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Lesson 2.06 Congruence & Correspondence
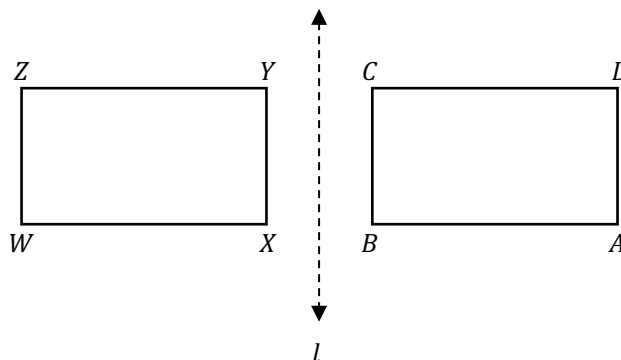
Students will be able to:

- **Content Objective:** Use geometric descriptions of rigid motions to transform figures and predict the effect of a given rigid motion on a given figure.

- **Language Objective**: Describe a single rigid motion that would map one figure onto another.

Warm Up

Quadrilateral $WXYZ$ has been reflected over line l to get its image, quadrilateral $ABCD$.
List the correspondences created.

Angles	Sides
$\angle W \rightarrow$	$\overline{WZ} \rightarrow$
$\angle X \rightarrow$	$\overline{WX} \rightarrow$
$\angle Y \rightarrow$	$\overline{XY} \rightarrow$
$\angle Z \rightarrow$	$\overline{YZ} \rightarrow$

Let's review some important concepts that we learned in 8th grade.

Vocabulary Review

Congruent Figures

1. A two-dimensional figure is _____ to another if the corresponding _____ and _____ are congruent.

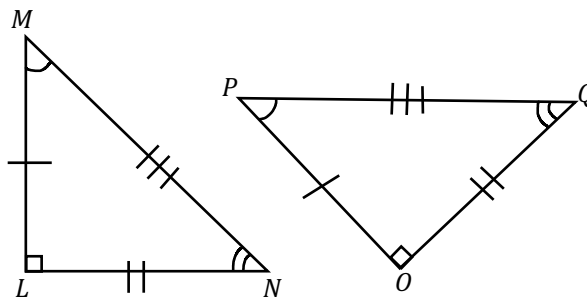2. Two two-dimensional figures are congruent if one is the image of the other after a sequence of _____ _____.

Graphic Organizer

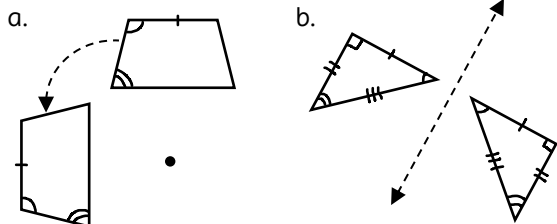## Corresponding Parts of Congruent Figures are Congruent

$$\Delta LMN \cong \Delta OPQ$$

We use the "≅ " symbol for congruence because "=" means equal and "~" means same shape.

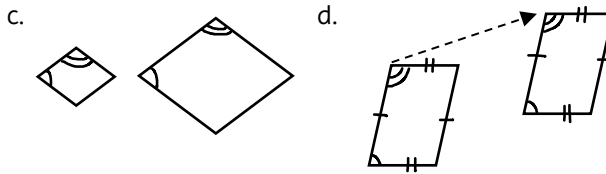# DigitLit
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Skill 1: Identifying Congruent Figures

Identify the transformation being shown, then identify whether the figures are congruent.

a.

b.

## Exercise 1: Identifying Congruent Figures

Identify the transformation being shown, then identify whether the figures are congruent.

c.

d.

Skill 2: Corresponding Parts of Congruent Figures

In the diagram below, ΔFGH is mapped onto ΔJGL by a rotation about point G.

a. List the correspondences created by filling in the table. Mark all congruent angles and segments on the diagram.

| Angles	Sides
$\angle FGH \rightarrow$	$\overline{FG} \rightarrow$
$\angle GHF \rightarrow$	$\overline{GH} \rightarrow$
$\angle HFG \rightarrow$	$\overline{HF} \rightarrow$
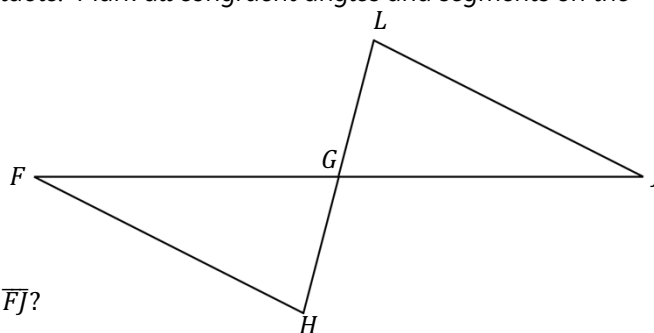
b. What does point G represent in terms of $\overline{LH}$ and $\overline{FJ}$?

c. Would a reflection map ΔFGH onto ΔJGL? Explain why or why not.

Exercise 2: Corresponding parts of Congruent Figures

ΔABC has been reflected over $\overline{BC}$ to get ΔDBC as shown below.

a. Use your knowledge of reflections to list the correspondences created. Mark all congruent angles and segments on the diagram.

| Angles	Sides
$\angle CAB \rightarrow$	$\overline{AB} \rightarrow$
$\angle ABC \rightarrow$	$\overline{AC} \rightarrow$
$\angle ACB \rightarrow$	$\overline{BC} \rightarrow$
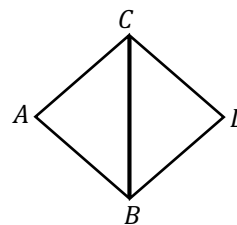
b. Which segment gets mapped to itself? Write a congruence statement. This is called the **reflexive property**.

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Skill 3: Sequence of Transformations

Complete the following based on the figures graphed below.

a. Describe a sequence of transformations that would map ΔABC onto ΔDEF. There is more than one right answer.

b. Explain how these transformations prove that $\Delta ABC \cong \Delta DEF$.
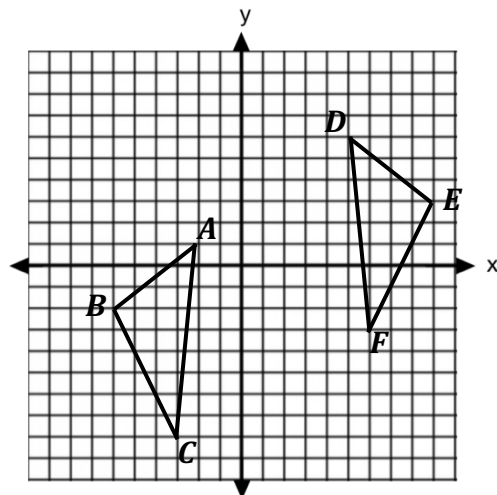
Write It Out

Describe a single rigid motion that maps ΔLMN onto ΔIJN. Explain how this proves the triangles are congruent.
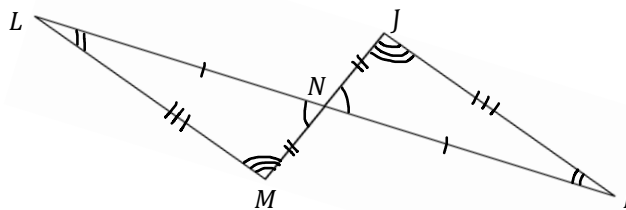
Check Point

Suppose ΔERU was rotated to become ΔUTE. Around what point would it have been rotated? Label this point P on the diagram and express this transformation using function notation.
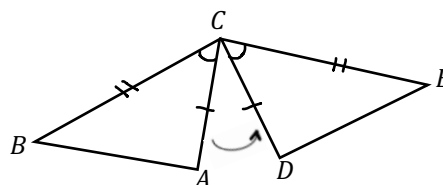
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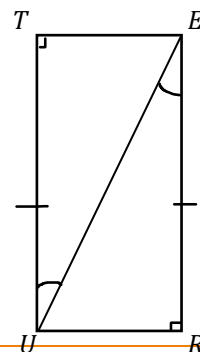
2.06- Problem Set

Name: _____

1. The first transformation shown below was a rotation of ΔABC counterclockwise about point A so that $\overline{AC}$ is mapped to $\overline{DC}$.

    a. State the 2ⁿᵈ rigid transformation that would map ΔABC onto ΔDEC.
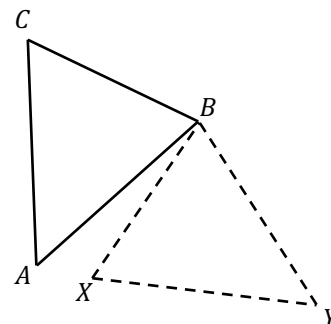
    b. Write the correct function notation that described the transformation from part a.

2. The figure below represents a rotation of ΔABC 78° counterclockwise around vertex B to get ΔYBX.

    a. List all corresponding angles and sides.

Angles	Sides
→	→
→	→
→	→

    b. Are ΔACB and ΔYXB congruent? Explain using rigid motion.

3. Is it possible for a triangle to be congruent to a quadrilateral? Explain you reasoning.

4. The Millau Viaduct is a bridge that spans the valley of the river Tarn near Millau in Southern France. Its unique structure and design were created using geometric transformations. What transformation would map one of the outlined triangles onto the other in relation to line P? Why is it important for there to be congruency when designing architecture?