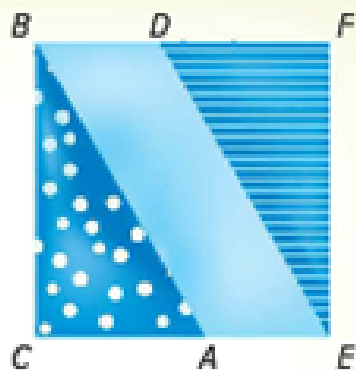




Real-World Link

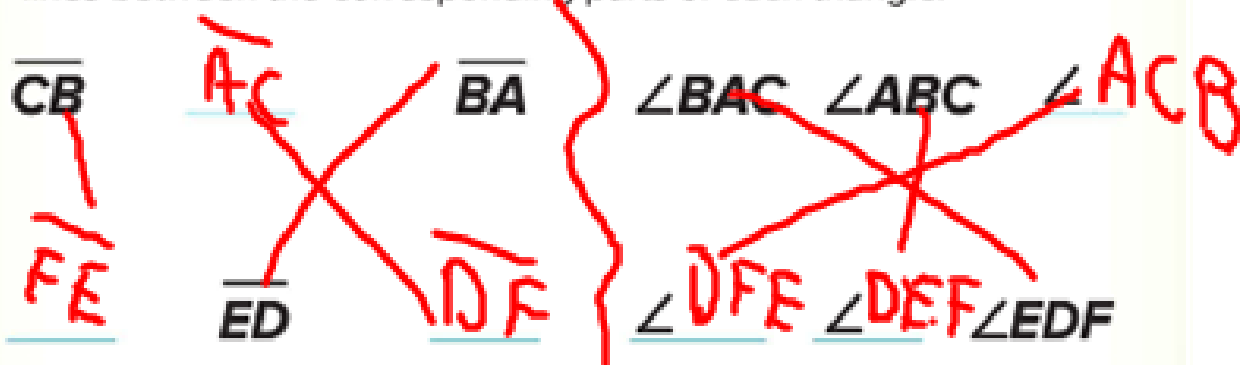
Crafts Lauren is creating a quilt using the geometric pattern shown. She wants to make sure that all of the triangles in the pattern are the same shape and size.



1. What would Lauren need to do to show the two triangles are congruent?

180° clockwise rotation
and a translation

2. Complete the lists of the parts of $\triangle ABC$ and $\triangle DEF$. Then draw lines between the corresponding parts of each triangle.

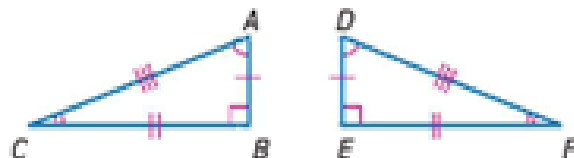


3. Suppose you cut out the two triangles and laid one on top of the other so the parts of the same measures were matched up. What is true about the triangles?

Corresponding Parts of Congruent Figures

Words If two figures are congruent, their corresponding sides are congruent and their corresponding angles are congruent.

Model



Symbols

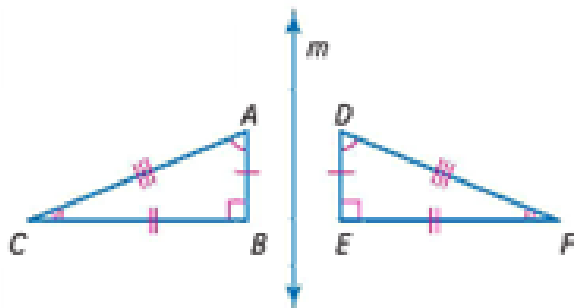
$$\triangle ABC \cong \triangle DEF$$

Congruent Angles: $\angle A \cong \angle D$; $\angle B \cong \angle E$; $\angle C \cong \angle F$

Congruent Sides: $\overline{AB} \cong \overline{DE}$; $\overline{BC} \cong \overline{EF}$; $\overline{CA} \cong \overline{FD}$

\cong
 \rightarrow Congruent

In the figure below, the two triangles are congruent because $\triangle DEF$ is the image of $\triangle ABC$ reflected over line m . The notation $\triangle ABC \cong \triangle DEF$ is read *triangle ABC is congruent to triangle DEF*.



The parts of congruent figures that *match* or correspond, are called **corresponding parts**.

Example



1. Write congruence statements comparing the corresponding parts in the congruent triangles shown.

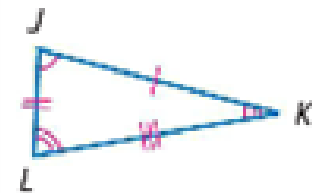
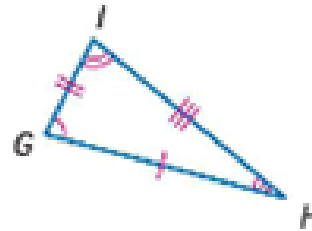
Use the matching arcs and tick marks to identify the corresponding parts.

Corresponding angles:

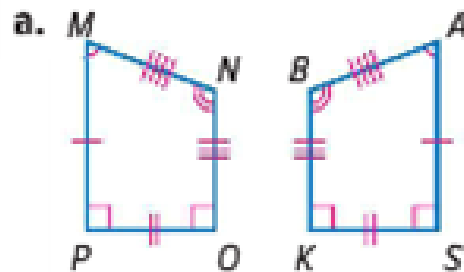
$$\angle J \cong \angle G, \angle L \cong \angle I, \angle K \cong \angle H$$

Corresponding sides:

$$\overline{JK} \cong \overline{GH}, \overline{KL} \cong \overline{HI}, \overline{LJ} \cong \overline{IG}$$



Got it? Do this problem to find out.



- Sides
- 1) $\overline{MP} \cong \overline{AS}$
 - 2) $\overline{PO} \cong \overline{KS}$
 - 3) $\overline{ON} \cong \overline{BK}$
 - 4) $\overline{MN} \cong \overline{BA}$

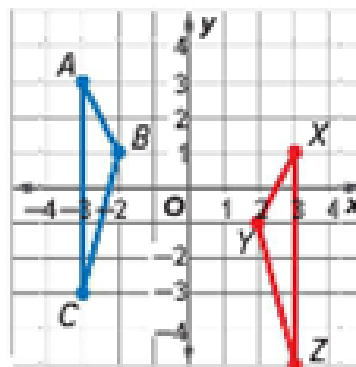
- Angles
- 1) $\angle N \cong \angle B$
 - 2) $\angle M \cong \angle A$
 - 3) $\angle O \cong \angle K$
 - 4) $\angle P \cong \angle S$

Example

Tutor



2. Triangle ABC is congruent to $\triangle XYZ$. Write congruence statements comparing the corresponding parts. Then determine which transformations map $\triangle ABC$ onto $\triangle XYZ$.



Step 1

Analyze the figures to determine which angles and sides of the figures correspond.

Corresponding angles: $\angle A \cong \angle X$, $\angle B \cong \angle Y$, $\angle C \cong \angle Z$
Corresponding sides: $\overline{AB} \cong \overline{XY}$, $\overline{BC} \cong \overline{YZ}$, $\overline{CA} \cong \overline{ZX}$

Step 2

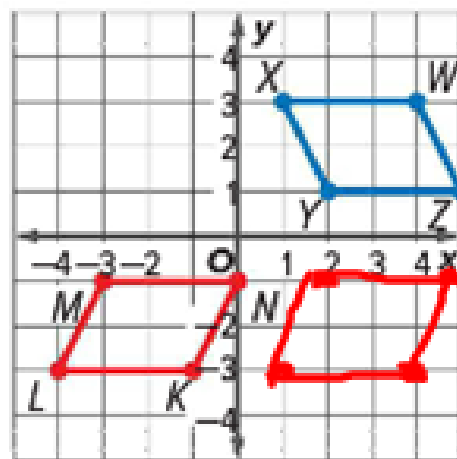
Determine any changes in the orientation of the triangles. The orientation is reversed so at least one of the transformations is a reflection. If you reflect $\triangle ABC$ over the y -axis and then translate it down 2 units, it coincides with $\triangle XYZ$.

The transformations that map $\triangle ABC$ onto $\triangle XYZ$ consist of a reflection over the y -axis followed by a translation of 2 units down.

Got it? Do this problem to find out.

WXYZ
KLMN

- b. Parallelogram $WXYZ$ is congruent to parallelogram $KLMN$. Write congruence statements comparing the corresponding parts. Then determine which transformation(s) map parallelogram $WXYZ$ onto parallelogram $KLMN$.



Sides

- 1) $\overline{WX} \cong \overline{KL}$
- 2) $\overline{XY} \cong \overline{LM}$
- 3) $\overline{YZ} \cong \overline{MN}$
- 4) $\overline{WZ} \cong \overline{KN}$

Angles

- 1) $\angle W \cong \angle K$
- 2) $\angle X \cong \angle L$
- 3) $\angle Y \cong \angle M$
- 4) $\angle Z \cong \angle N$

Reflection over the
x-axis and a translation
5 units left.

Find Missing Measures

You can use properties of congruent figures to find the missing measures of angles and sides in a figure.

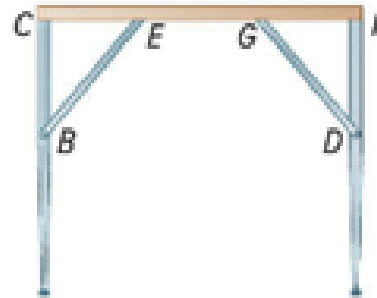


Example



- 3.** Miley is using a brace to support a tabletop. In the figure, $\triangle BCE \cong \triangle DFG$. If $m\angle CEB = 50^\circ$, what is the measure of $\angle FGD$?

Since $\angle CEB$ and $\angle FGD$ are corresponding parts in congruent figures, they are congruent. So, $\angle FGD$ measures 50° .



Got it? Do this problem to find out.

- c. In the figure shown above, the length of \overline{CE} is 2 feet. What is the length of \overline{FG} ?

$$\overline{CE} \cong \overline{FG}$$

2 feet