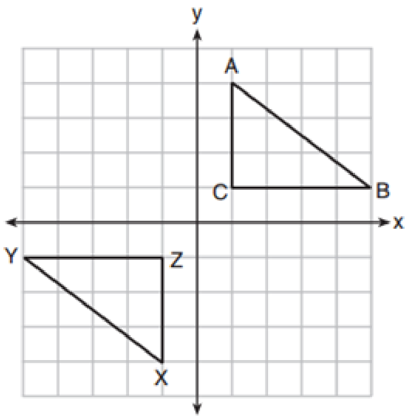
Name: ___________________________________________ Date: __________________________

**UNIT 3** **LESSON 2**

**AIM: WHAT ARE THE SSS, SAS AND HL "SHORTCUTS" TO PROVE TRIANGLES ARE CONGRUENT?**

*Do Now:* In the diagram below, $\Delta ABC$ and $\Delta XYZ$ are graphed.



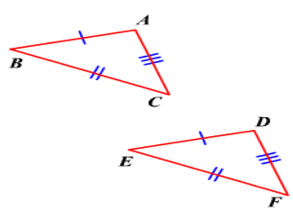
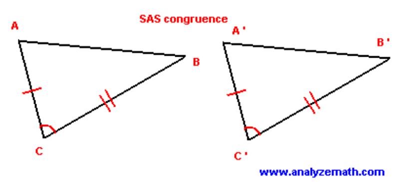
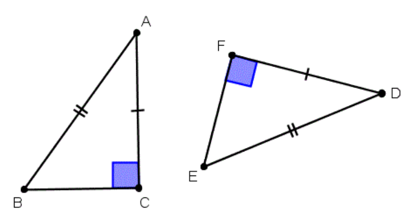

1. Use properties of rigid motions to explain why $\Delta ABC \cong \Delta XYZ$.

2. Identify all corresponding sides and angles:

| ANGLES | SIDES |
|---|---|
| | |

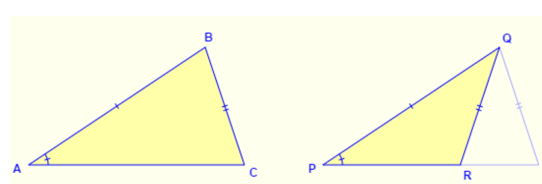
**RECALL:**

- Basic rigid motions produce ________________________ figures.
- Therefore, in order for triangles to be congruent all _____________________ must be of equal length and all _______________ must be of equal measure.
- **BUT** we do not need to know that *ALL* sides and *ALL* angles are congruent in order to identify congruent triangles! We can use 5 "shortcuts" to help us out! *(Today, we will learn three of them!)*

| 1. SSS Shortcut (Side-Side-Side) | 2. SAS Shortcut (Side-Angle-Side) | 3. HL Shortcut (Hyptoenuse-Leg) |
|---|---|---|
|   |   ***THE ANGLE MUST BE <u>BETWEEN</u> THE SIDES!*** |   ***ONLY VALID IN <u>RIGHT</u> TRIANGLES!*** |

***BEWARE!*** There is a method that DOES NOT work – SSA (Side-Side-Angle) **<u>WHY?!</u>**

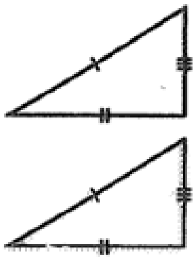
- There are **<u>2 possible triangles</u>** that can be created with these conditions. It is clear that one of the possibilities does not produce a congruent triangle (same shape, different size)
- Therefore, you **<u>MUST</u>** only use the **<u>INCLUDED</u>** angle!

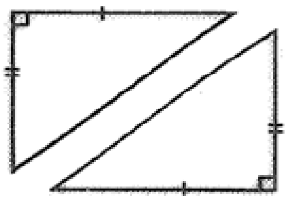


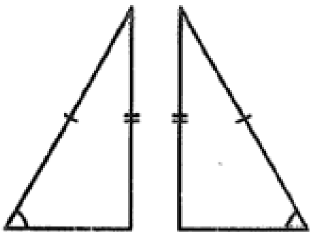

***DON'T BE AN***

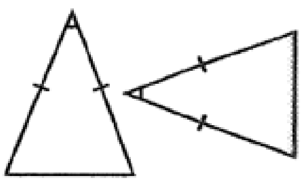
***!***

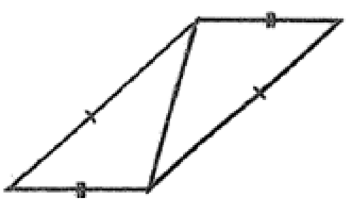
For each of the following, iidentify which postulate will prove these triangles congruent (HL, SSS, SAS, or none)

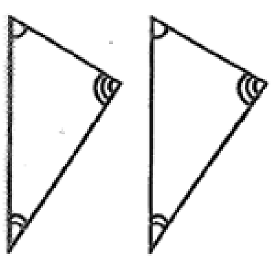


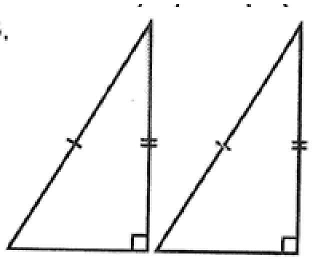


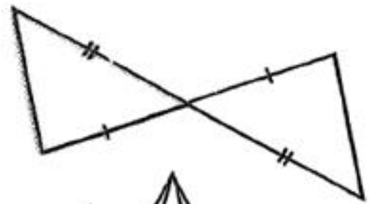


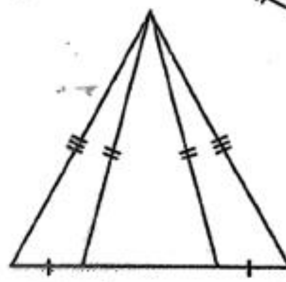


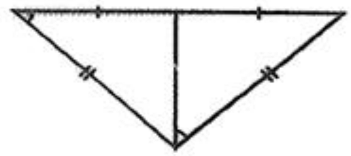


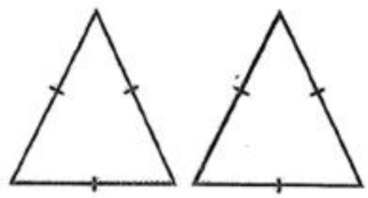


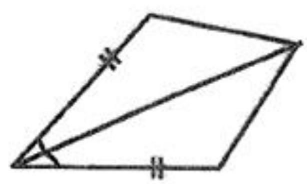


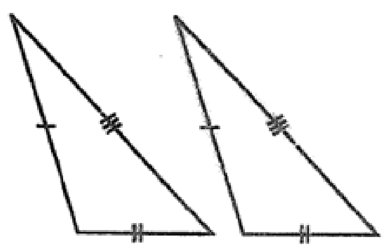


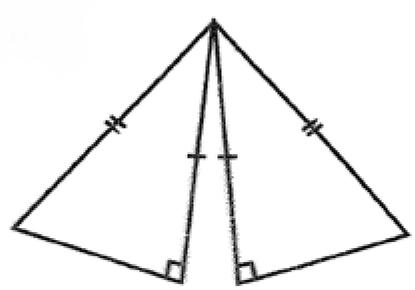








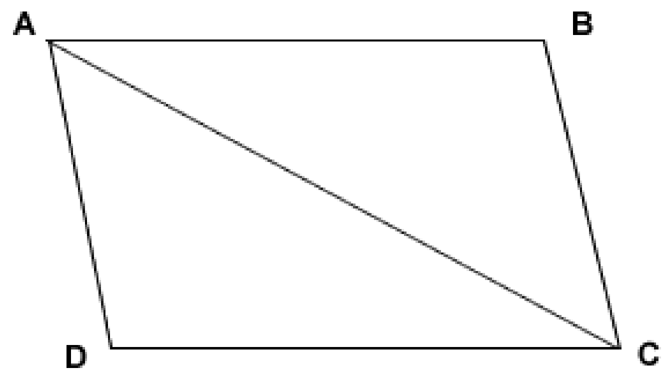




*Based on the given information, determine what shortcut should be used and write a plan on how you would prove the triangles congruent.*

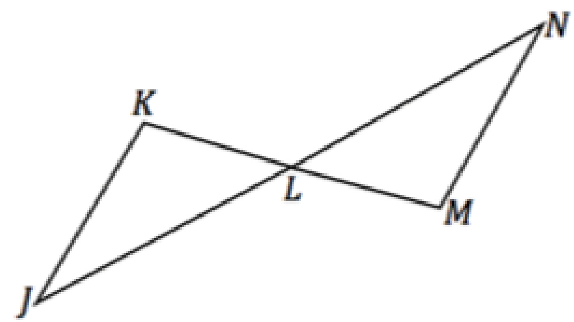
1. Given: $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$
   Prove: $\Delta ABC \cong \Delta CDA$

   **PLAN:**



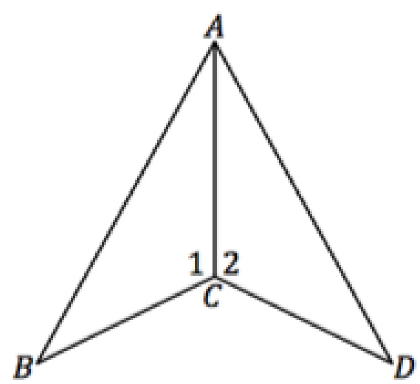

2. Given: $\overline{JN}$ *and* $\overline{KM}$ bisect each other at $L$
   Prove: $\Delta JKL \cong \Delta NML$

   **PLAN:**



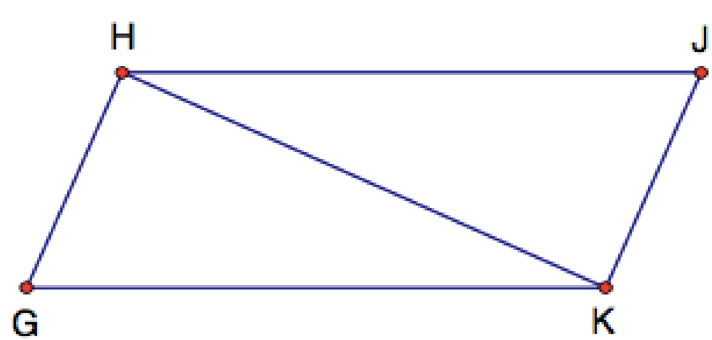

3. Given: $\angle 1 \cong \angle 2, \overline{BC} \cong \overline{DC}$
   Prove: $\Delta ABC \cong \Delta ADC$

   **PLAN:**




4. Given: $\overline{GH} \perp \overline{HK}, \overline{JK} \perp \overline{KH}, \overline{GK} \cong \overline{JH}$
   Prove: $\Delta GHK \cong \Delta JKH$

   **PLAN:**

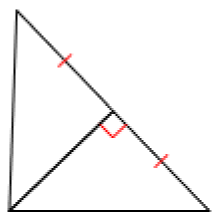


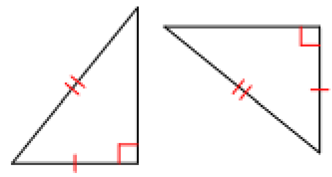
Name: ____________________________________________ Date: ___________________________

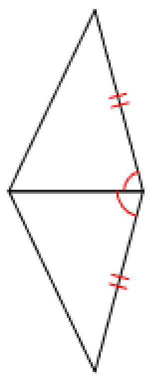
**UNIT 3** **LESSON 1**

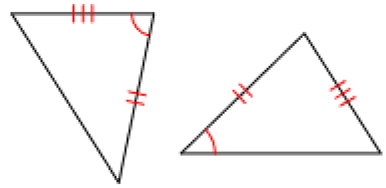
**HOMEWORK**

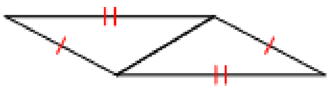
*For numbers 1-6, identify the shortcut used to prove the triangles are congruent.*

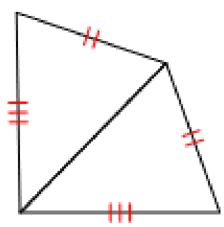
1) 

2) 

3) 

4) 

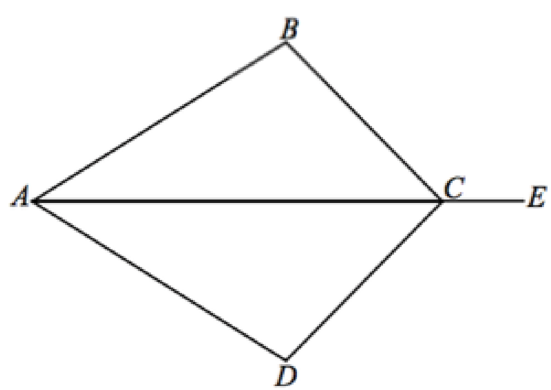
5) 

6) 

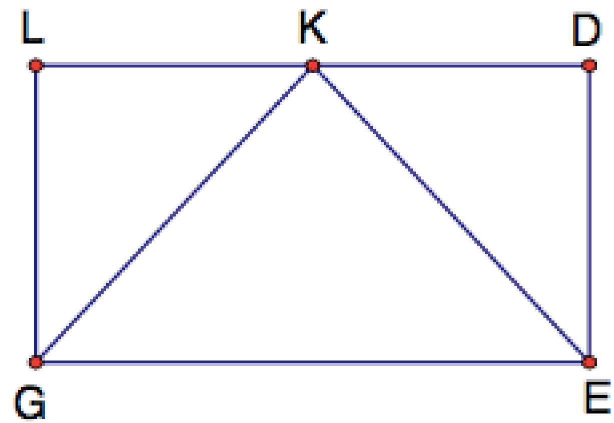
*For numbers 7-8, use the given information to determine the shortcut and write a plan for how you would prove the triangles are congruent*

7. Given: $\overline{AE}$ bisects $\angle BCD$ and $\overline{BC} \cong \overline{DC}$
   Prove: $\Delta CAB \cong \Delta CAD$

   **PLAN:**

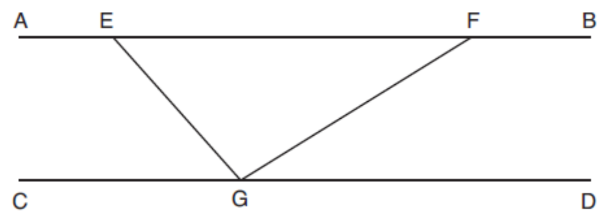


8. Given: $\angle KGE \cong \angle KEG$, $\overline{GL} \perp \overline{LD}$, $\overline{ED} \perp \overline{DL}$ and $K$ is the midpoint of $\overline{LD}$
Prove: $\Delta KLG \cong \Delta KDE$




**PLAN:**

9. In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$, and $\overline{GE}$ and $\overline{GF}$ are drawn.




If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?

1) 11º

2) 43º

3) 75º

4) 105º

10. In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are intersected by transversal at points *G* and *H*, respectively, $m\angle AGH = x + 15$, and $m\angle GHD = 2x$.

Which equation can be used to find the value of *x*?

1) $2x = x + 15$

2) $2x + x + 15 = 180$

3) $2x + x + 15 = 90$

4) $2x(x + 15) = 0$