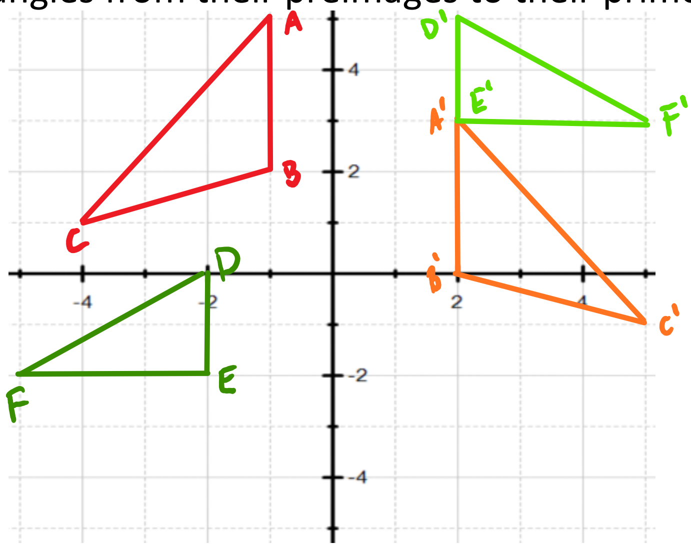
4.3 Proving and Applying The SAS and SSS Congruence Criteria

Monday, September 23, 2019 7:46 AM

Warm Up

Map the following Triangles from their preimages to their primes.



$ABC \to A'B'C'$

$R_{x=.5} \circ T_{\langle 0,-2 \rangle}$

$DEF \to D'E'F'$

$R_{y\text{-axis}} \circ T_{\langle 0,5 \rangle}$

Essential Question

How are SAS and SSS used to show that two triangles are congruent?

Needed Vocab:

- ► **Side Angle Side**
- ► **Side Side Side**
- ► **CPCTC**

Goal: "I can. . .

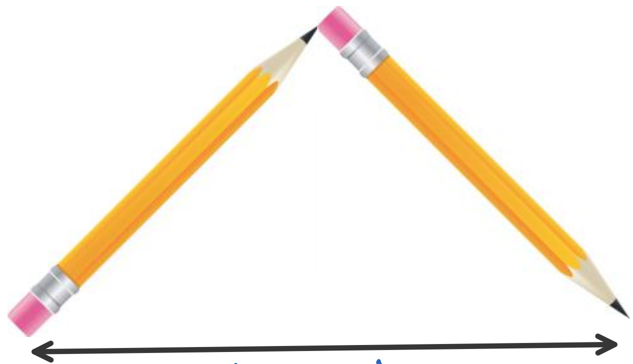
Use SAS and SSS to determine whether triangles are congruent."

With the people next to you, take two pencils (or Pens) and place them together so that the end of one is touching the end of the other creating an angle. Without changing the angle how many different lengths are there between the other two end points.

Example:

other two end points.

Example:



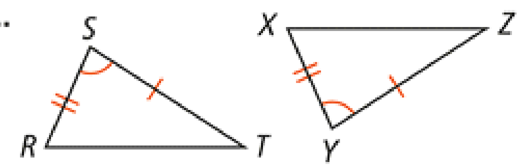
Has to be same distance

Side-Angle-Side (SAS) Congruence Criterion

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

PROOF: SEE EXAMPLE 1.

If...



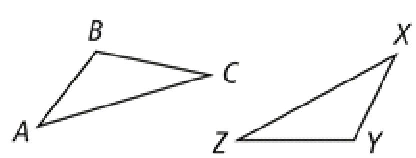
Then... $\triangle RST \cong \triangle XYZ$

Corresponding Parts of Congruent Triangles are Congruent (CPCTC)

If two triangles are congruent, then each pair of corresponding sides is congruent and each pair of corresponding angles is congruent.

PROOF: SEE EXERCISE 13.

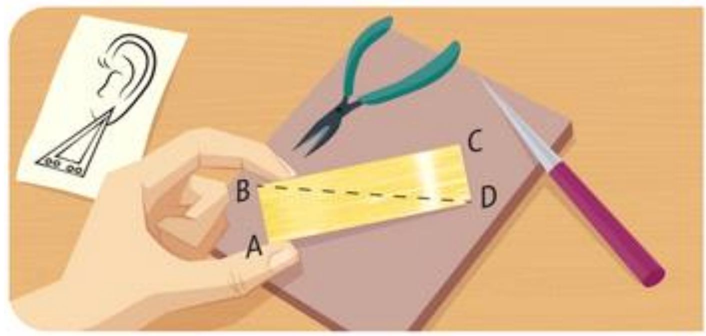
If... $\triangle ABC \cong \triangle XYZ$

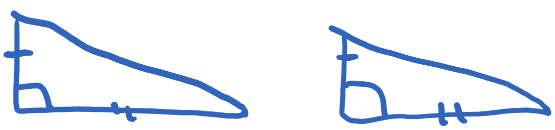


Then... $\overline{AB} \cong \overline{XY}$, $\overline{BC} \cong \overline{YZ}$, $\overline{AC} \cong \overline{XZ}$, $\angle A \cong \angle X$, $\angle B \cong \angle Y$, and $\angle C \cong \angle Z$.

Example 1

Allie cuts two triangles from a rectangular piece of metal along the dashed line to make earrings. How can Allie show that the earrings are the same size and shape?

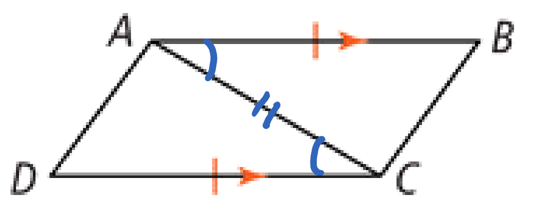




In rectangles opp. sides are $\cong$ and every angle is $90°$.

By SAS They are $\cong$.

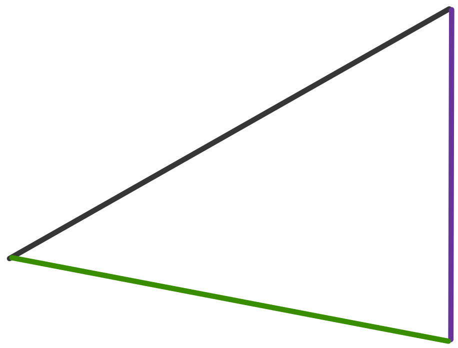
2. Given that $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$, how can you show that $\angle B \cong \angle D$?



If $\overline{AB} \parallel \overline{DC}$ then $\angle ACD \cong \angle BAC$, Alt. Int. $\overline{AC} \cong \overline{AC}$, and it's given $\overline{AB} \cong \overline{DC}$ so by SAS the $\triangle$'s are $\cong$. Since the $\triangle$'s are $\cong$ and D and B are corresponding parts $\angle B \cong \angle D$.

With the people next to you place 3 pens/pencils end to end and see how many different triangles you can make with those 3 and only those 3.

Example:



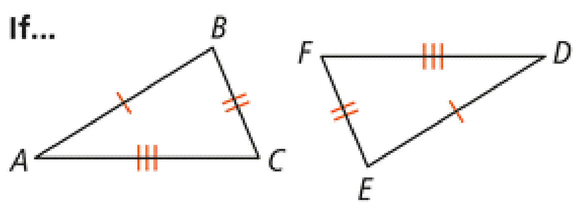
only 1 Δ is possible to make.

Side-Side-Side (SSS) Congruence Criterion

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

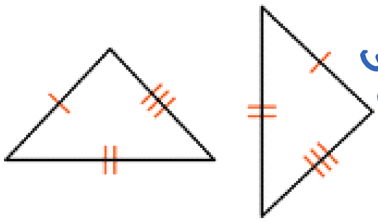
PROOF: SEE EXAMPLE 3.

If...

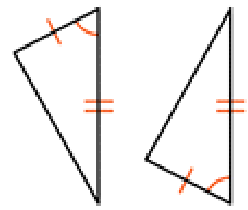


Then... $\triangle ABC \cong \triangle DEF$

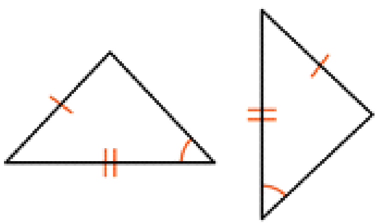
A. Which of the following pairs are congruent by SAS or SSS?



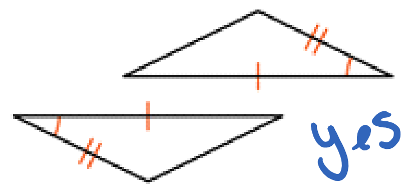
yes, SSS



yes, SAS

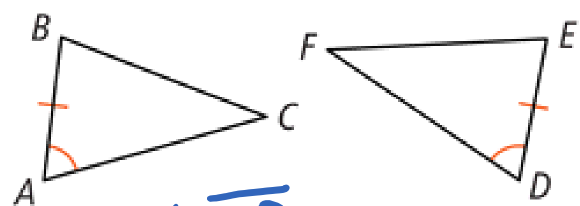


NO, SSA



yes, SAS

B. What additional information is needed to show $\triangle ABC \cong \triangle DEF$ by SAS? By SSS?



$\overline{AC} \cong \overline{FD}$ for SAS.

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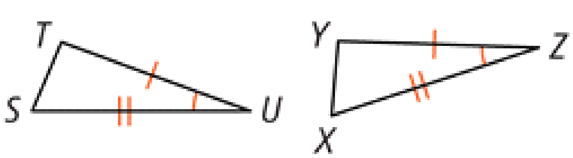
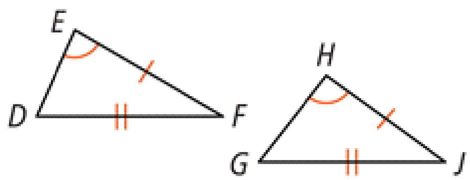
4. a. Is $\triangle STU$ congruent to $\triangle XYZ$? Explain.



yes, SAS $\cong$

4. b. Is any additional information needed to show $\triangle DEF \cong \triangle GHJ$ by SAS? Explain.

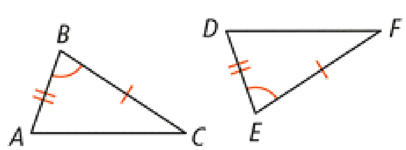


yes, we need $\overline{ED} \cong \overline{HG}$.

Triangle Congruence Criteria

THEOREM 4-3 Side-Angle-Side (SAS)

If...

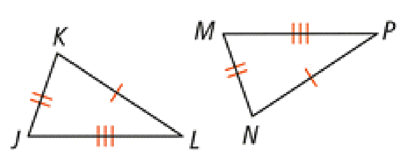


$\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, and $\angle B \cong \angle E$

Then... $\triangle ABC \cong \triangle DEF$

THEOREM 4-5 Side-Side-Side (SSS)

If...



$\overline{JK} \cong \overline{MN}$, $\overline{JL} \cong \overline{MP}$, and $\overline{KL} \cong \overline{NP}$

Then... $\triangle JKL \cong \triangle MNP$

Homework

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