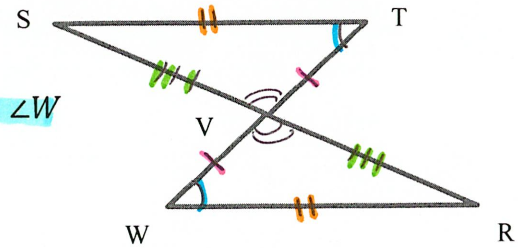
Example #4: Prove.

Why do they give us this info?

Given: $\overline{TV} \cong \overline{WV}$, $\overline{ST} \cong \overline{RW}$, point P is the midpoint of $\overline{SR}$, $\angle T \cong \angle W$

Prove: $\triangle STV \cong \triangle RWV$

Therefore $\overline{SV} \cong \overline{RV}$

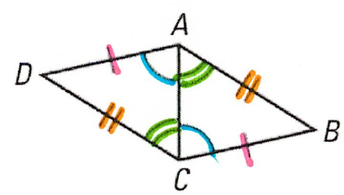


Statement		Reason
1. $\overline{TV} \cong \overline{WV}$	$\overline{ST} \cong \overline{RW}$	1. Given
1. P is the midpt of $\overline{SR}$	$\angle T \cong \angle W$	
2. $\overline{SV} \cong \overline{RV}$		2. Defn of a midpoint
3. $\angle TVS \cong \angle WVR$		3. Vertical Angles Thrm
4. $\angle S \cong \angle R$		4. Third Angles Thrm
5. $\triangle STV \cong \triangle RWV$		5. Defn of Congruent Triangles

Example #5: Prove.

Given: $\overline{AD} \cong \overline{CB}$, $\overline{DC} \cong \overline{BA}$, $\angle ACD \cong \angle CAB$, $\angle CAD \cong \angle ACB$

Prove: $\triangle ACD \cong \triangle CAB$



Statement		Reason
1. $\overline{AD} \cong \overline{CB}$	$\overline{DC} \cong \overline{BA}$	1. Given
1. $\angle ACD \cong \angle CAB$	$\angle CAD \cong \angle ACB$	
2. $\overline{AC} \cong \overline{CA}$		2. Reflexive Property
3. $\angle D \cong \angle B$		3. Third Angles Thrm
4. $\triangle ACD \cong \triangle CAB$		4. Defn of Congruent Triangles.

Chapter 4.3: Prove Triangles Congruent by SSS

Side-Side-Side (SSS) Congruence Postulate (Postulate 19):

If three sides of one triangle are congruent to three sides of a second triangle, then the two triangles are Congruent.

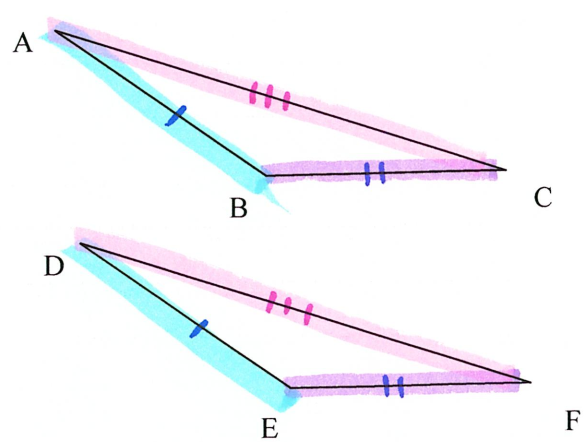
If S: $\overline{AB} \cong \overline{DE}$

S: $\overline{BC} \cong \overline{EF}$

S: $\overline{CA} \cong \overline{FD}$

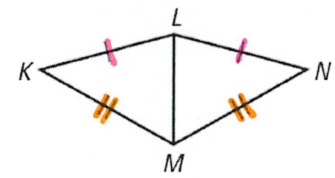
Then $\triangle ABC \cong \triangle DEF$

Congruence Statement



Example #1: Prove.

Given: $\overline{KL} \cong \overline{NL}$, $\overline{KM} \cong \overline{NM}$
Prove: Triangle $KLM \cong$ Triangle NLM



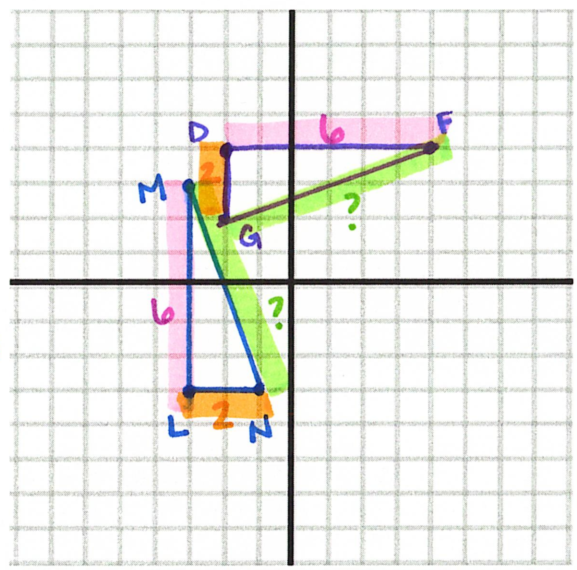
Statement	Reason
1. S : $\overline{KL} \cong \overline{NL}$ S : $\overline{KM} \cong \overline{NM}$	1. Given
2. S: $\overline{LM} \cong \overline{LM}$	2. Vertical Angles
3. $\triangle KLM \cong \triangle NLM$	3. SSS

Example #3: Triangle DFG has vertices D(-2, 4), F(4, 4), and G(-2, 2). Triangle LMN has vertices L(-3, -3), M(-3, 3) and N(-1, -3). Graph the triangles in the same coordinate plane and show that they are congruent.

S: $\overline{DF} \cong \overline{LM}$ S: $\overline{DG} \cong \overline{LN}$

Distance (to find side length) Formula

↳ $D = \sqrt{(x_2 - x_1)^2 + (y_2 + y_1)^2}$



G(-2,2) F(4,4)
x_1 y_1 x_2 y_2

$D = \sqrt{(4-(-2))^2 + (4-2)^2}$

$D = \sqrt{6^2 + 2^2}$

$D = \sqrt{36+4}$

$D = \sqrt{40}$

M(-3,3) N(-1,-3)
x_1 y_1 x_2 y_2

$D = \sqrt{(-3-3)^2 + (-1-(-3))^2}$

$D = \sqrt{(-6)^2 + (2)^2}$

$D = \sqrt{36+4}$

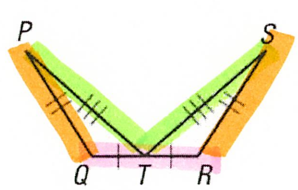
$D = \sqrt{40}$

S: $\overline{GF} \cong \overline{NM}$

All corresponding sides are $\cong$
So... $\triangle DFG \cong \triangle LMN$ by SSS

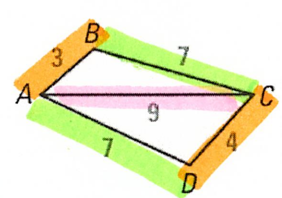
Example #2: Decide whether the ~~congruence statement is true~~ triangles are $\cong$. Explain why or why not.

a.)



$\triangle TQP \cong \triangle TRS$
by S : $\overline{TQ} \cong \overline{TR}$
S : $\overline{QP} \cong \overline{RS}$
S : $\overline{PT} \cong \overline{ST}$

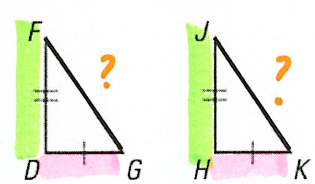
b.)



$\triangle ADC \not\cong \triangle CBA$

$\overline{AB} \not\cong \overline{DC}$

c.)



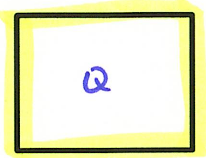
Not Enough Information

Stability in Structures:

A diagonal support form triangles with fixed side lengths. By SSS, these triangles cannot change shape. A structure without a diagonal support is not stable because there are many possible quadrilaterals with the given side length. ☆ Look for all triangles … no quadrilaterals ☆

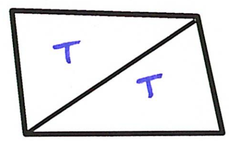
Example #4: Determine whether the figure is stable.

a.)



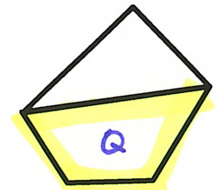
Not Stable

b.)



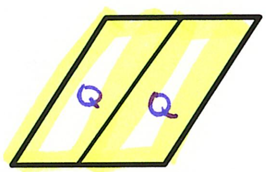
Stable

c.)



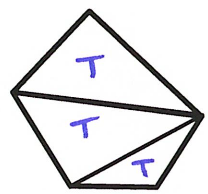
Not stable

d.)



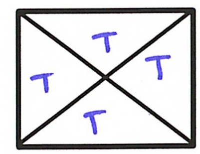
Not Stable

e.)



Stable

f.)



Stable

Chapter 4.4: Prove Triangles Congruent by SAS and HL

Side-Angle-Side (SAS) Congruence Postulate **(Postulate 20):**

If two sides and the included angles → in between two ≅ sides

of one triangle are congruent to two sides and the included

of a second triangle, then the two triangles are Congruent

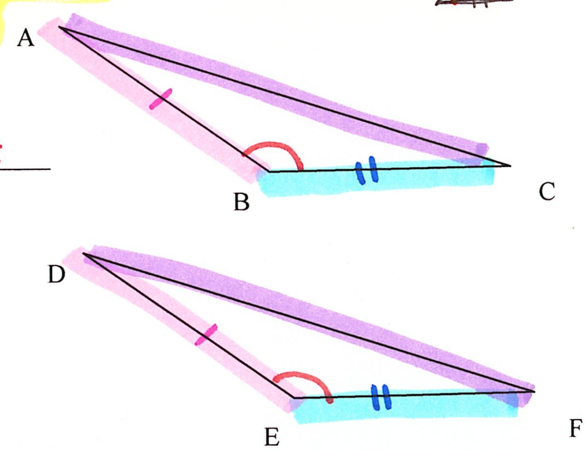
If S: $\overline{AB} \cong \overline{DE}$

A: $\angle B \cong \angle E$

S: $\overline{BC} \cong \overline{EF}$

Then $\triangle ABC \cong \triangle DEF$

congruence Statement



Example #1: Use the diagram to name the included angle between the given pair of sides.

a.) $\overline{AB}$ and $\overline{BC}$

$\angle ABC$

Not just $\angle B$ because there are 3 different angles in that spot. ($\angle ABC$, $\angle ABD$, $\angle CBD$)

b.) $\overline{BC}$ and $\overline{CD}$

$\angle C$ or $\angle BCD$

c.) $\overline{AB}$ and $\overline{BD}$

$\angle ABD$

d.) $\overline{BD}$ and $\overline{DA}$

$\angle BDA$