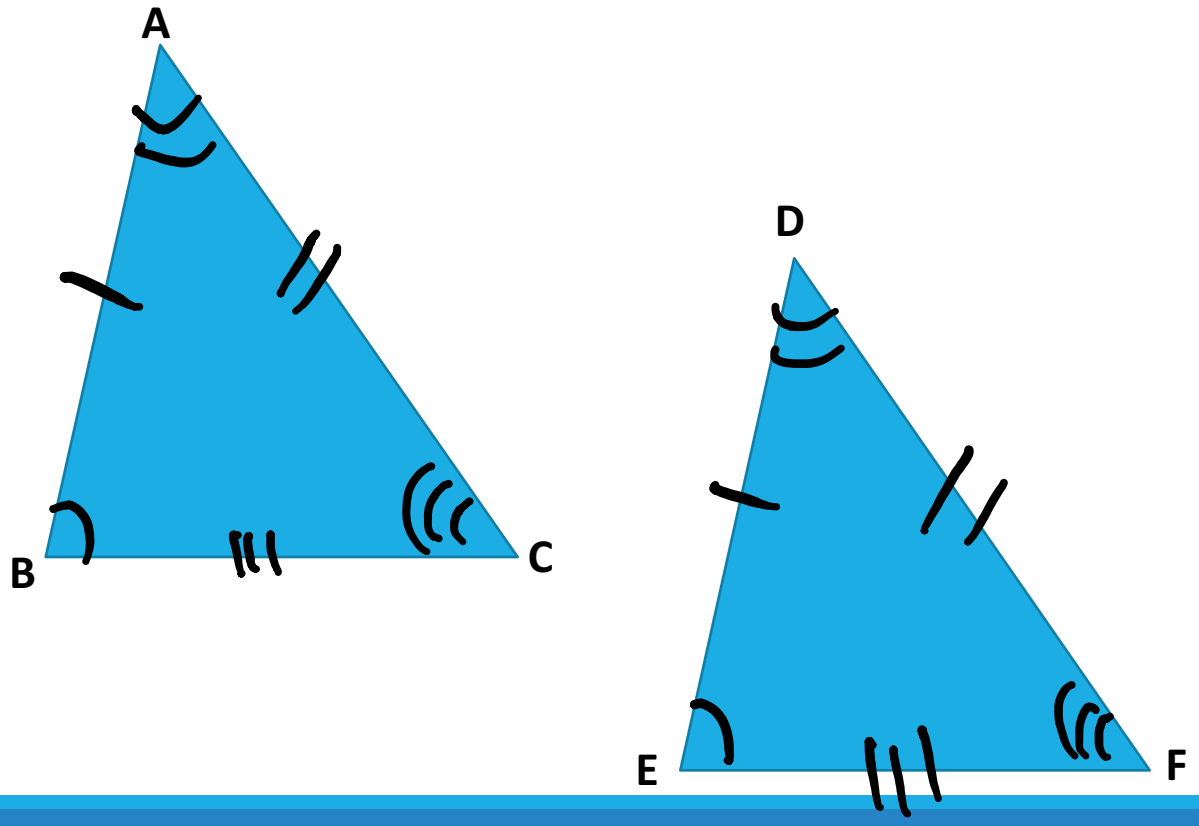
Objective: Explore Triangle Congruence

Remember:
Rigid Motions and Congruence

Based on what we have learned so far, what do you need to know in order to be able to say that these two triangles are congruent?



Remember:
What does congruent mean?

Two figures are congruent if they have all of the same side lengths and angle measures.

Remember: What are tick marks? Arc Marks?

Sticks Activity!

Using one red stick, one purple stick, and one yellow stick, snap together a triangle.

Now try to make another triangle with the same three colored sticks that is NOT congruent to the first triangle

Reflection Questions

Do you think it is possible to make two triangles that have the same side lengths but are not congruent? Why or why not?

Complete the following conjecture based on your results:

Two triangles are congruent if all their side lengths ≅

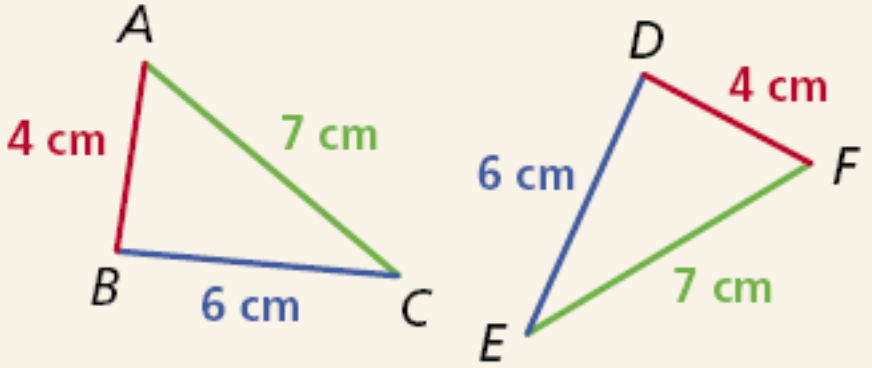
What about quadrilaterals?

SSS (Side-Side-Side) Congruence

Definition

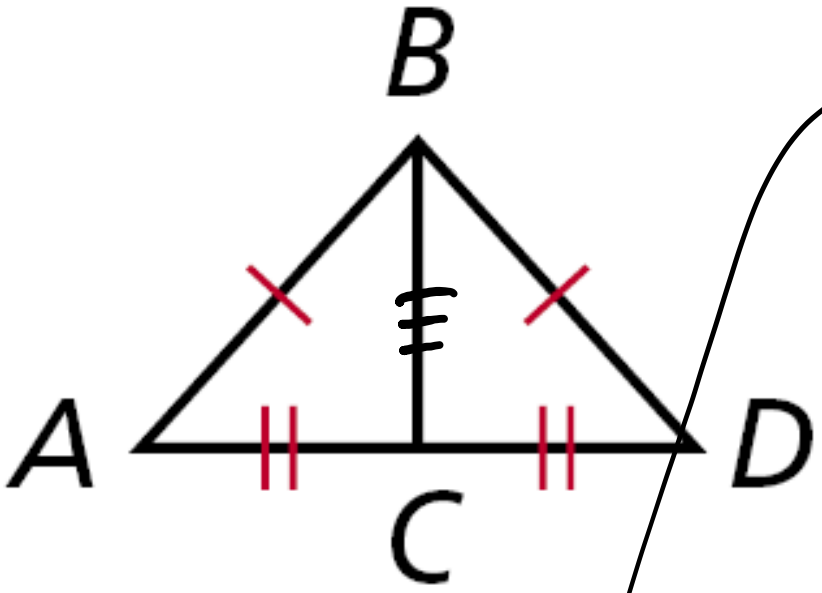
If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.

Example



$\triangle ABC \cong \triangle FDE$

Example of SSS Congruence



Which rigid motion???

S $\overline{AB} \cong \overline{DB}$ Given

S $\overline{AC} \cong \overline{DC}$ Given

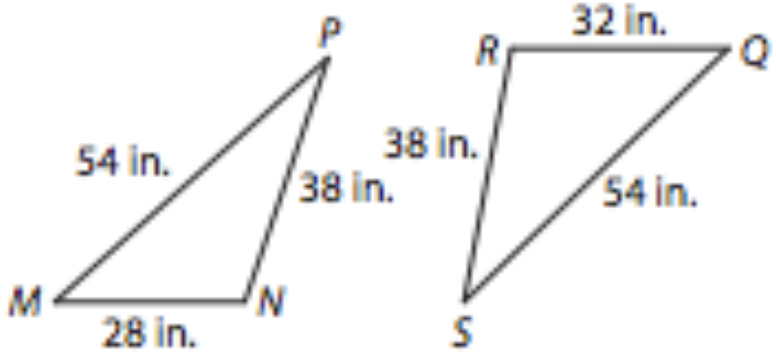
S $\overline{BC} \cong \overline{BC}$ Reflexive Property

$\triangle ABC \cong \triangle DBC$ SSS

Your Turn

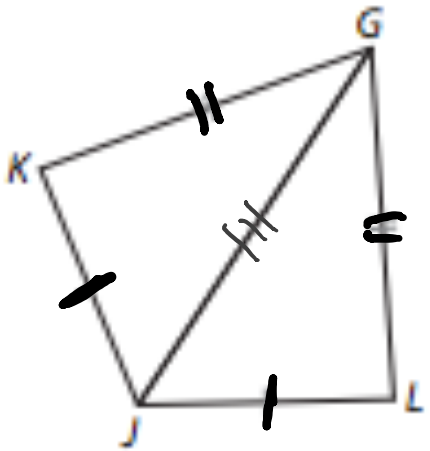
Prove that the triangles are congruent or explain why they are not congruent.

5.



No $\overline{MN} \neq \overline{RQ}$

6.

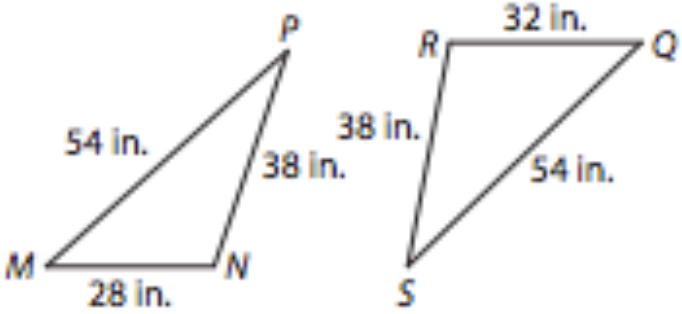


they are.
by SSS

Your Turn

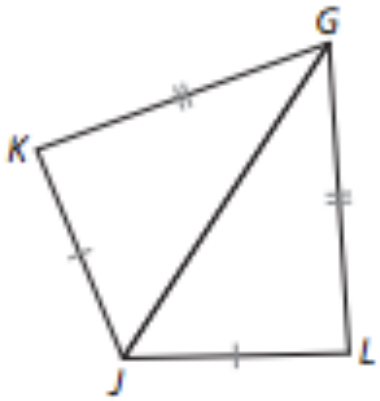
Prove that the triangles are congruent or explain why they are not congruent.

5.



The corresponding sides $\overline{MN}$ and $\overline{QR}$ are not congruent. Therefore, the triangles are not congruent.

6.



It is given that $\overline{GK} \cong \overline{GL}$ and $\overline{JK} \cong \overline{JL}$, and $\overline{GJ} \cong \overline{GJ}$ by the Reflexive Property.

Sticks Activity Part Two!

Using one red stick and one yellow stick- snap them together with the protractor at 60 degrees. Without changing the angle at which the red stick and the yellow stick are to each other, fill in the missing side length with another color stick. Is there only one possible way to do this?

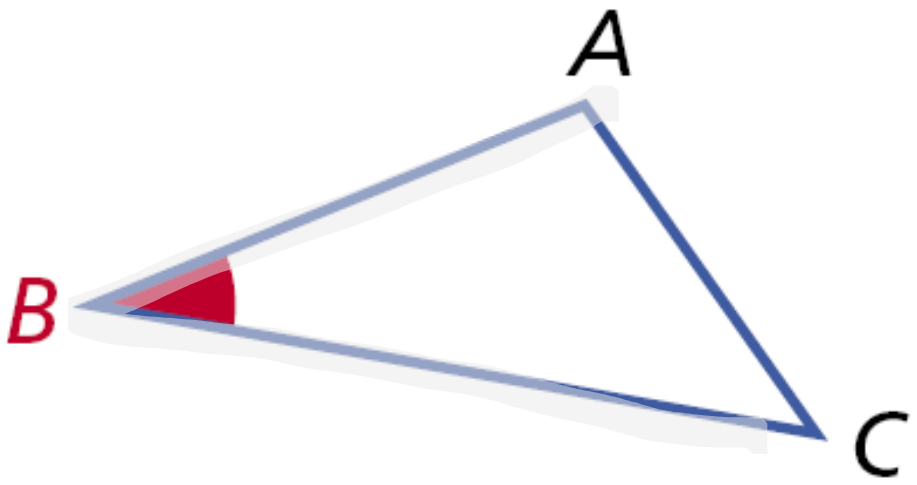
Reflection Questions

Suppose you know two side lengths of a triangle and the measure of the angle between these sides. Can the length of the third side be any measure? Explain.

Complete the following conjecture based on your results:

Two triangles are congruent if

_____



An **included angle** is an angle formed by two adjacent sides of a polygon.

$\angle B$ is the included angle between sides $\overline{AB}$ and $\overline{BC}$.

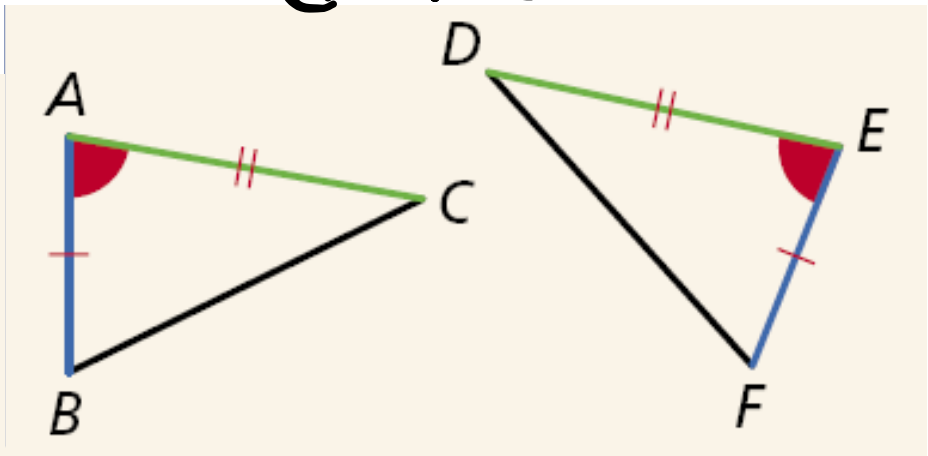
SIDE - ANGLE - SIDE

SAS Congruence

Definition

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

Example



$\triangle ABC \cong \triangle EFD$

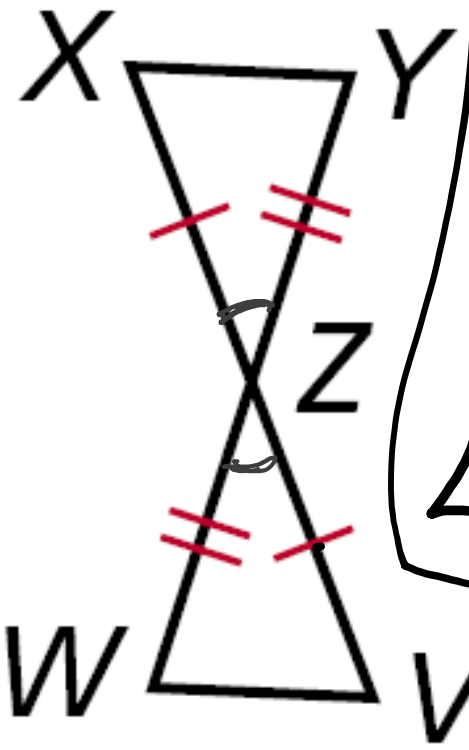
Caution

The letters SAS are written in that order because the congruent angles must be between pairs of congruent corresponding sides.

Example of SAS Congruence

Which rigid motion???

Rotation



S $\overline{XZ} \cong \overline{VZ}$ Given

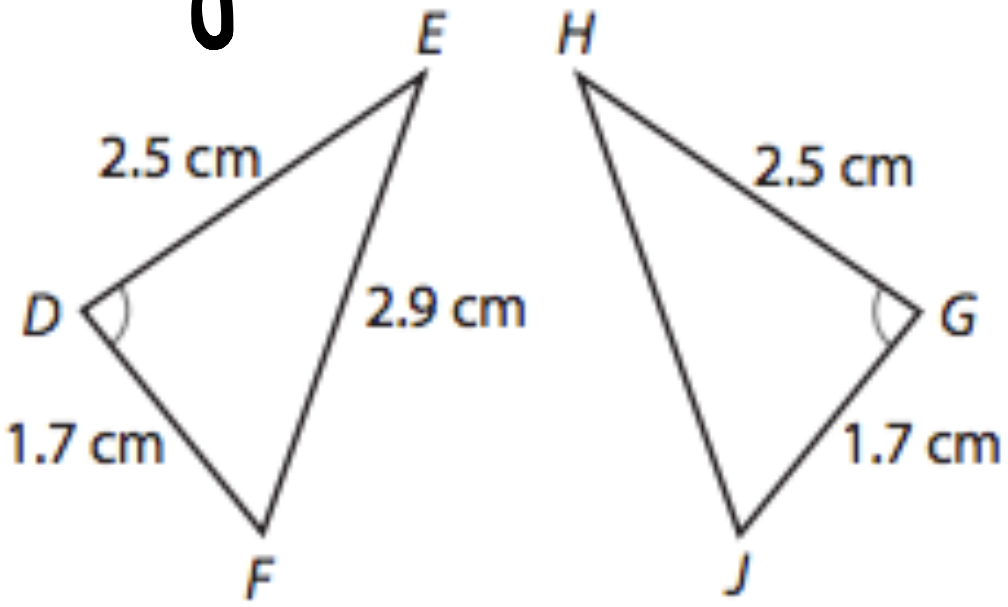
A $\angle XZY \cong \angle VZW$ vertical angles

S $\overline{ZY} \cong \overline{ZW}$ Given

$\triangle XZY \cong \triangle VZW$ SAS

Are the triangles congruent?
Explain your reasoning.

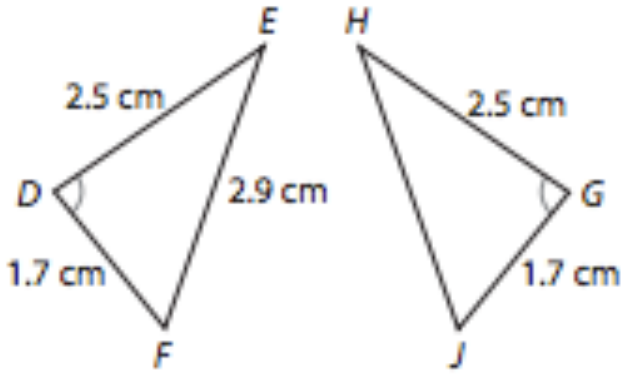
Yes, by SAS



Your Turn

3. Determine whether the triangles are congruent. Explain your reasoning.

$\overline{DE} \cong \overline{GH}$, $\overline{DF} \cong \overline{GJ}$, and $\angle D \cong \angle G$, and $\angle D$ and $\angle G$ are included by congruent corresponding sides. $\triangle EDF \cong \triangle HGJ$ by the SAS Triangle Congruence Theorem.



Homework

SSS pg. 1033 (10-14)

SAS pg. 1020 (2-7)