Geometry

Ch. 4 Handout 4.1

Congruent Figures

Congruent Figures

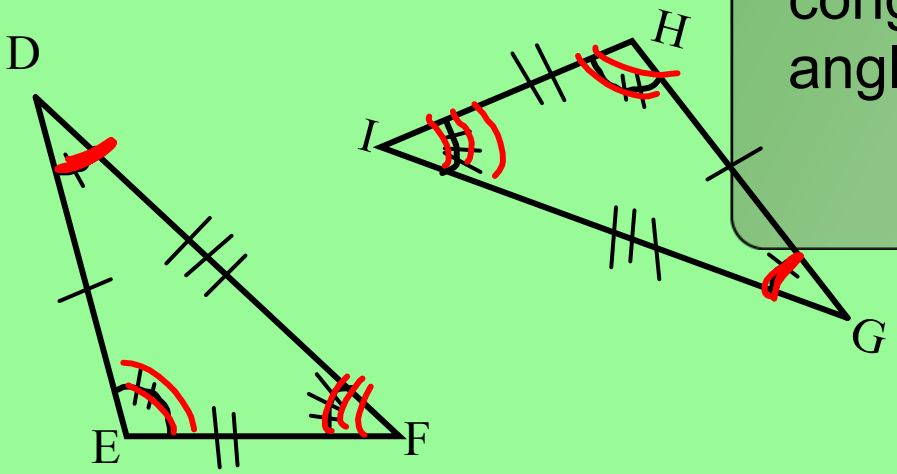
Pull

have the same size and shape (congruent angles and congruent sides).

Congruent polygons

Pull

polygons that have corresponding sides congruent and corresponding angles congruent



$\Delta DFE \cong \Delta GIH$

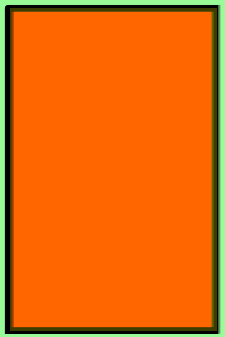
Key Concepts

1. Congruent figures have the same size and shape.

2. You might have to rotate or reflect a figure to test for congruency.

3. This is the mathematical symbol for congruent $\cong$.

Are the figures congruent?

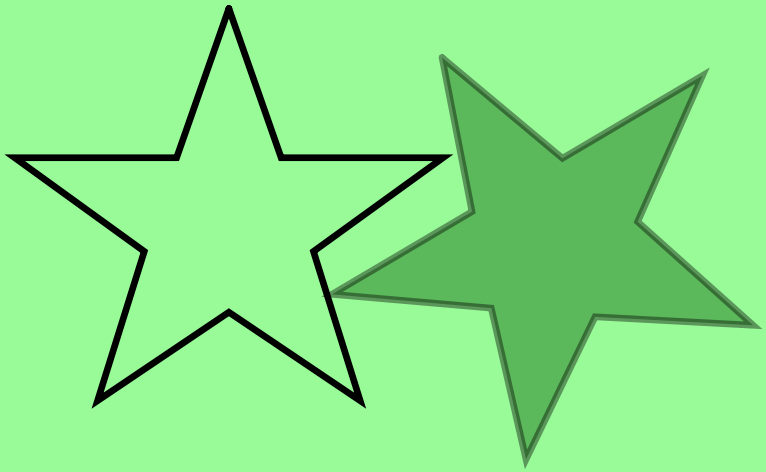


Yes No

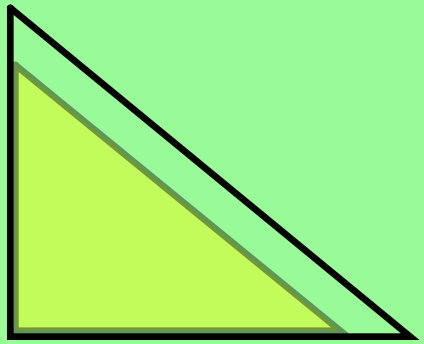
Yes No

You can tell if figures are congruent by placing one over the other to see if they are the same shape and size.

Are the figures congruent?



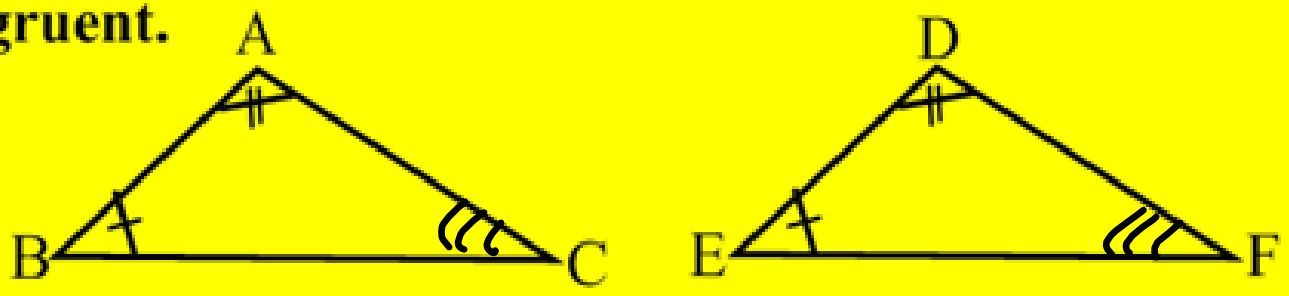
Yes No



Yes No

You can tell if figures are congruent by placing one over the other to see if they are the same shape and size.

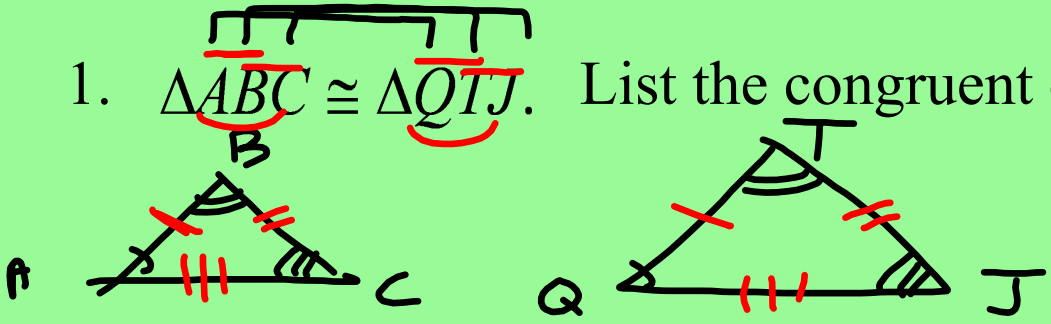
Theorem 4.1
If two angles of one triangle are congruent to two angles of another triangle, then the third angles are congruent.



$\angle C \cong \angle F$

*order in writing congruent triangles is important

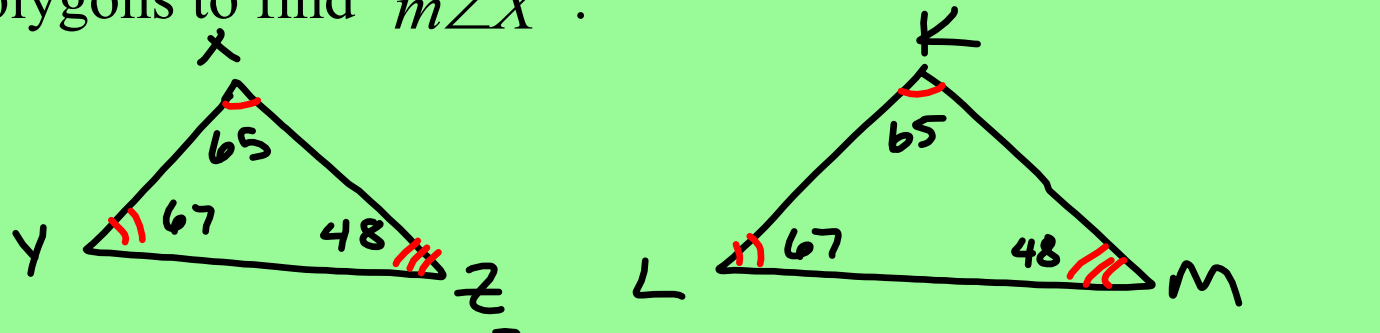
1. $\Delta ABC \cong \Delta QTJ$. List the congruent corresponding parts.



Corresponding ∠'s	Corresponding Sides
$\angle A \cong \angle Q$	$\overline{AB} \cong \overline{QT}$
$\angle B \cong \angle T$	$\overline{BC} \cong \overline{TJ}$
$\angle C \cong \angle J$	$\overline{AC} \cong \overline{QJ}$

2. $\Delta XYZ \cong \Delta KLM$, $m\angle Y = 67$ and $m\angle M = 48$. Find $m\angle X$.

Use the Triangle Angle-Sum Theorem and the definition of congruent polygons to find $m\angle X$.



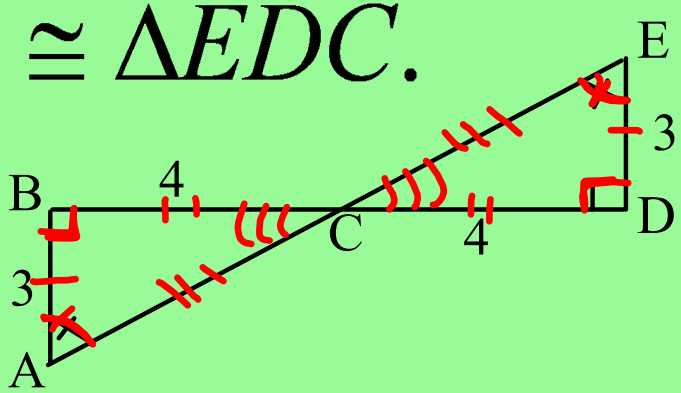
$$\begin{array}{r} 67 \\ +\,48 \\ \hline 115 \end{array} \qquad \begin{array}{r} 180 \\ -115 \\ \hline 65 \end{array}$$

$m\angle X = 65°$

3. Can you conclude that $\Delta ABC \cong \Delta EDC$.

C is the midpoint of $\overline{AE}$

$\overline{AC} \cong \overline{CE}$ defn of midpt

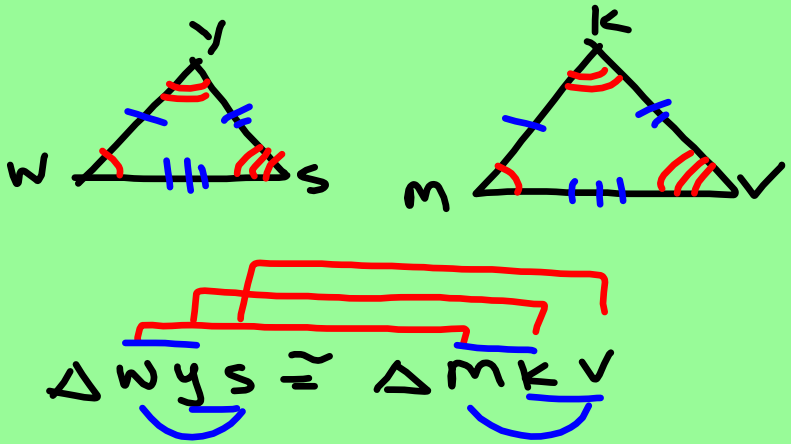


$\angle B \cong \angle D$ all Right $\angle$'s are $\cong$

$\angle BCA \cong \angle DCE$ Vert. $\angle$'s $\cong$

Yes, $\Delta ABC \cong \Delta EDC$ because corresp. $\angle$'s are $\cong$ and corrs. sides are $\cong$

4. $\Delta WYS \cong \Delta MKV$. List the congruent corresponding parts.



Corrs. ∠'s

$\angle W \cong \angle M$

$\angle Y \cong \angle K$

$\angle S \cong \angle V$

Corrs. sides

$\overline{WY} \cong \overline{MK}$

$\overline{YS} \cong \overline{KV}$

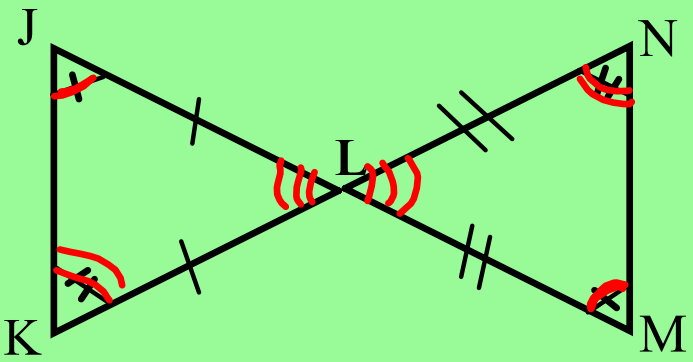
$\overline{WS} \cong \overline{MV}$

5. It is given that $\Delta WYS \cong \Delta MKV$. If $m\angle Y = 35$, what is $m\angle K$?

$\angle Y \cong \angle K$

$m\angle K = 35$

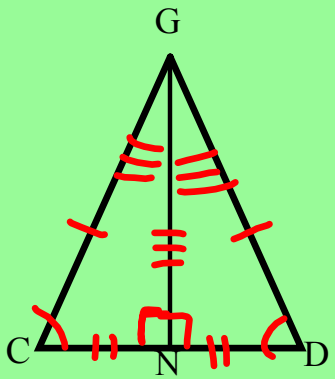
6. Can you conclude that $\Delta JKL \cong \Delta MNL$? Justify your answer.



No, cannot prove Δ's $\cong$ because you cannot prove corrs. sides $\cong$

7. Given: $\overline{CG} \cong \overline{DG}, \overline{CN} \cong \overline{DN}, \angle C \cong \angle D, \overline{GN} \perp \overline{CD}$

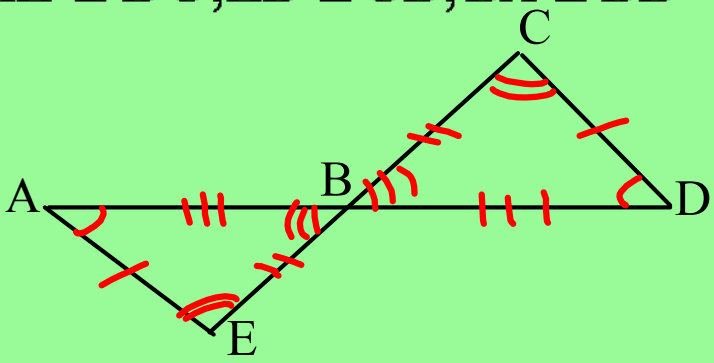
Prove: $\Delta CNG \cong \Delta DNG$



Statements	Reasons
① $\overline{CG} \cong \overline{DG}$, $\overline{CN} \cong \overline{DN}$, $\angle C \cong \angle D$; $\overline{GN} \perp \overline{CD}$	① Given
② $m\angle GNC = 90$, $m\angle GND = 90$	② defn of $\perp$ lines
③ $m\angle GNC = m\angle GND$	③ subst prop =
④ $\angle CGN \cong \angle DGN$	④ If 2 $\angle$s of 1 $\Delta \cong$ to 2 $\angle$s of another Δ then 3rd $\angle$s $\cong$
⑤ $\overline{GN} \cong \overline{GN}$	⑤ Reflexive prop $\cong$
⑥ $\Delta CNG \cong \Delta DNG$	⑥ Defn. of $\cong$ Δs

8. Given: $\angle A \cong \angle D, \angle E \cong \angle C, \overline{AE} \cong \overline{DC}, \overline{EB} \cong \overline{CB}, \overline{BA} \cong \overline{BD}$

Prove: $\Delta AEB \cong \Delta DCB$



Statements	Reasons
① $\angle A \cong \angle D$, $\angle E \cong \angle C$, $\overline{AE} \cong \overline{DC}$, $\overline{EB} \cong \overline{CB}$; $\overline{BA} \cong \overline{BD}$	① Given
② $\angle ABE \cong \angle DBC$	② Vert $\angle$s $\cong$
③ $\Delta AEB \cong \Delta DCB$	③ def of $\cong$ Δs

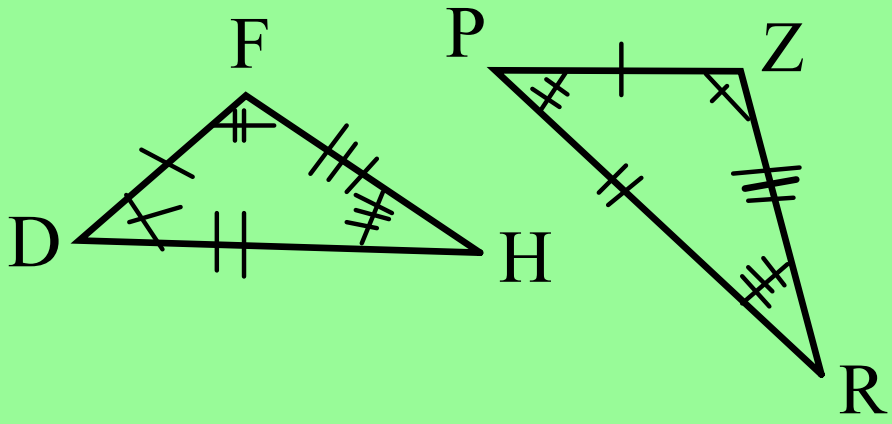
In exercises 9 and 10, quadrilateral WASH $\cong$ quadrilateral NOTE.

9. List the congruent corresponding parts.

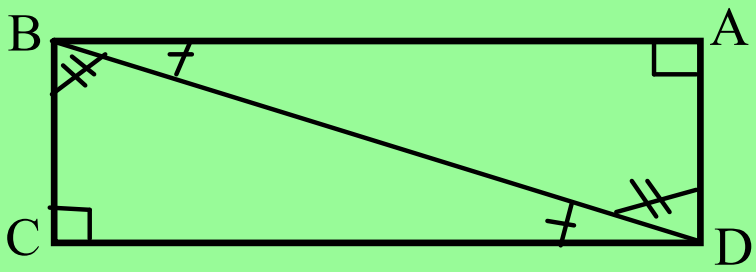
Corrs. ∠	Corrs sides
∠W ≅ ∠N	$\overline{WA} \cong \overline{NO}$
∠A ≅ ∠O	$\overline{AS} \cong \overline{OT}$
∠S ≅ ∠T	$\overline{SH} \cong \overline{TE}$
∠H ≅ ∠E	$\overline{WH} \cong \overline{NE}$

10. $m\angle O = m\angle T = 90$ and $m\angle H = 36$. Find $m\angle N$.

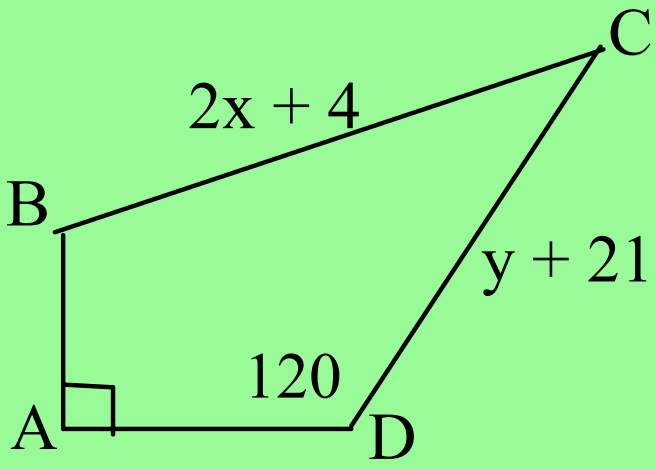
11. Write a statement of triangle congruence.

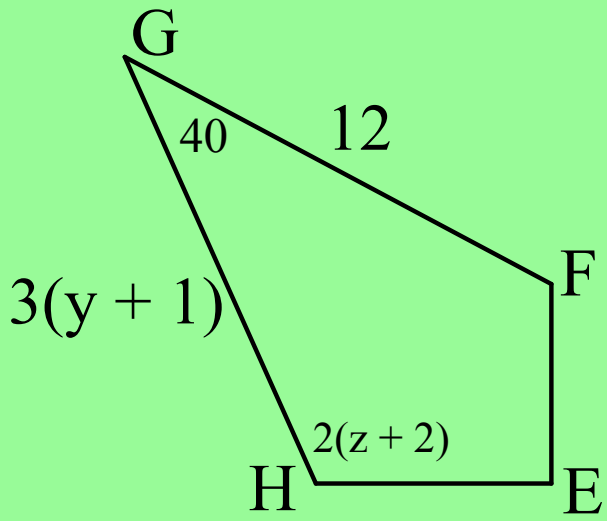


12. Write a statement of triangle congruence.



13. ABCD $\cong$ EFGH.





A) Find x.

B) Find y.

C) Find z.

D) $m\angle E =$

E) $m\angle C =$

F) $m\angle B =$