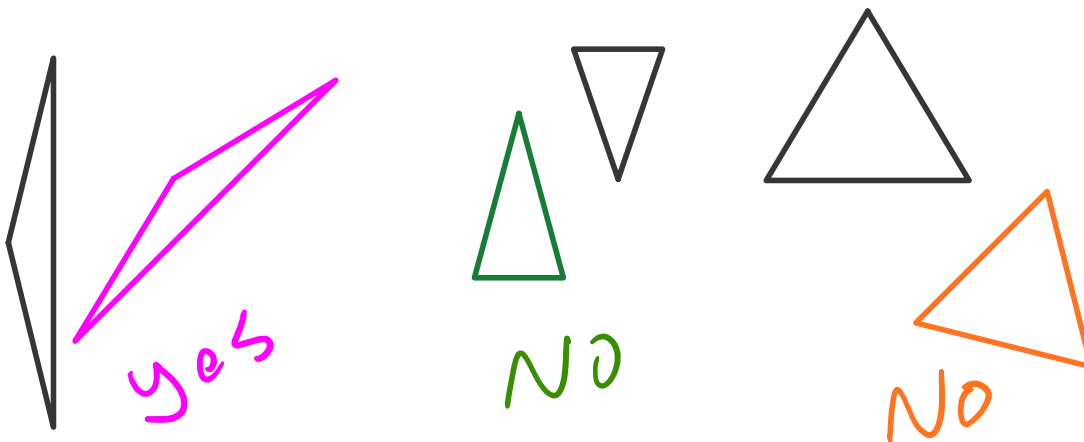


## 4.4 Proving and Applying the ASA and AAS Congruence Criteria

Monday, September 23, 2019 7:46 AM

### WARM UP

Are the following triangles congruent?



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## ESSENTIAL QUESTION

How are ASA and AAS used to show that triangles are congruent?

### NEEDED VOCAB:

- ▶ **Angle Side Angle**
- ▶ **Angle Angle Side**

GOAL: "I CAN. . ."

**Determine congruent triangles by comparing two sides and one angle."**

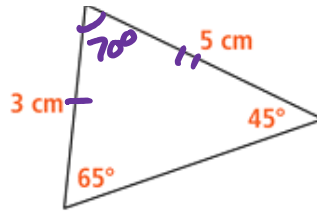
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Are the two triangles congruent? What reasoning can you give to justify your answer?

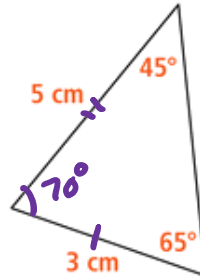


yes  $\cong$ . SAS

answer:



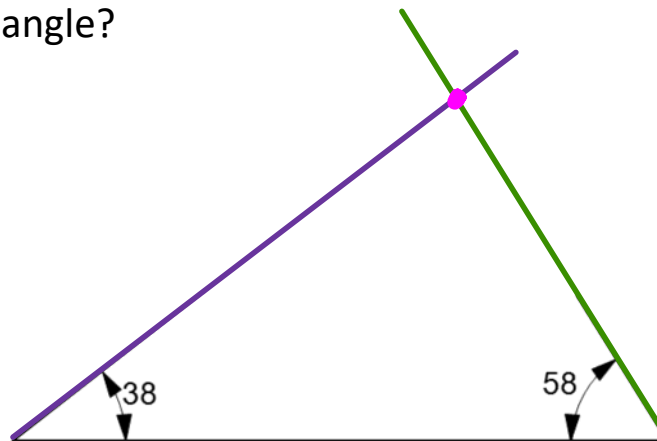
$\cong$



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### EXAMPLE 1

How many possible triangles can you make when given two angles and the included side of a triangle?

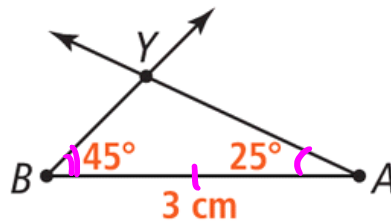
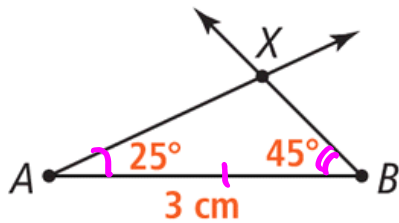


only 1.

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What is the relationship between  $\triangle AXB$  and  $\triangle AYB$ ?

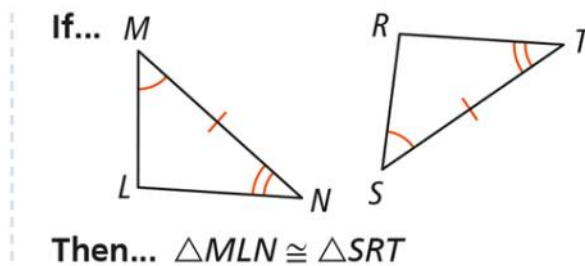
same as before  $\cong$ .



## Angle-Side-Angle (ASA) Congruence Criterion

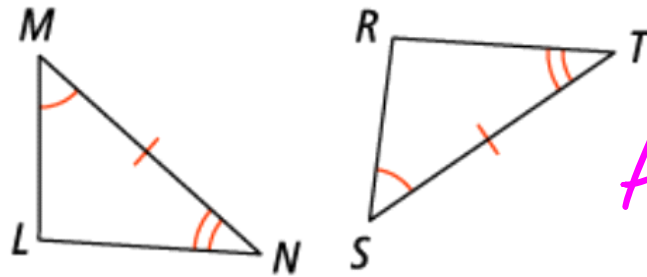
If two angles of one triangle and the included side are congruent to two angles and the included side of another triangle, then the two triangles are congruent.

PROOF: SEE EXAMPLE 2.



### EXAMPLE 2

Given two sets of congruent angles and congruent included side lengths, prove that the two triangles are congruent. (Discuss, DO NOT WRITE A PROOF)



ASA  $\cong$

Describe the series of rigid motions that need to occur to show that  $\triangle JKL \cong \triangle MNO$ .

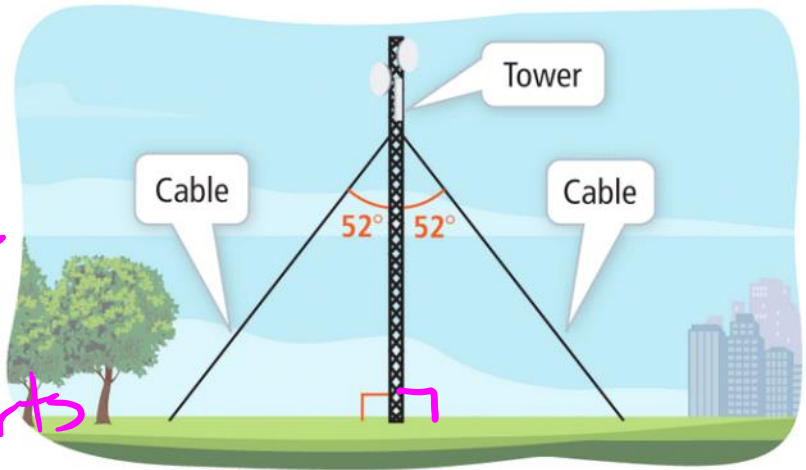


map  $\triangle JKL$   
by some  
translation  
so that  $K$   
maps to  $N$ .  
Rotate the  
new image about  
 $N$  so that  $L'$   
maps to  $O$ .

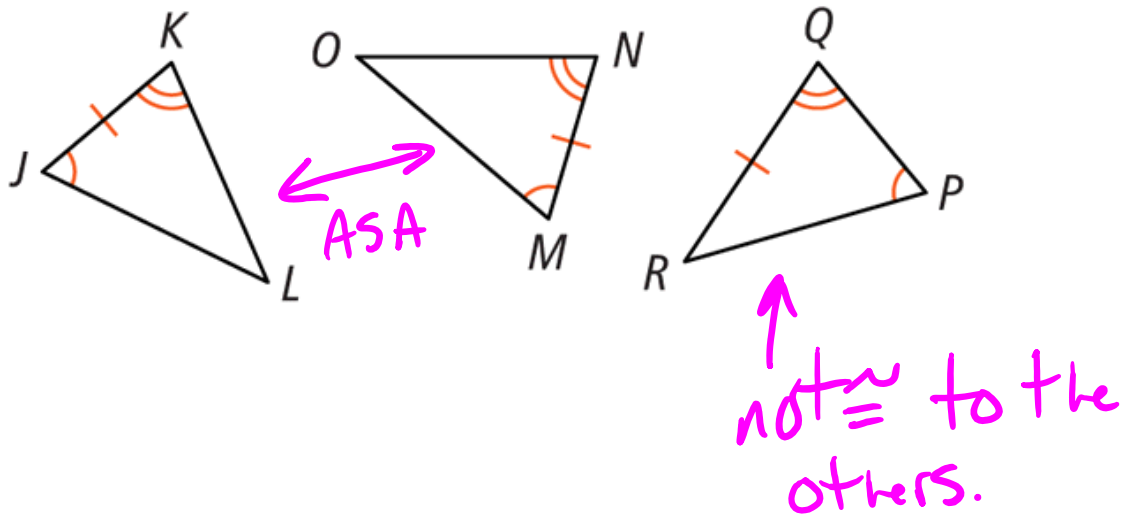
### EXAMPLE 3

A technician installs cables from a cell phone tower to the ground. To pass inspection, both cables must be the same length. Does this installation meet the cable-length requirement? Explain.

ASA states both  $\Delta$ 's are  $\cong$   $\therefore$  corr. parts are  $\cong$ .

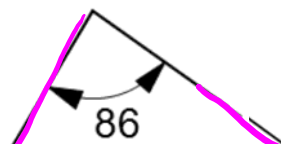


Which, if any, of the following triangles are congruent?  
Explain why they are, or why they are not.

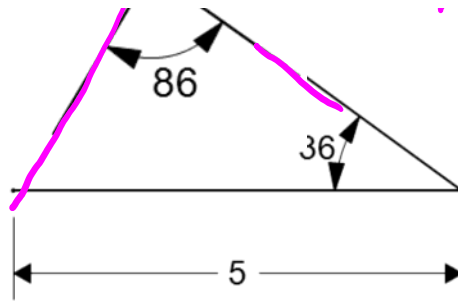


### EXAMPLE 4

If we are given two angles and an attached side length, how many different triangles can we create?

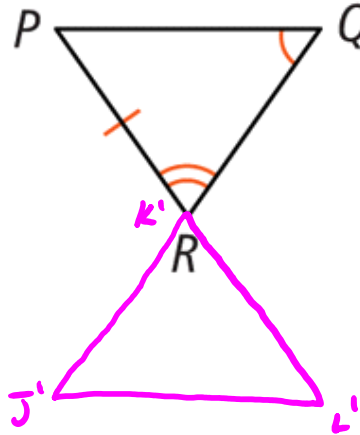


only one  $\Delta$  can be made.



be made.  
 $\therefore$  AAS  
 is a  
 $\cong$   
 $\cong$

Describe the series of rigid motions that need to occur to show that  $\triangle JKL \cong \triangle MNO$ .



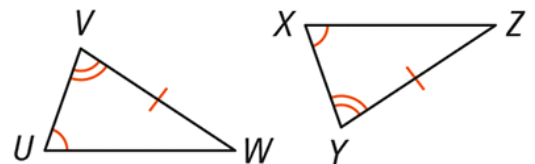
Translate  $\triangle JKL$   
 so that  $K$   
 maps to  $R$ .  
 Rotate  $\triangle J'K'L'$   
 about  $K'$  so  
 that  $J'$  maps to  
 $Q$ .

## Angle-Angle-Side (AAS) Congruence Criterion

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

PROOF: SEE EXERCISE 16.

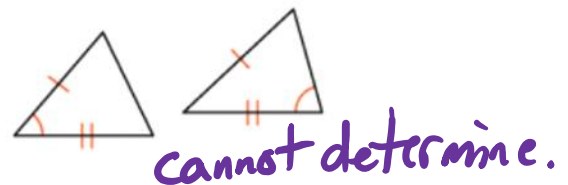
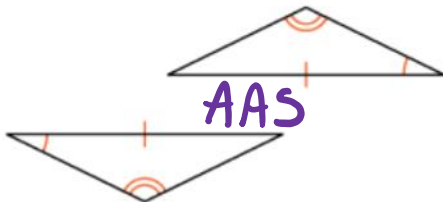
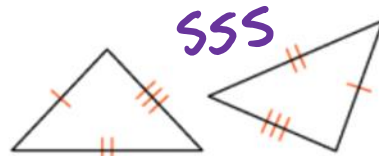
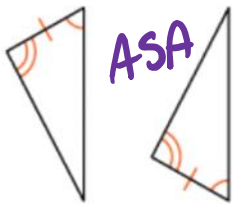
If...



Then...  $\triangle UVW \cong \triangle XYZ$

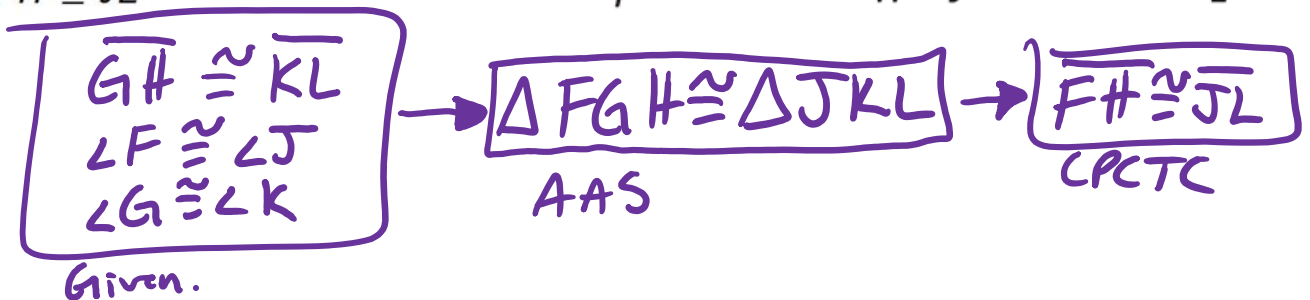
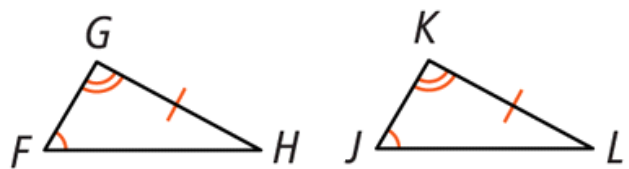
## EXAMPLE 5

State whether each pair of triangles is congruent by SAS, SSS, ASA, or AAS, or if the congruence cannot be determined.



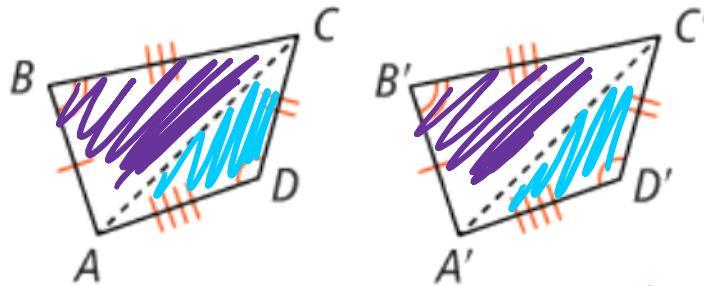
Given:  $\overline{GH} \cong \overline{KL}$ ,  $\angle GFH \cong \angle KJL$ , and  $\angle FGH \cong \angle JKL$

Prove:  $\overline{FH} \cong \overline{JL}$



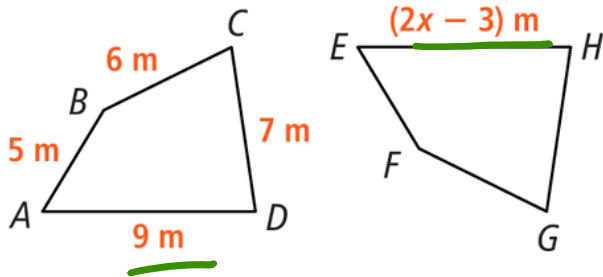
### EXAMPLE 6

All sides and angles of ABCD are congruent to the corresponding sides and angles of A'B'C'D'. Is ABCD congruent to A'B'C'D'?



$\cong$  by SAS.  $\cong$  by SAS  
both are connected through  
AC or A'C' and in same  
manner.  $\therefore \cong$ .

Given that  $ABCD \cong EFGH$ , what is the value of  $x$ ?

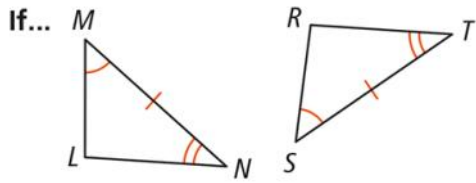


$$\begin{aligned} 2x - 3 &= 9 \\ 2x &= 12 \\ \boxed{x = 6} \end{aligned}$$



## Triangle Congruence

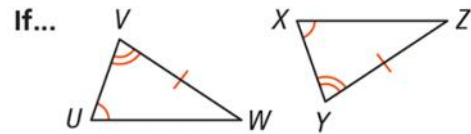
### THEOREM 4-6 Angle-Side-Angle (ASA)



$\overline{MN} \cong \overline{ST}$ ,  $\angle M \cong \angle S$ , and  $\angle N \cong \angle T$

Then...  $\triangle MLN \cong \triangle SRT$

### THEOREM 4-7 Angle-Angle-Side (AAS)



$\overline{VW} \cong \overline{YZ}$ ,  $\angle U \cong \angle Z$ , and  $\angle V \cong \angle X$

Then...  $\triangle UVW \cong \triangle XYZ$

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# HOMework

**Pg. 180** (If the problem asks for a proof, do any type.)  
**11, 12, 15-18, 20, 21, 24**

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