent, write *not possible*.

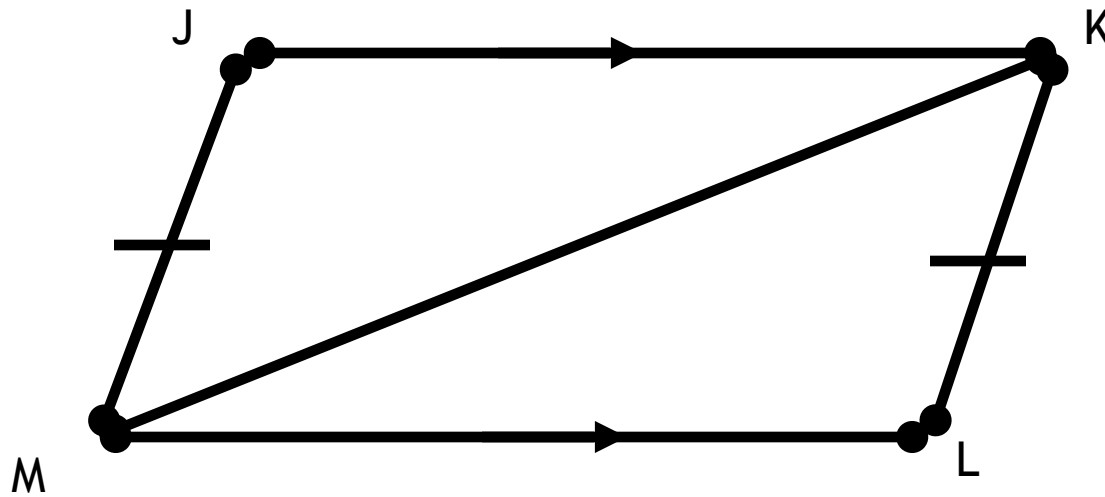
Ex 6



$\triangle ACB \cong \triangle ECD$  by SAS

Determine if whether each pair of triangles is congruent by SSS, SAS, ASA, or AAS. If it is not possible to prove that they are congruent, write *not possible*.

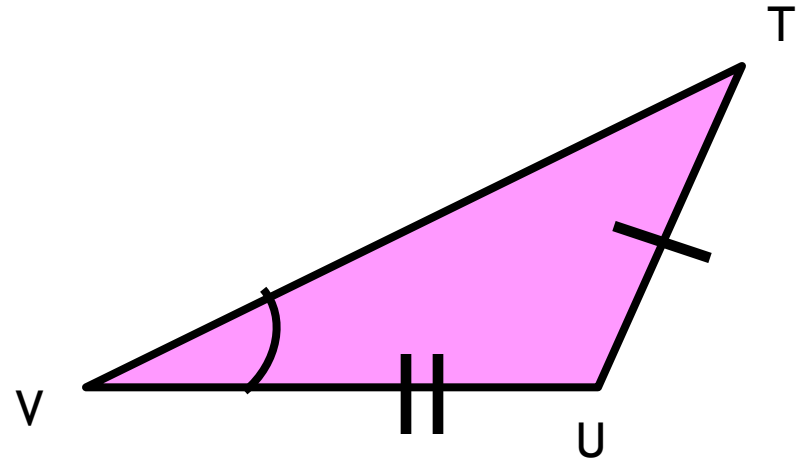
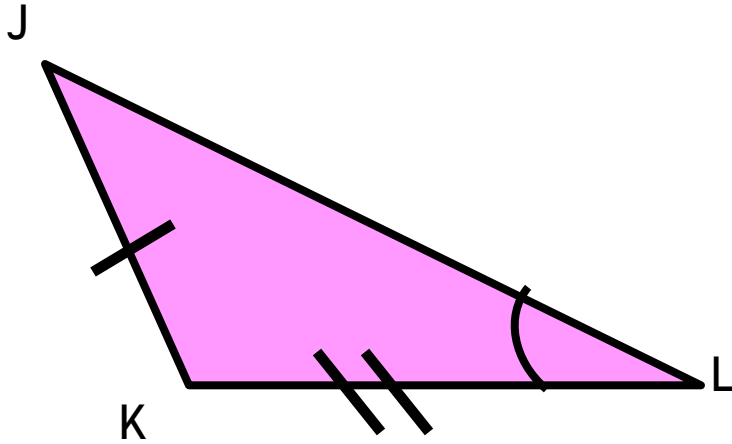
Ex 7



$\triangle JMK \cong \triangle LKM$  by SAS or ASA

Determine if whether each pair of triangles is congruent by SSS, SAS, ASA, or AAS. If it is not possible to prove that they are congruent, write *not possible*.

Ex 8



Not possible

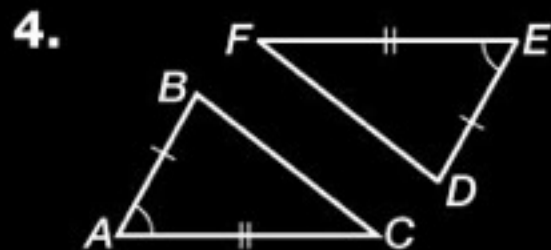
Write a congruence statement for each pair of triangles represented.

1.  $\overline{YZ} \cong \overline{SQ}$ ,  $\overline{XZ} \cong \overline{RQ}$ , and  $\overline{XY} \cong \overline{RS}$

2.  $\overline{FE} \cong \overline{AC}$ ,  $\overline{FD} \cong \overline{AB}$ , and  $\angle F \cong \angle A$

3.  $\angle H \cong \angle N$ ,  $\overline{KH} \cong \overline{LN}$ , and  $\overline{JH} \cong \overline{MN}$

Determine whether each pair of triangles is congruent. If so, write a congruence statement and explain why the triangles are congruent.



Write a congruence statement for each pair of triangles represented.

1.  $\overline{YZ} \cong \overline{SQ}$ ,  $\overline{XZ} \cong \overline{RQ}$ , and  $\overline{XY} \cong \overline{RS}$

Sample answer:  $\triangle XYZ \cong \triangle RSQ$

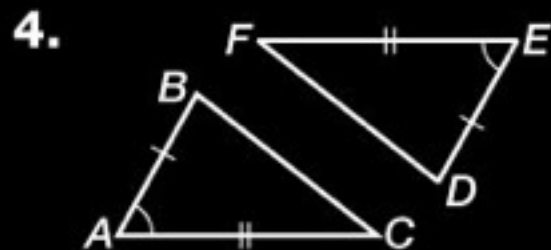
2.  $\overline{FE} \cong \overline{AC}$ ,  $\overline{FD} \cong \overline{AB}$ , and  $\angle F \cong \angle A$

Sample answer:  $\triangle DEF \cong \triangle BCA$

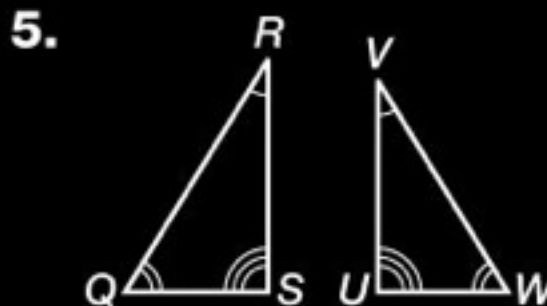
3.  $\angle H \cong \angle N$ ,  $\overline{KH} \cong \overline{LN}$ , and  $\overline{JH} \cong \overline{MN}$

Sample answer:  $\triangle KHJ \cong \triangle LNM$

Determine whether each pair of triangles is congruent. If so, write a congruence statement and explain why the triangles are congruent.



Sample answer:  
 $\triangle ABC \cong \triangle EDF$  by SAS



The triangles are *not* congruent.