

4.2 Apply Congruence and Triangles

Term	Definition	Example
congruent figures	Congruent figures have congruent corresponding sides and corresponding angles.	
congruence statement	always list corresponding vertices in same order	$\triangle ABC \cong \triangle DEF$ or $\triangle BCA \cong \triangle FED$
corresponding parts	corresponding sides & angles that are congruent	 $\angle A \cong \angle F$ $\angle B \cong \angle E$ $\angle C \cong \angle D$ $\overline{AB} \cong \overline{FE}$ $\overline{BC} \cong \overline{ED}$ $\overline{AC} \cong \overline{FD}$
Theorem 4.3 Third Angles Theorem	If <u>two angles</u> of one triangle are <u>congruent</u> to <u>two angles</u> of another triangle, then the third angles are also congruent.	 if $\angle A \cong \angle D$ + $\angle B \cong \angle E$ then $\angle C \cong \angle F$

Properties of Congruent Triangles

Theorem 4.4 Properties of Congruent Triangles

(A) Reflexive Property of Congruent Triangles	For any triangle ABC , $\triangle ABC \cong \triangle ABC$. (1)	
(B) Symmetric Property of Congruent Triangles	If $\triangle ABC \cong \triangle DEF$, then $\triangle DEF \cong \triangle ABC$. (2)	
(C) Transitive Property of Congruent Triangles	If $\triangle ABC \cong \triangle DEF$ and $\triangle DEF \cong \triangle JKL$, then $\triangle ABC \cong \triangle JKL$. (3)	

Examples:

1. Write a congruence statement for the triangles.

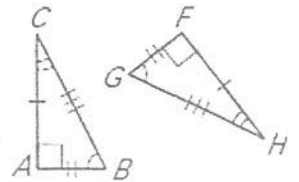
Identify all pairs of congruent, corresponding parts.

Corresponding angles: $\angle C \cong \angle H$, $\angle A \cong \angle F$ sides: $\overline{AC} \cong \overline{FH}$, $\overline{CB} \cong \overline{HG}$, $\overline{AB} \cong \overline{FG}$

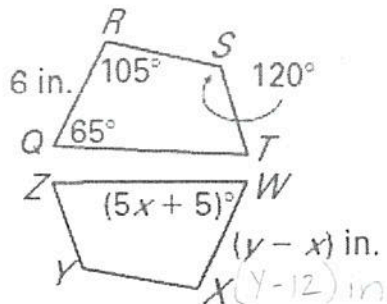
Triangle congruence statements: $\angle B \cong \angle G$

$\triangle ABC \cong \triangle FGH$

ORDER MATTERS!



2. In the diagram, $QRST \cong WXYZ$.



a). Find the value of x .

$$\begin{aligned} 5x + 5 &= 65 \\ 5x &= 60 \\ \boxed{x} &= 12 \end{aligned}$$

b). Find the value of y .

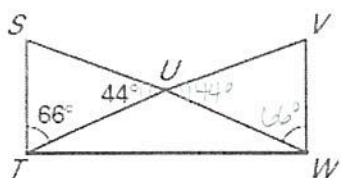
$$\begin{aligned} y - x &= 6 \\ y - 12 &= 6 \\ \boxed{y} &= 18 \end{aligned}$$

3. Given $\triangle JKL \cong \triangle WZX$.

a. Complete the statements: $\triangle KLI \cong \triangle XWI$

b. Write another congruence statement: $\triangle LTK \cong \triangle XWI$

4. Find $m\angle V$.

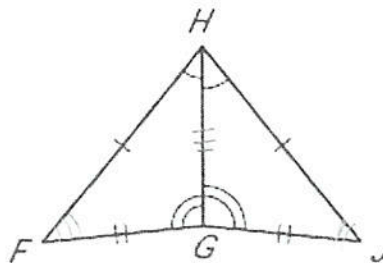


$$\begin{aligned} 66 + 44 &= 110 \\ 180 - 110 &= 70 \end{aligned}$$

$$\boxed{m\angle V = 70^\circ}$$

5. Given $\overline{FH} \cong \overline{JH}$, $\overline{FG} \cong \overline{JG}$,
 $\angle FHG \cong \angle JHG$, $\angle FGH \cong \angle JGH$

Prove $\triangle FGH \cong \triangle JGH$



Statements

Reasons

1. $\overline{FH} \cong \overline{JH}$, $\overline{FG} \cong \overline{JG}$

1. Given

$\angle FHG \cong \angle JHG$

$\angle FGH \cong \angle JGH$

2. $\angle HFG \cong \angle HJG$

2. Third Ang's Thm

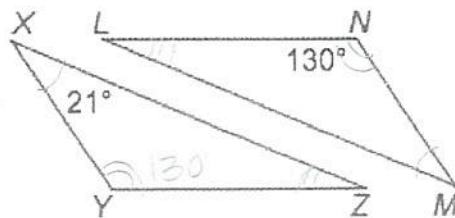
3. $\overline{HG} \cong \overline{HG}$

3. Reflexive Prop of \cong

4. $\triangle FGH \cong \triangle JGH$

4. Def of $\cong \Delta$'s

6. In the diagram, $\triangle XYZ \cong \triangle MNL$. Find $m\angle Z$.



$$m\angle Z = \boxed{29}^\circ$$

$$\begin{aligned} 21 + 130 &= 151 \\ 180 - 151 &= 29 \end{aligned}$$