

## Warm-up

Congruence

What side corresponds to  $\overline{BC}$  in  $\triangle DEF$ ?

$\overline{BC}$  corresponds to  $\overline{DE}$

What angle in  $\triangle ACB$  corresponds to  $\angle EDF$ ?

$\angle EDF$  corresponds to  $\angle CBA$

Is  $\triangle ACB \sim \triangle FED$ ?

Yes by SAS. The corresponding sides are proportional.  $\frac{9}{6} = \frac{21}{14} \rightarrow \frac{3}{2} = \frac{3}{2}$  and  $\angle CAB \cong \angle FED$ .

Goals for today:

- What does it mean for a triangle to be congruent?
- What are the shortcuts for showing triangle congruence?

Triangle Congruence - when all corresponding sides are equal in length, and all corresponding angles are equal in size.

Today we will be completing an activity.  
This activity should help you determine the  
shortcuts (Theorems) for proving  
**TRIANGLE CONGRUENCE**

Congruence

For the following task you will need

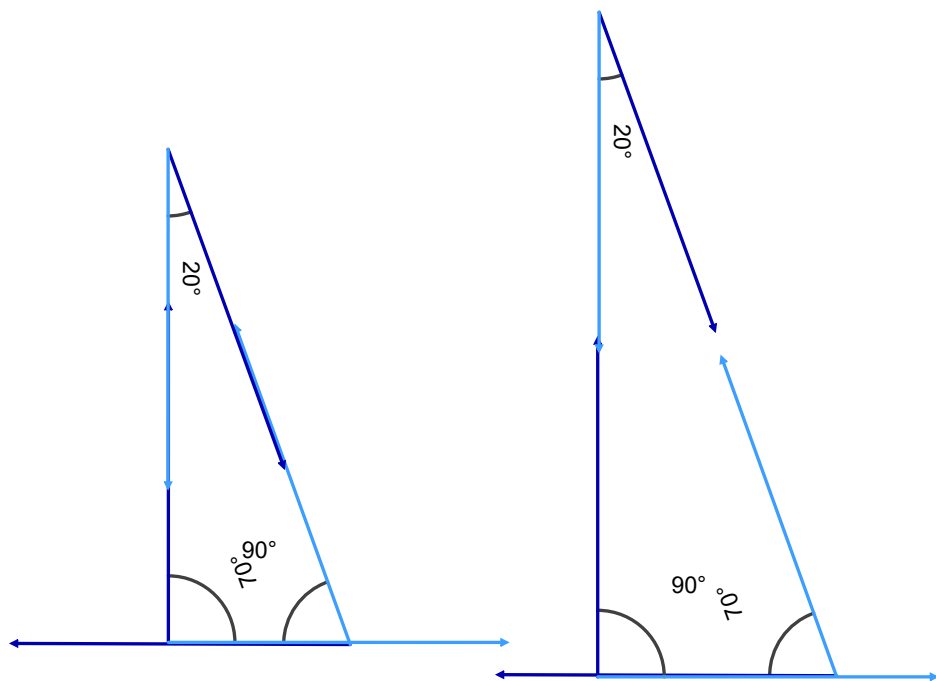
- 5 pieces of spaghetti broken into 1in, 2in, 3in, 4in, 5in pieces.
- Angle measurements
- a ruler
- a pencil

You will be using these tools and given conditions to challenge a partner to find a non-congruent triangle with the same conditions.

We will look at the first one together.

Conditions:  $20^\circ$ ,  $70^\circ$ , and  $90^\circ$

Congruence



Could you make a non-congruent triangle?

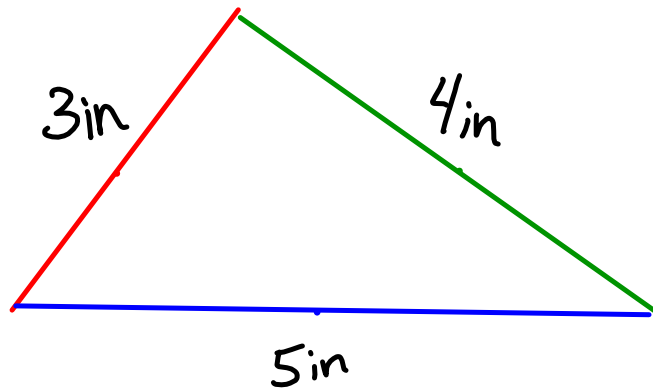
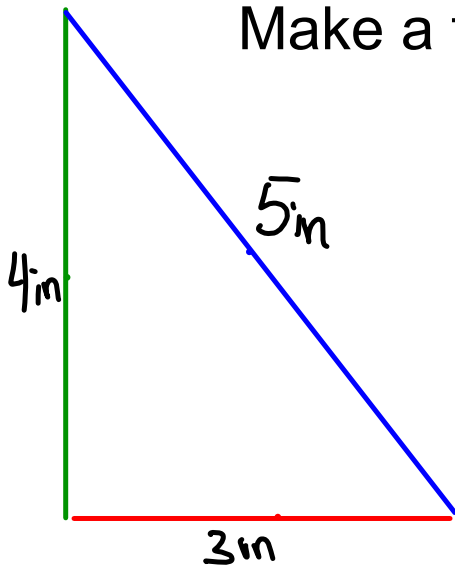
Yes. This means AAA does not guarantee that triangles are congruent.



# SSS

Conditions: 3 in, 4 in, 5 in pieces

Make a triangle and trace it.



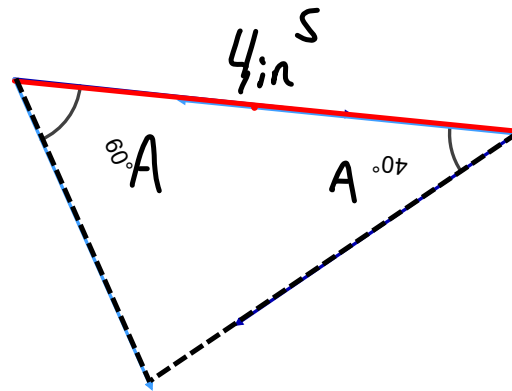
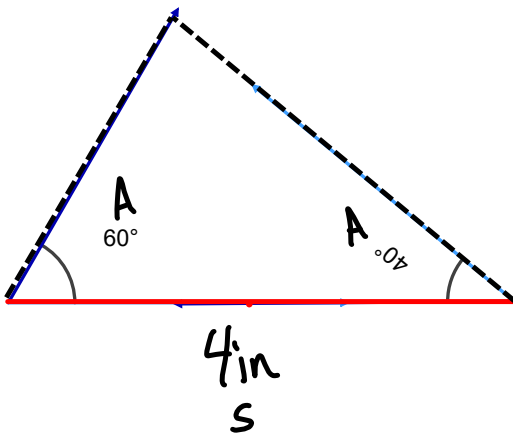
Could you make a non-congruent triangle?

No. This means SSS guarantees  
triangle congruence.

## ASA

Conditions:  $40^\circ$ , 4in, and  $60^\circ$

The order here is important. The side needs to connect the two angle vertexes.

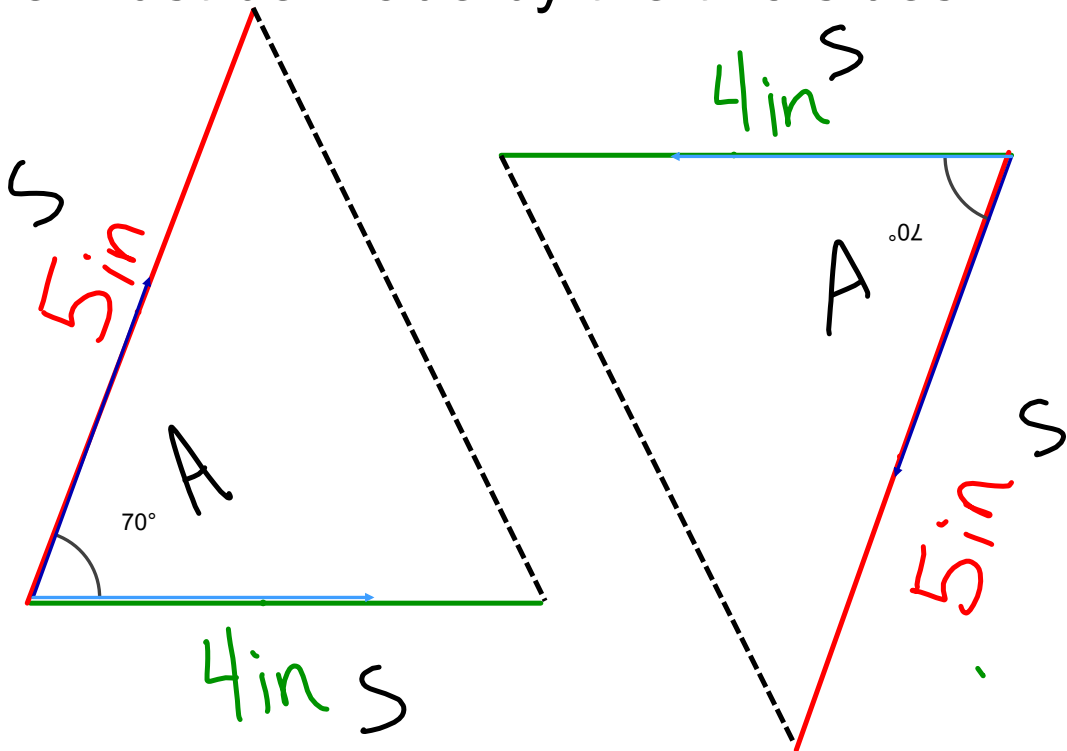


Could you make a non-congruent triangle? :)

No. This means ASA guarantees  
congruent triangles.

## SAS

Conditions: 4in,  $70^\circ$ , 5in  
Order here is important. The angle must be made by the two sides.



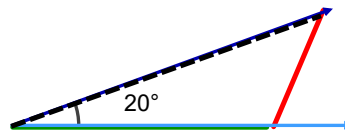
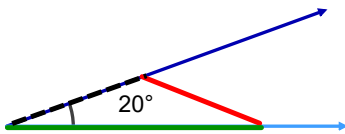
Could you make a non-congruent triangle?

No. This means SAS guarantees  
congruent triangles

# SSA

Conditions: 1in, 2 in ,  $20^\circ$

Order must be the two sides then the angle.

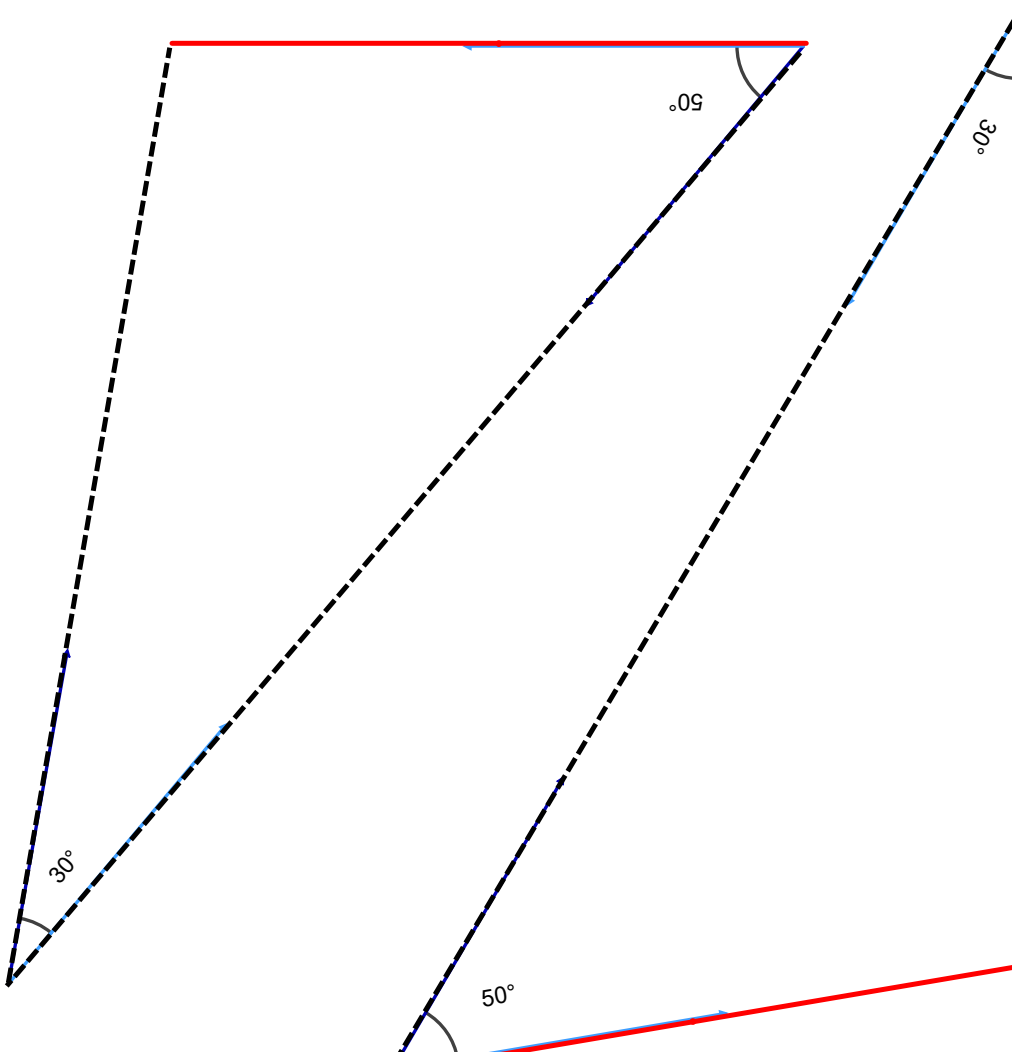


Could you make a non-congruent triangle?

Yes. This means SSA does not guarantee triangle congruence.



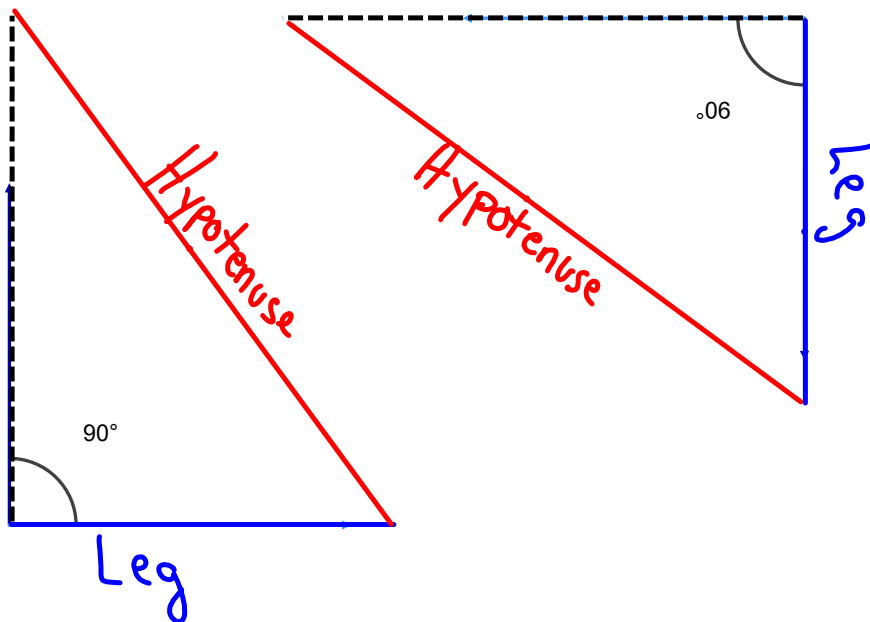
Conditions  $30^\circ$ ,  $50^\circ$ , and 5 in.



Could you make a non-congruent triangle?

No. This means AAS guarantees  
triangle congruent

HL  $90^\circ$ , 3 in. and 5 in.



## Answer the questions on the last page.

For each of these sets of conditions, you were testing to see if it was possible to make two triangles that were not congruent. What do you think it means if you were unable to make a non-congruent triangle?

Proves Congruence

Do all triangles that have three pairs of corresponding congruent angles (AAA) have to be congruent? **No**

Do all triangles that have three pairs of corresponding congruent side lengths (SSS) have to be congruent? **Yes**

Do all triangles that have two pairs of corresponding congruent angles and 1 pair of included side lengths (ASA) have to be congruent? **Yes**

Do all triangles that have two pairs of corresponding congruent side lengths and 1 pair of included angles (SAS) have to be congruent? **Yes**

Do all triangles that have two pairs of corresponding congruent side lengths and 1 pair of non-included angles (SSA) have to be congruent? **No**

Do all triangles that have 2 pairs of corresponding congruent angles and 1 pair of non-included side lengths (AAS) have to be congruent? **Yes**

Match Each theorem to the correct column

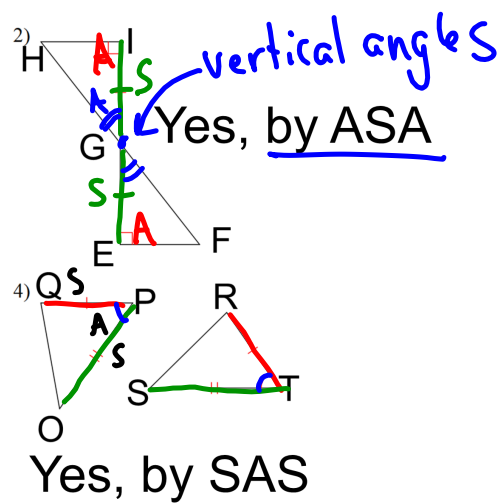
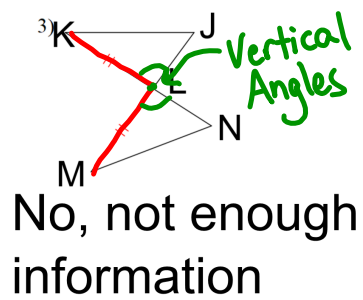
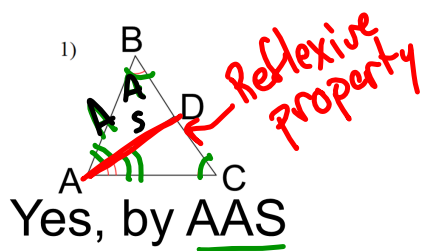
CONGRUENCE

Proves It		Does not
SAS		SSA
ASA		AAA
HL		
SSS		
AAS		

## Let's get some practice

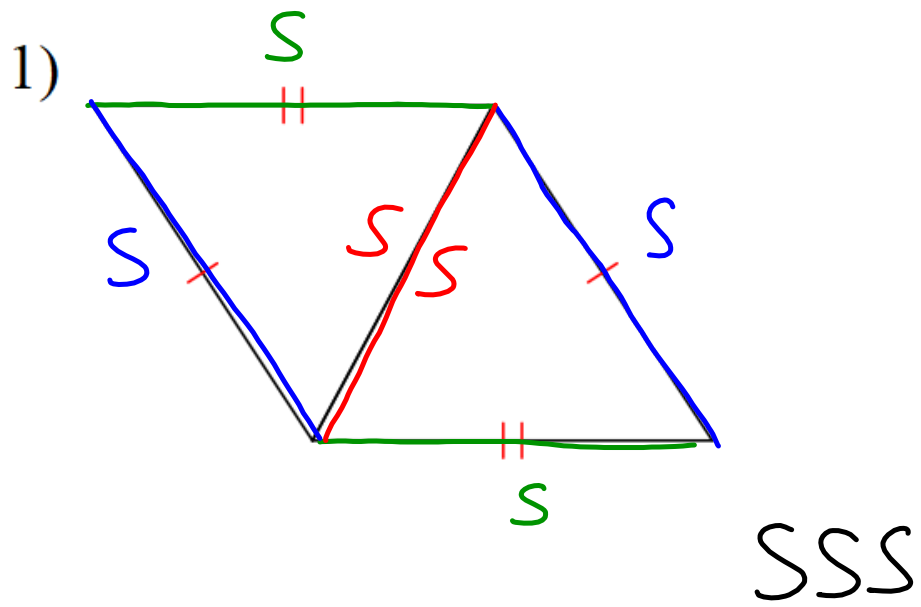
Determine if the pairs of triangles are congruent or not on the bottom of the page.

## Answers

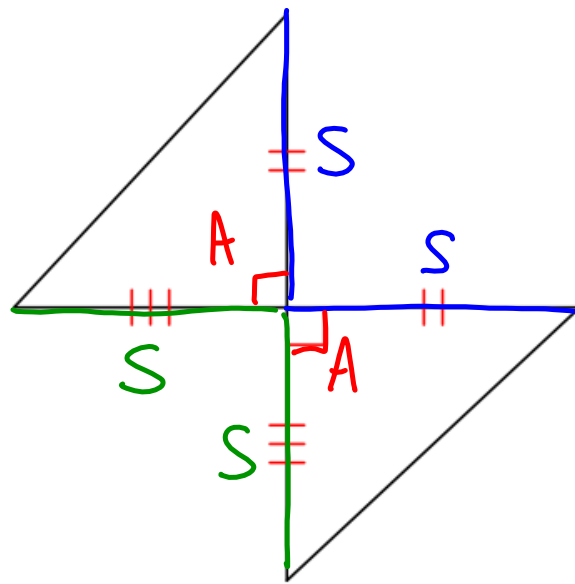


More examples together



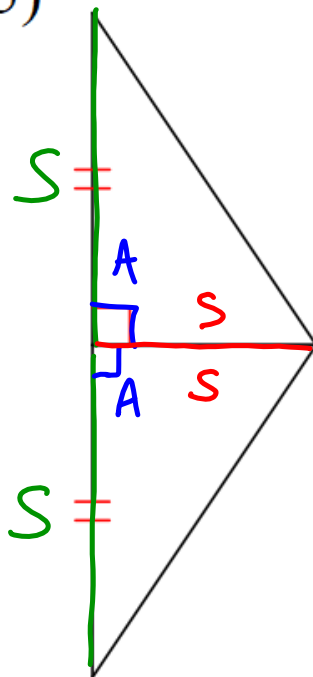


3)



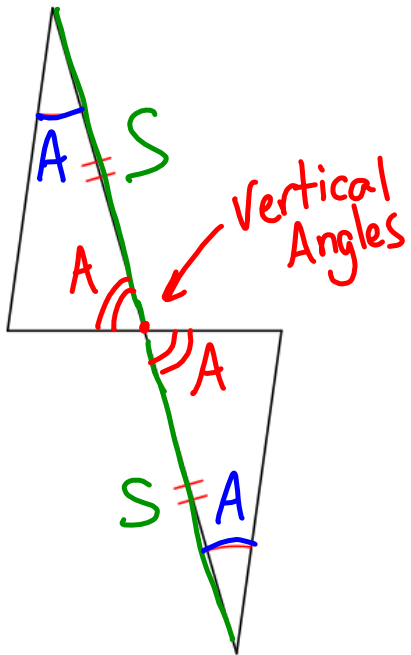
SAS

5)



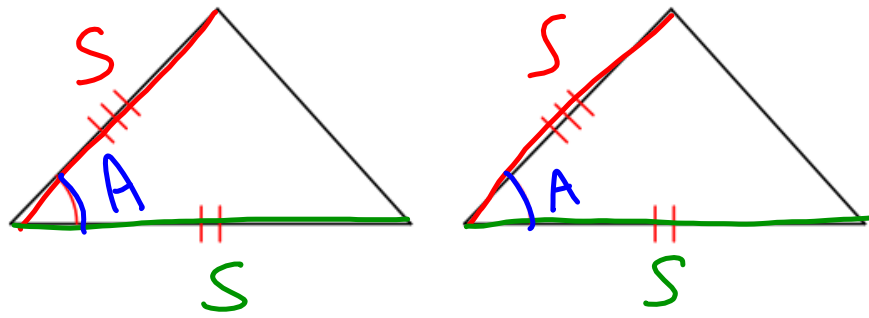
SAS

7)



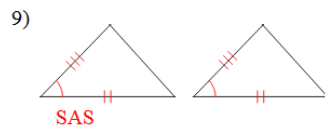
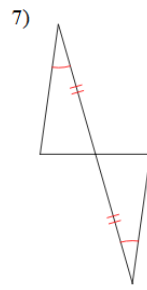
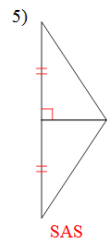
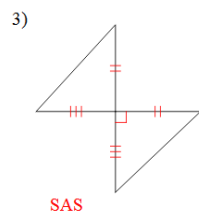
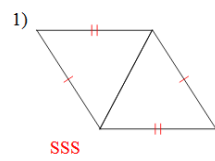
ASA

9)



SAS

# Answers

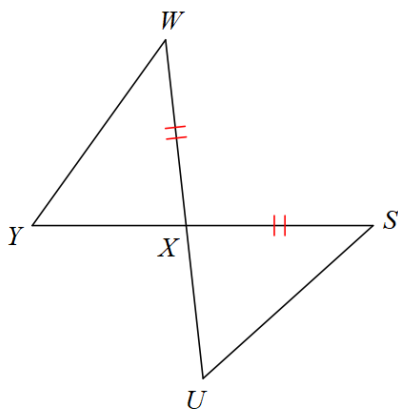


**February 13, 2017**

One other type of problem:

State what additional information is required in order to know that the triangles are congruent for the reason given.

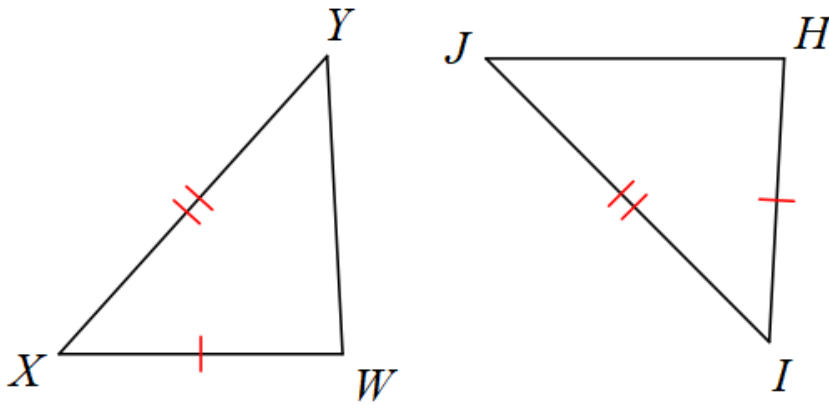
11) ASA



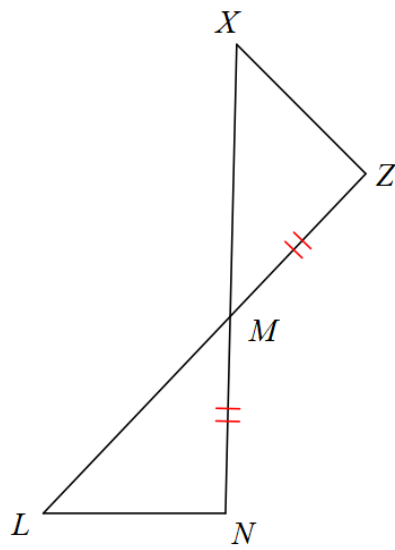


Try the next one.

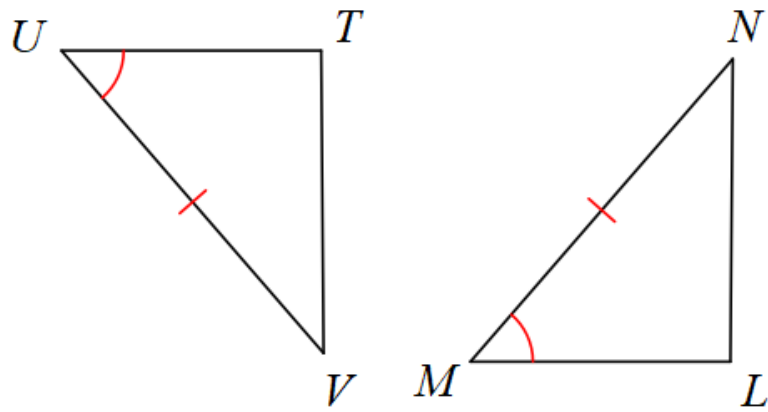
13) SSS



15) AAS



17) AAS



Review:

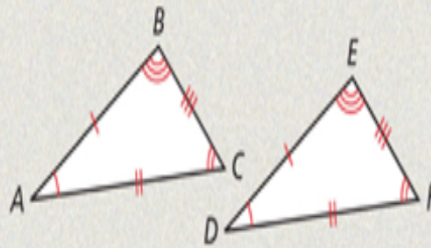
What theorems can be used to prove triangles are congruent?

Why do these theorems work and AAA doesn't?

## Quizlet

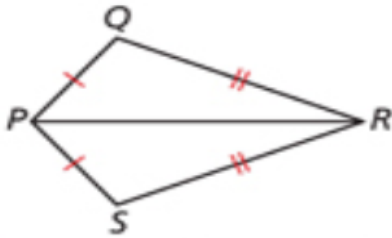
### THINK AND DISCUSS

1. Describe three ways you could prove that  $\triangle ABC \cong \triangle DEF$ .
2. Explain why the SSS and SAS Postulates are shortcuts for proving triangles congruent.

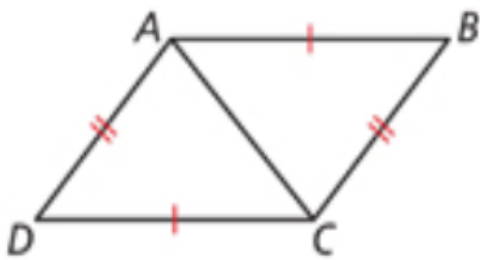


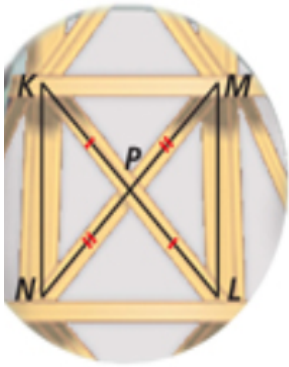
2 column

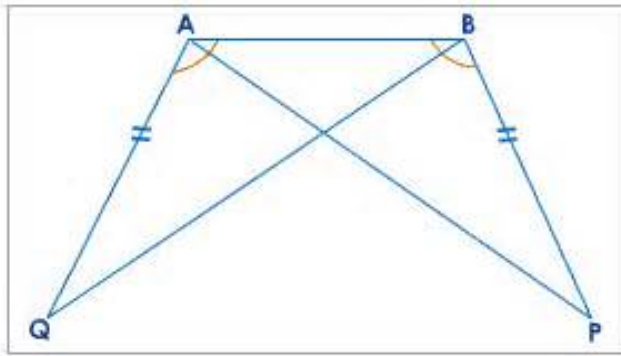
$$\triangle QRP \cong \triangle SRP$$



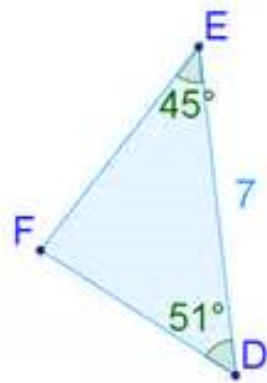
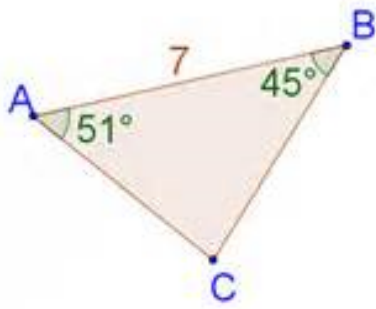
Paragraph











**February 13, 2017**