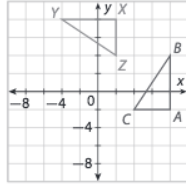


Warmup 2/(Enrique's age – the # of letters in the morpheme that means "love" + how many hearts you have)

Created by Ms. Martin

- Each table needs:
- Ten straws
 - 2 pairs of scissors
 - 2 rulers
 - 2 pieces of string



The two figures appear to be the same/different.

You can map $\triangle ABC$ to $\triangle XYZ$

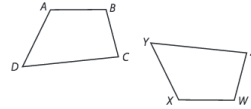
by a counter-clockwise rotation of 90° around the origin.

This is not a rigid motion that maps $\triangle ABC$ to $\triangle XYZ$, so the two figures are/are not congruent.

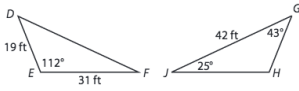
The coordinate notation for the rotation is $(x, y) \rightarrow (-y, x)$.

1. Danielle finds that she can use a translation and a reflection to make quadrilateral $ABCD$ fit perfectly on top of quadrilateral $WXYZ$. What congruence statements can Danielle write using the sides and angles of the quadrilaterals? Why?

- Online Homework
- Hints and Help
- Extra Practice

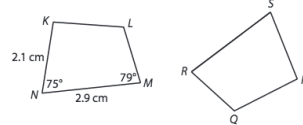


The same sequence of rigid motions that maps $ABCD$ to $WXYZ$ also maps sides and angles of $ABCD$ to corresponding sides and angles of $WXYZ$. Therefore, those sides and angles are congruent: $\overline{AB} \cong \overline{WX}$, $\overline{BC} \cong \overline{XY}$, $\overline{CD} \cong \overline{YZ}$, $\overline{AD} \cong \overline{WZ}$, $\angle A \cong \angle W$, $\angle B \cong \angle X$, $\angle C \cong \angle Y$, $\angle D \cong \angle Z$.



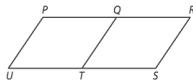
2. \overline{JH} Since $\triangle DEF \cong \triangle GHJ$, $\overline{FE} \cong \overline{JH}$.
 $FE = JH = 31$ ft, so $JH = 31$ ft.
3. $m\angle D$ Since $\triangle DEF \cong \triangle GHJ$, $\angle D \cong \angle G$.
 $m\angle D = m\angle G = 43^\circ$

$KLMN \cong PQRS$. Find the given side length or angle measure.



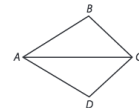
4. $m\angle R$ $\angle M \cong \angle R$.
 $m\angle M = m\angle R = 79^\circ$.
5. $\overline{PS} \cong \overline{KN}$. $KN = PS = 2.1$ cm

14. Given: Quadrilateral $PQTU \cong$ quadrilateral $QRST$
 Prove: \overline{QT} bisects \overline{PR} .



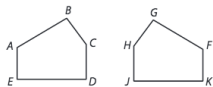
Statements	Reasons

15. Given: $\triangle ABC \cong \triangle ADC$
 Prove: \overline{AC} bisects $\angle BAD$ and \overline{AC} bisects $\angle BCD$.



Statements	Reasons

16. Given: Pentagon $ABCDE \cong$ pentagon $FGHIK$; $\angle D \cong \angle E$
Prove: $\angle D \cong \angle K$

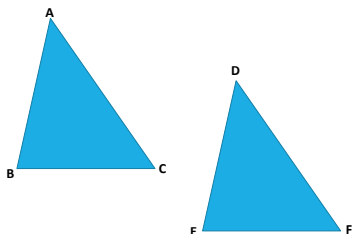


Statements	Reasons

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?

Straw Activity!

Measure and cut six pieces from the straws:

- Two are 2 inches long
- Two are 4 inches long
- Two are 5 inches long

Cut two pieces of string that are about 20 inches long

Thread one piece of each size of straw together so the pieces form a triangle.

Using the remaining pieces, try to make another triangle with the same side lengths that is NOT congruent to the first triangle

Reflection Questions

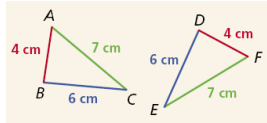
Do you think it is possible to make two triangles that have the same side lengths but are not congruent? Why or why not?

Complete the following conjecture based on your results:

Two triangles are congruent if

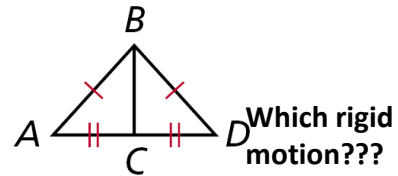
SSS (Side-Side-Side) Congruence

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



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

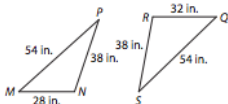
Example of SSS Congruence



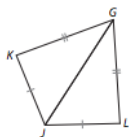
Your Turn

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

5.



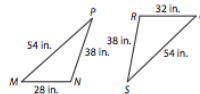
6.



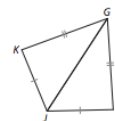
Your Turn

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

5.



6.



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

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.

Straw Activity Part II

Measure and cut two pieces from the straws:

- One that is 4 inches long
- One that is 5 inches long

Use a protractor to help you bend a paper clip to form a 90 degree angle

Place the pieces of straw on the sides of the 30 degree angle

Without changing the angle formed by the paper clip, use a piece of straw to create a third side for your triangle. (Use two more paper clips to hold it all together).

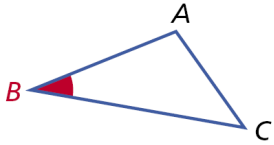
Compare your triangle with your neighbor's triangle. Are they congruent?

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:

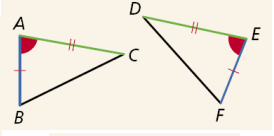
Two triangles are congruent if



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} .

SAS Congruence

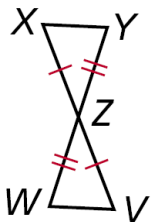
If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.



$\triangle ABC \cong$

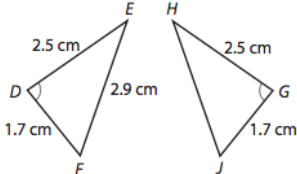
Caution
 The letters SAS are written in that order because the congruent angles must be between pairs of congruent corresponding sides.

Example of SAS Congruence



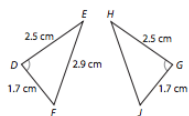
Which rigid motion???

Are the triangles congruent?
 Explain your reasoning.



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)