Section 4.3: Prove Triangles Congruent by SSS

EQ: How can you use side lengths to prove △s are ≅?

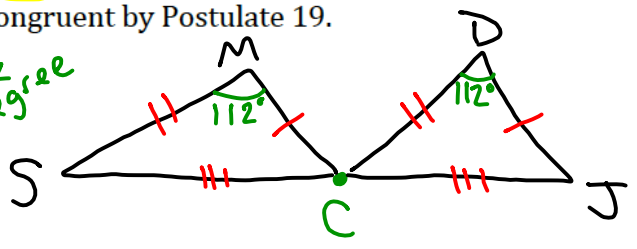
Postulate 19: Side-Side-Side Congruence Postulate

If three sides of one triangle are congruent to 3 sides of another triangle, then the two triangles are congruent.

A1. Sketch obtuse triangles CMS and JDC that are congruent by Postulate 19.

pt. in common

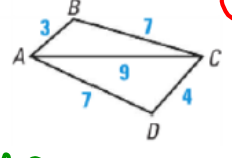
mark w/ degree



yes or NO?

A2. Determind whether the congruence statement is true. Explain.

a. $\Delta ACB \cong \Delta CAD$ NO



AC = 9 CA = 9

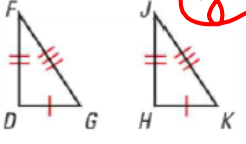
$\overline{AC} \cong \overline{CA}$

AB = 3 CD = 4

3 ≠ 4

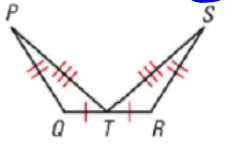
△ NOT ≅

b. $\Delta DFG \cong \Delta HJK$ yes



△ ≅ by SSS

c. $\Delta QTP \cong \Delta TRS$ NO



△ ≅ by SSS

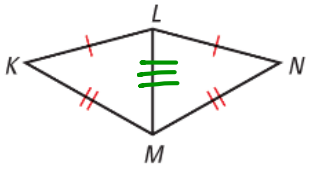
but ≅ statement is incorrect should read

△QTP ≅ △RTS

A3. **Write a proof.**

GIVEN ▶ $\overline{KL} \cong \overline{NL}$, $\overline{KM} \cong \overline{NM}$

PROVE ▶ $\triangle KLM \cong \triangle NLM$



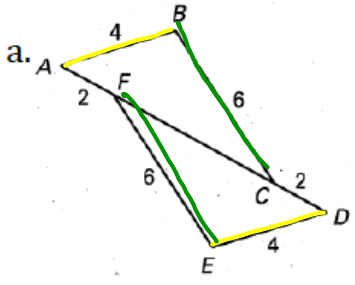
1) $\overline{KL} \cong \overline{NL}$, $\overline{KM} \cong \overline{NM}$ 1) Given

2) $\overline{LM} \cong \overline{LM}$ 2) Reflexive

3) $\triangle KLM \cong \triangle NLM$ 3) SSS $\triangle\cong$

A4. Determine whether $\Delta ABC \cong \Delta DEF$. *Explain* your reasoning.

a.



$\overline{AB} \cong \overline{DE}$
$\overline{BC} \cong \overline{EF}$
$\overline{CA} \cong \overline{FD}$

$AB = DE = 4$

$BC = EF = 6$

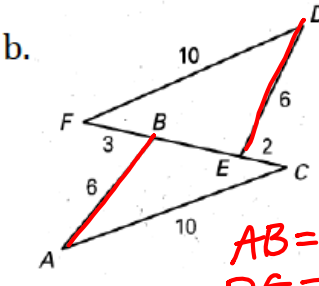
a) yes SSS

$CA = CF + FA$
$CF + 2$

$FD = CF + DC$
$= CF + 2$

Same $\therefore \cong$

b.



b) NO 3rd side $\neq$

$AB = 6$
$DE = 6$
$\overline{AB} \cong \overline{DE}$

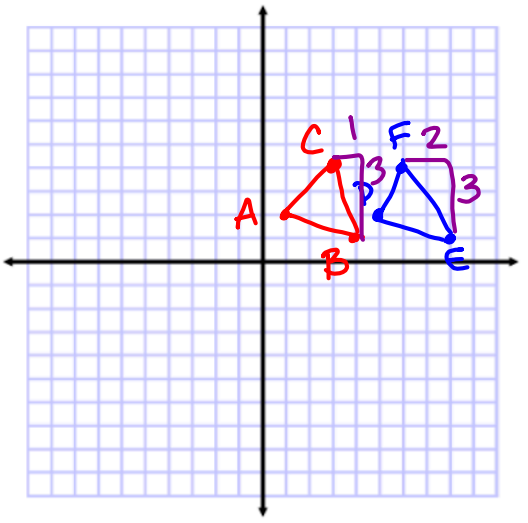
$CA = 10$, $FD = 10$
$\overline{CA} \cong \overline{FD}$

$EF = EB + 3$
$BC = BE + 2$ $>$ $\neq$

$\overline{EF} \not\cong \overline{BC}$

A5. Use the given coordinates to determine if $\Delta ABC \cong \Delta DEF$.

* $A(1,2), B(4,1), C(3,4)$
* $D(5,2), E(8,1), F(6,4)$



To be true all corresponding sides must be $\cong$ (SSS)

$AB = DE$

$BC = EF$

$CA = FD$

$BC = \sqrt{1^2+3^2} = \sqrt{1+9} = \sqrt{10}$

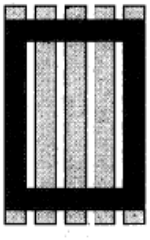
$EF = \sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13}$

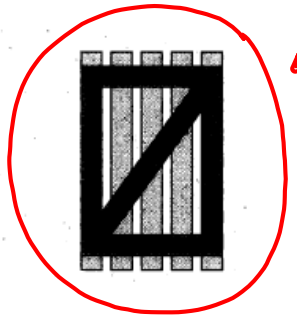
$\sqrt{10} \neq \sqrt{13}$

$\therefore \overline{BC} \ncong \overline{EF}$

so Δ's $\ncong$ b.c

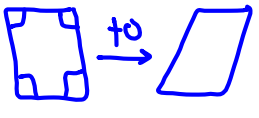
A6. Two different gate doors are shown. Which gate door is more stable? *Explain* your reasoning.





The diagonal creates SSS Δ thus the Δ's are fixed and cannot change size or shape

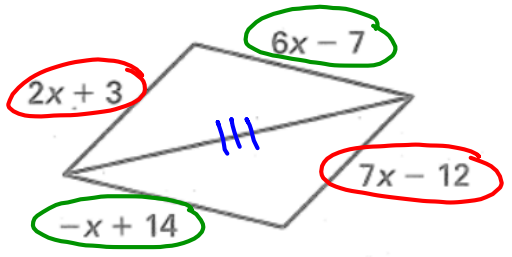
No diagonal $\therefore$ over time will change shape



* If there is a diagonal (from 1 vertice to another) then the frame is stable

B7. Find all values of x that make the triangles congruent. *Explain.*

$\triangle \cong$ if SSS $\cong$



$6x-7 = -x+14$

$+x \quad +7$

$7x = 21$

$x = 3$

$2x+3 = 7x-12$

$+12 \quad -2x$

$15 = 5x$

$x = 3$

Same ∴ answer is $x=3$

If you try...

$6x-7 = 7x-12$

$+12 \quad -6x$

$5 = x$

and

$2x+3 = -x+14$

$+x \quad -3$

$3x = 11$

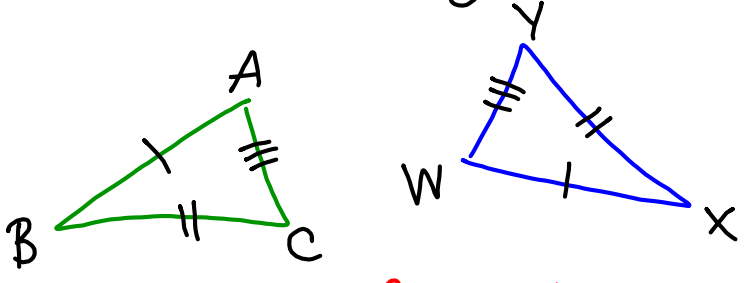
$x = \frac{11}{3}$

$\neq$

∴ the answer is $x=3$

4.3 Summary:

If 3 sides of one $\triangle$ are $\cong$ to 3 sides of another $\triangle$ then the $\triangle$s are $\cong$ by SSS $\triangle \cong$.



$\triangle ABC \cong \triangle WXY$