

Objective

Identify congruent figures.

Common Core State Standards

- **8.G.2** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

Geometry

Congruent Figures and Transformations

Congruent figures are exactly the same size and shape. Manipulatives help students visualize this. They can match figures and then move the figures to different positions and orientations, noting that the model does not change. They also can reverse the process to determine if figures in different positions are congruent.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- **Ask:** How can you tell if two figures are congruent?
- **Ask:** Are figures still congruent when they are moved in more than one way? Have students show two transformations, such as a reflection and a rotation, to verify their responses.
- Have students identify congruent figures in the classroom and recognize how different positions could be the result of translations, reflections, rotations, or combinations of transformations.

Solve It

Reread the problem with students. Have them draw a design for Calvin's window using four congruent rectangles. Then have them explain how to tell that the figures are congruent.

More Ideas

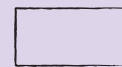
For other ways to teach about congruency and transformations—

- Use Pattern Blocks to show congruency. Have students use different shapes to make congruent hexagons. Have them move the shapes to show that position and orientation do not affect congruency.
- Adapt the problem to use a different shape, such as a triangle. Have students use AngLegs® to solve the problem.

Formative Assessment

Have students try the following problem.

Which shape is congruent to this rectangle?



Try It! 25 minutes | Groups of 4

Here is a problem about congruent figures and transformations.

Calvin makes stained-glass windows. He lays out 4 rectangles to be used in one of his designs. The rectangles are arranged in two rows and two columns. How can he move the rectangles to determine if they are congruent?

Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials. **Say:** *Remember there are three types of transformations: translations, or slides; reflections, or flips; and rotations, or turns. Draw the arrangement of the rectangles on the board.*

Materials

- AngLegs® (1 set per group)



1. Have students use AngLegs to make a rectangle. **Say:** *Make three more rectangles that are the same size and shape as the one you just made. Have students arrange the four rectangles as shown on the board.*



2. Have students slide the top right-hand model to the left on top of the other rectangle. **Say:** *Compare the two rectangles. Are they the same size and shape?*



3. Have students reflect the bottom left rectangle onto the top rectangle. Then have them rotate the last rectangle onto the top of the stack of rectangles. Guide students to see that the size and shape of each rectangle remains the same when the position and/or orientation is changed. Explain that the figures are *congruent* because they have exactly the same size and shape.

! Look Out!

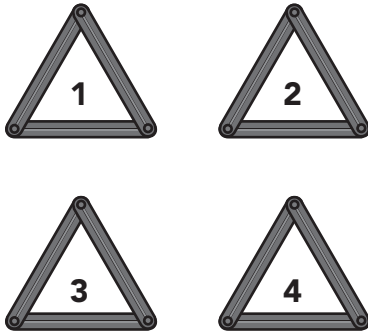
Some students may have difficulty maintaining the shape of the AngLegs when moving the models. You might need to have them brace the figure by connecting one or more diagonals. Remind them that the brace does not change the characteristics of the larger shape. Students who think that position and orientation affect congruency may need more hands-on practice with a variety of shapes.



Use AngLegs to model each set of shapes. Complete each statement with the phrase "is" or "is not."

(Check students' work.)

1.

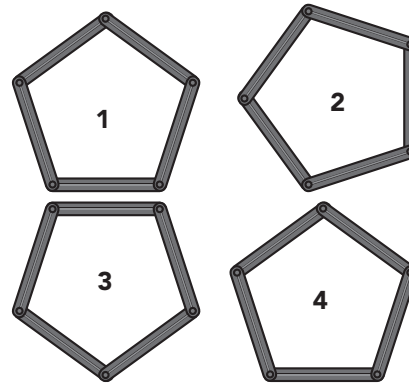


Triangle 1 is congruent to Triangle 2.

Triangle 2 is congruent to Triangle 3.

Triangle 3 is congruent to Triangle 4.

2.



Pentagon 1 is congruent to Pentagon 4.

Pentagon 3 is congruent to Pentagon 2.

Pentagon 4 is congruent to Pentagon 3.

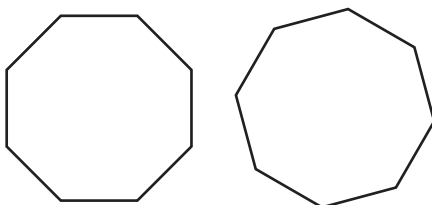
Using AngLegs, build three figures that are congruent to each other and one model that is not congruent to the others. Sketch the models. Write three statements about the figures' congruency.

3.

Students' models will vary.

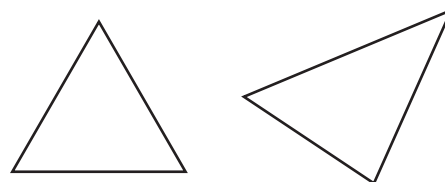
Tell if each pair of figures are congruent.

4.



congruent

5.



not congruent

Answer Key

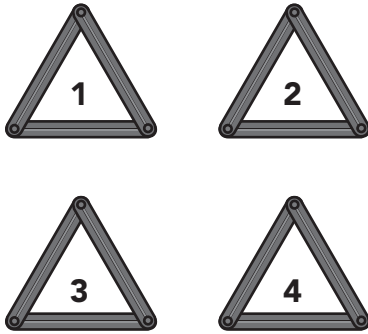
Challenge! Why can you use the transformation of a slide to determine if your figures are congruent? Explain the process. Draw a picture to help.

Challenge: (Sample) A slide gets the figure oriented the same direction. You can slide the figure on top of the other to see if they are an identical match.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Use AngLegs to model each set of shapes. Complete each statement with the phrase "is" or "is not."

1.

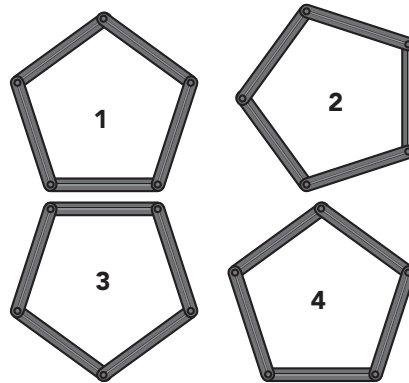


Triangle 1 _____ congruent to Triangle 2.

Triangle 2 _____ congruent to Triangle 3.

Triangle 3 _____ congruent to Triangle 4.

2.



Pentagon 1 _____ congruent to Pentagon 4.

Pentagon 3 _____ congruent to Pentagon 2.

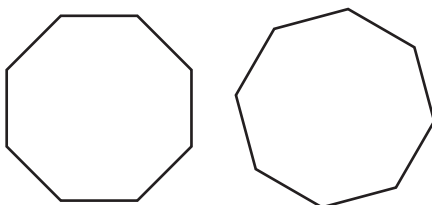
Pentagon 4 _____ congruent to Pentagon 3.

Using AngLegs, build three figures that are congruent to each other and one model that is not congruent to the others. Sketch the models. Write three statements about the figures' congruency.

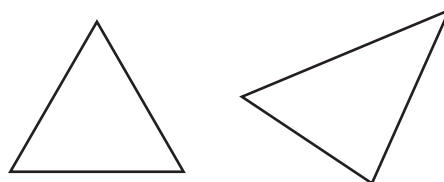
3.

Tell if each pair of figures are congruent.

4.



5.



Name _____

Challenge! Why can you use the transformation of a slide to determine if your figures are congruent? Explain the process. Draw a picture to help.

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