No Bending or Stretching

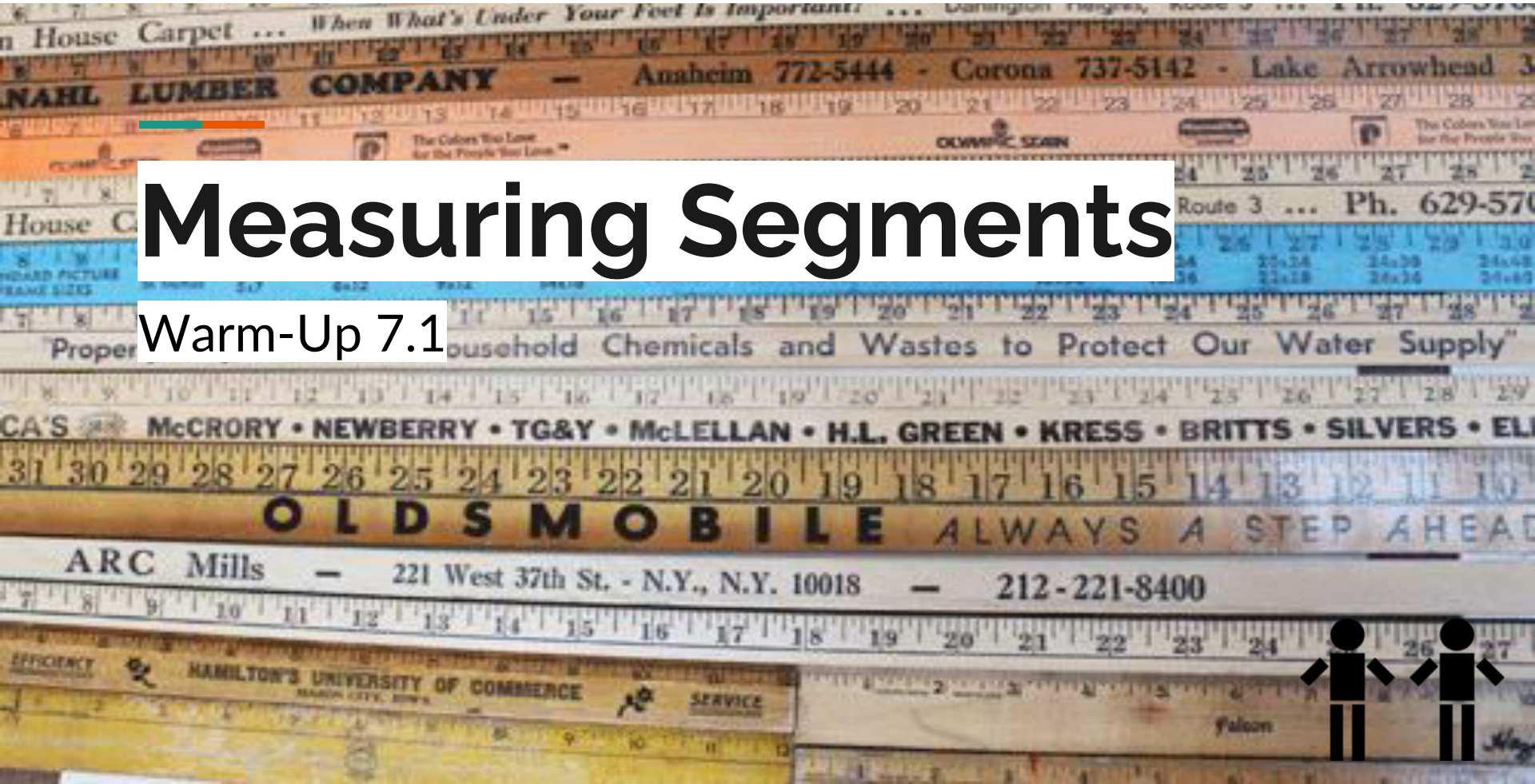
Lesson 7

CCSS Standards: Building on	• 4.MD.A
CCSS Standards: Addressing	• 8.G.A.1.a • 8.G.A.1.b

Let’s compare measurements before and after translations, rotations, and reflections!

Measuring Segments

Warm-Up 7.1

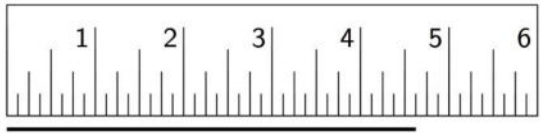


Begin with Quiet Work Time. (2 min)

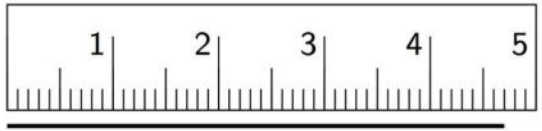
Then we'll share as a class!

For each question, the unit is represented by the large tick marks with whole numbers.

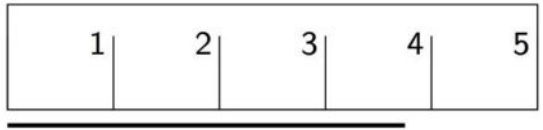
1. Find the length of this segment to the nearest $\frac{1}{8}$ of a unit.



2. Find the length of this segment to the nearest 0.1 of a unit.



3. Estimate the length of this segment to the nearest $\frac{1}{8}$ of a unit.



4. Estimate the length of the segment in the prior question to the nearest 0.1 of a unit.

Sides and Angles

Activity 7.2

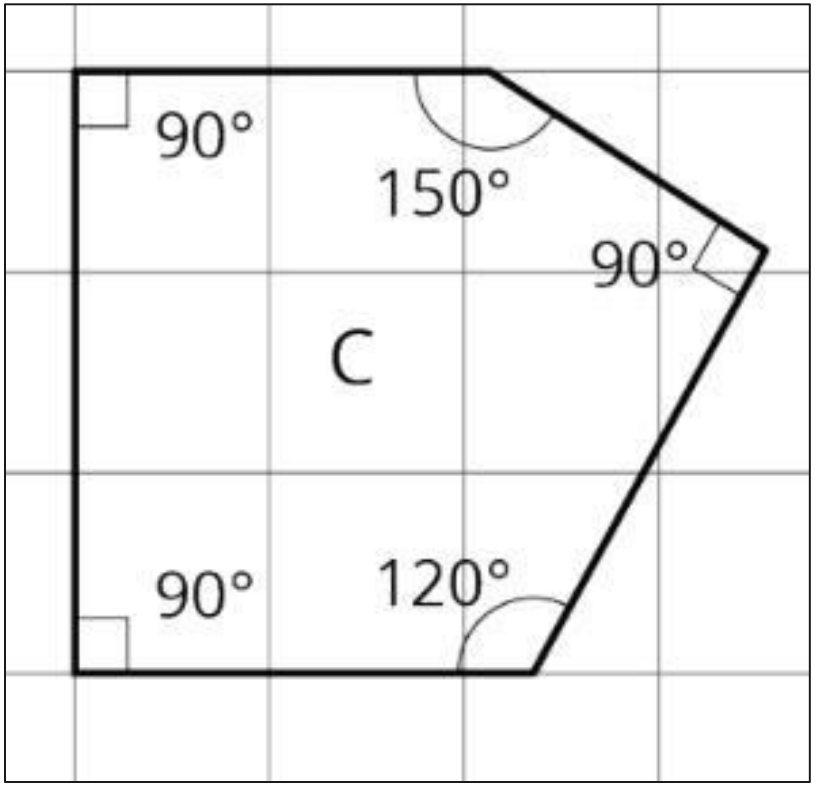
- Discussion Supports

In this activity you will be performing transformations.

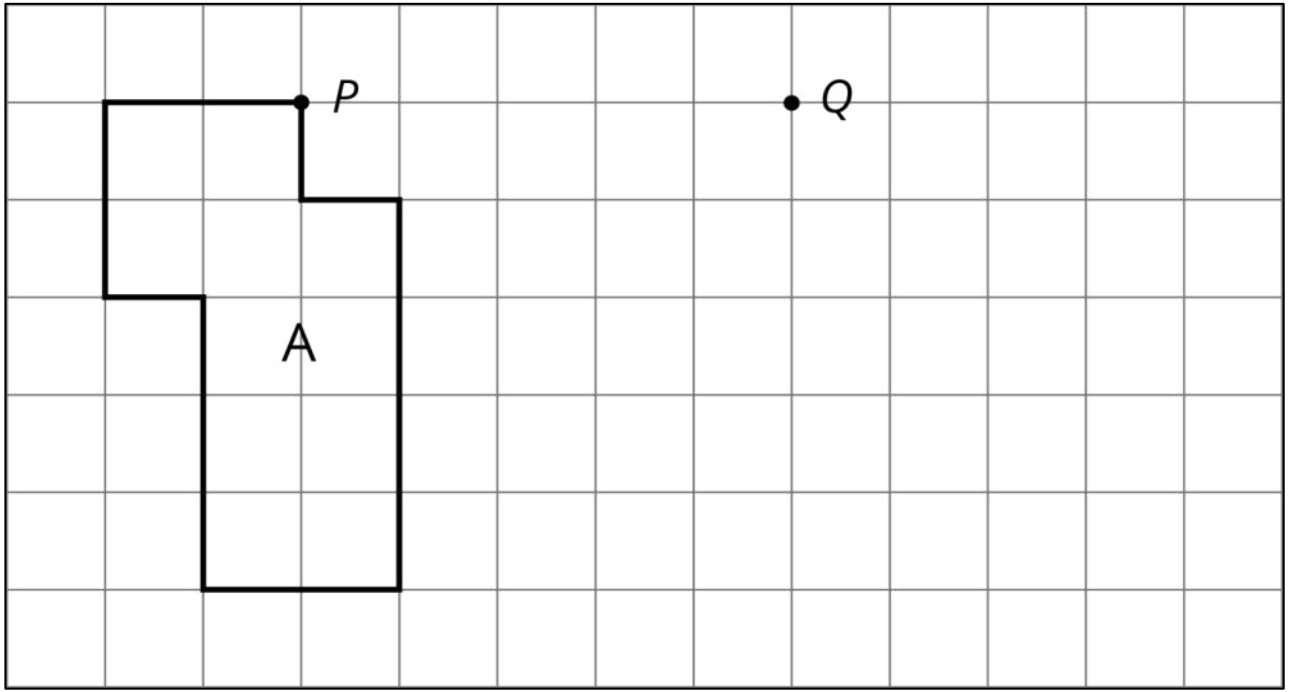
You can use tracing paper to help you draw images of the figures or to check your work.

When you are asked to measure side lengths, you will need to make a ruler on either tracing paper or on a blank edge of an index card.

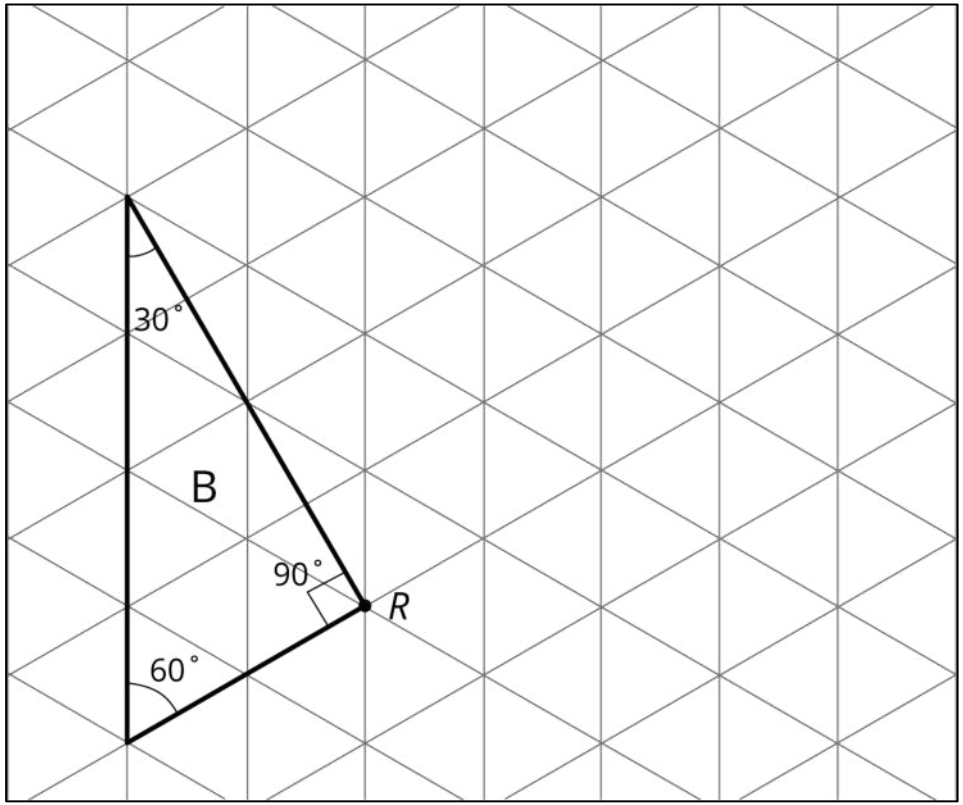
Begin with Quiet Think Time. (3 min)



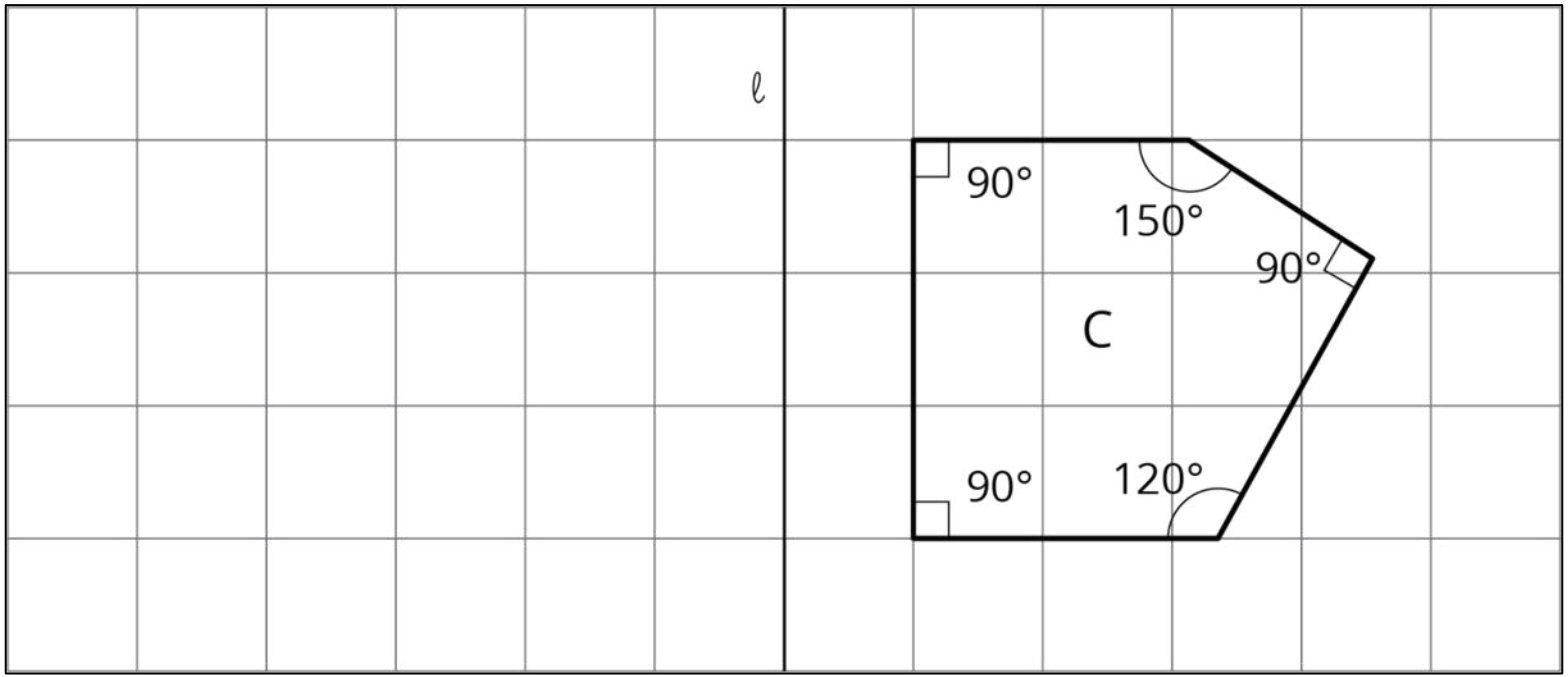
1. Translate Polygon *A* so point *P* goes to point *Q*. In the image, write the length of each side, in grid units, next to the side.



2. Rotate Triangle *B* 90 degrees clockwise using *R* as the center of rotation. In the image, write the measure of each angle in its interior.

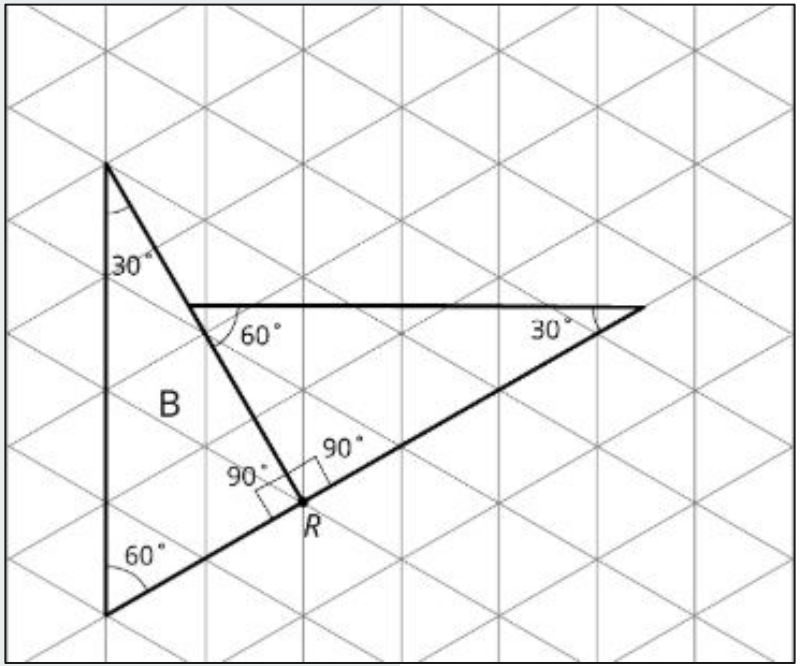


3. Reflect Pentagon *C* across line *l*.
   a. In the image, write the length of each side, in grid units, next to the side.
   b. In the image, write the measure of each angle in the interior.



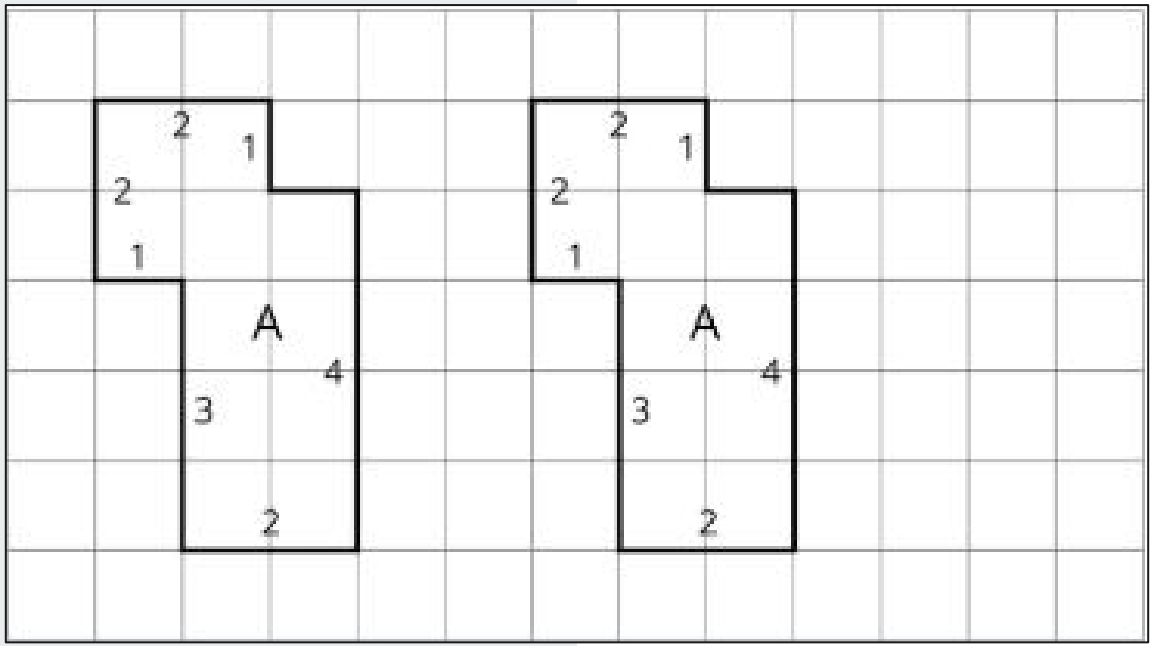
corresponding sides

a pair of matching sides that are in the same spot in two different shapes



corresponding angles

a pair of matching angles that are in the same spot in two different shapes



Key Points

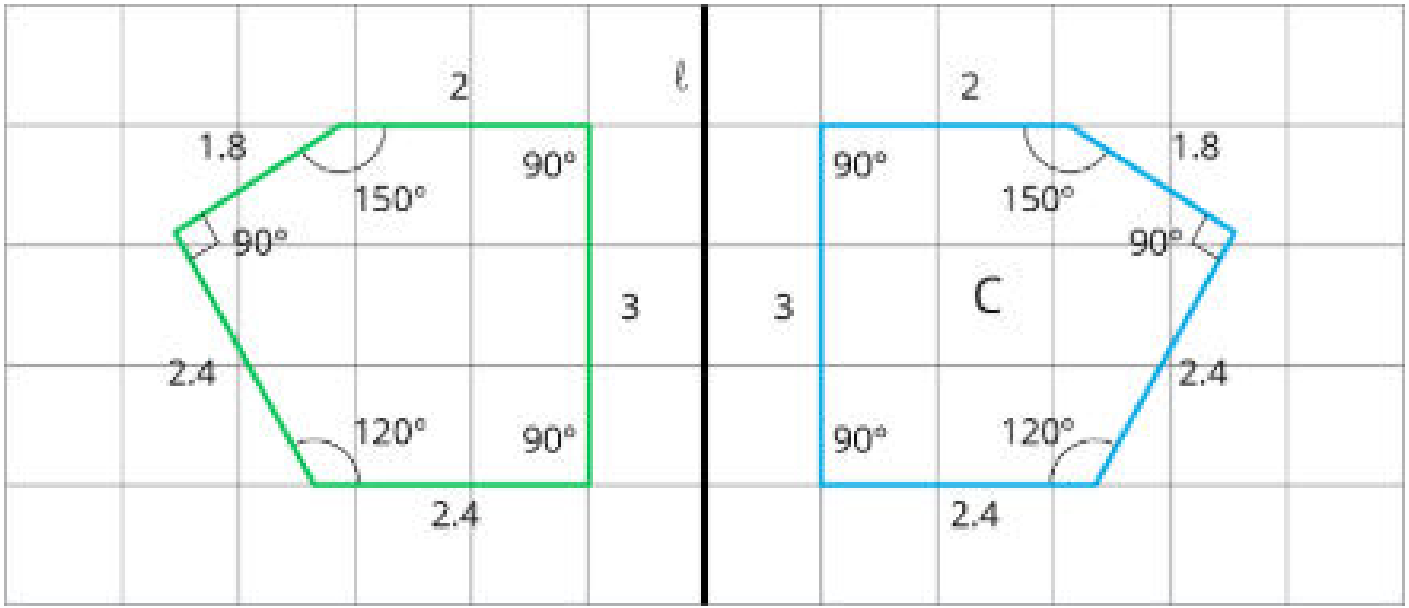
- For each transformation in this activity, the lengths of the sides of the original figure equal the lengths of the **corresponding sides** in the image.
- The measures of the angles in the original figure equal the measures of the **corresponding angles** in the image.

Key Points

We will call these transformations **rigid transformations**.

They behave as if we are moving the shapes around without stretching, bending, or breaking them.

Is this a rigid transformation? How do you know?



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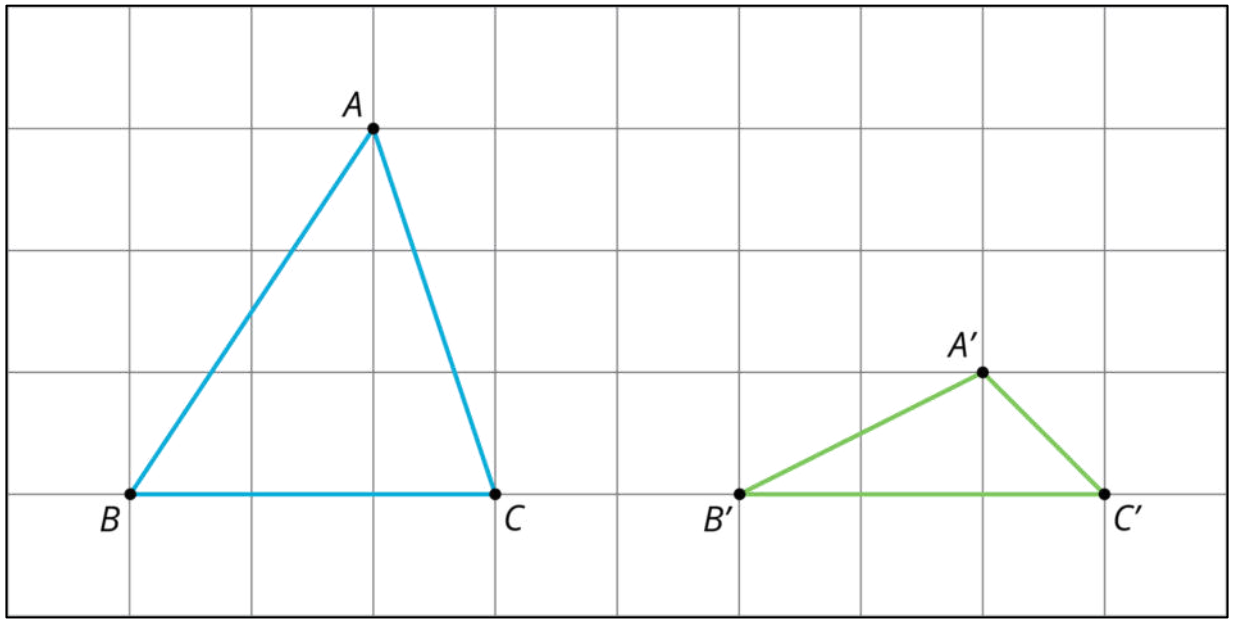
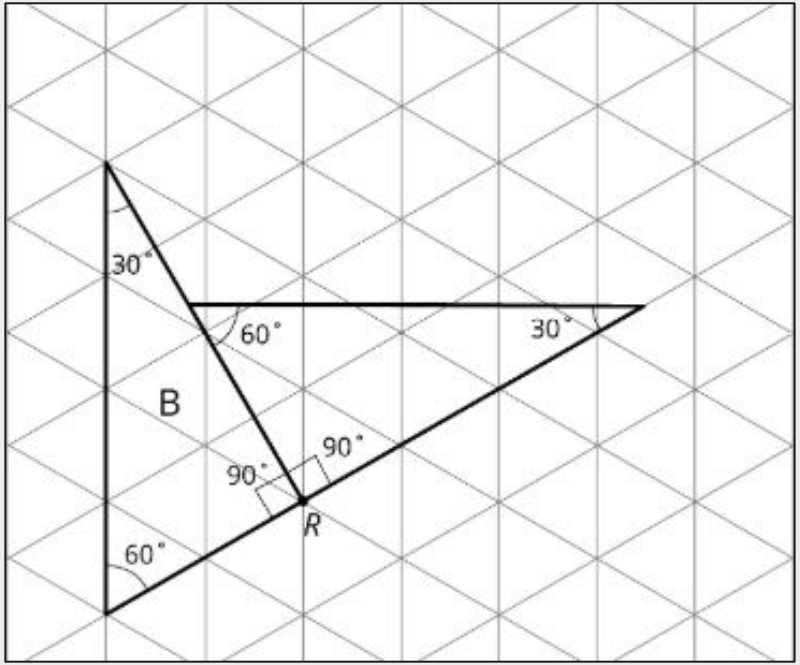


rigid transformation



transformation where all pairs of corresponding distances and angle measures in the figure and its image are equal

★ Translations, reflections, and rotations are all **rigid transformations**.

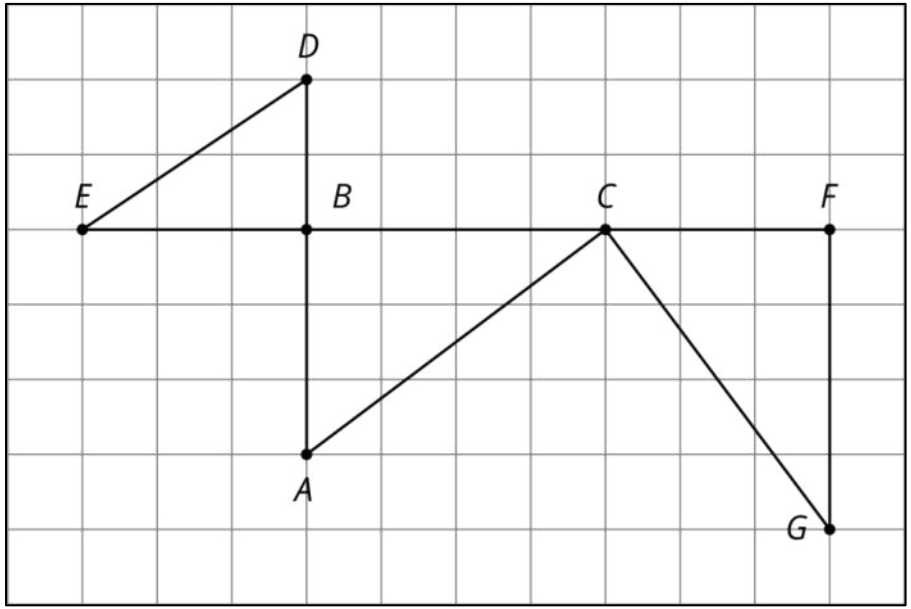
Which One?

Activity 7.3

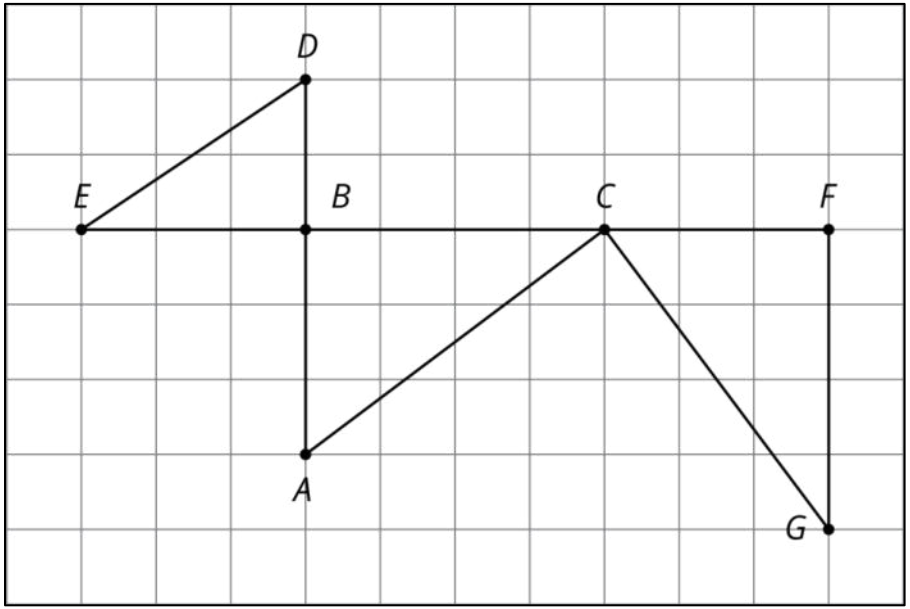
- 5 Practices
- MLR1: Stronger and Clearer Each Time

Here is a grid showing triangle ABC and two other triangles.

- **Begin with Quiet Work Time.** (4 min)
- **Share your thinking as a team!** (2 min)



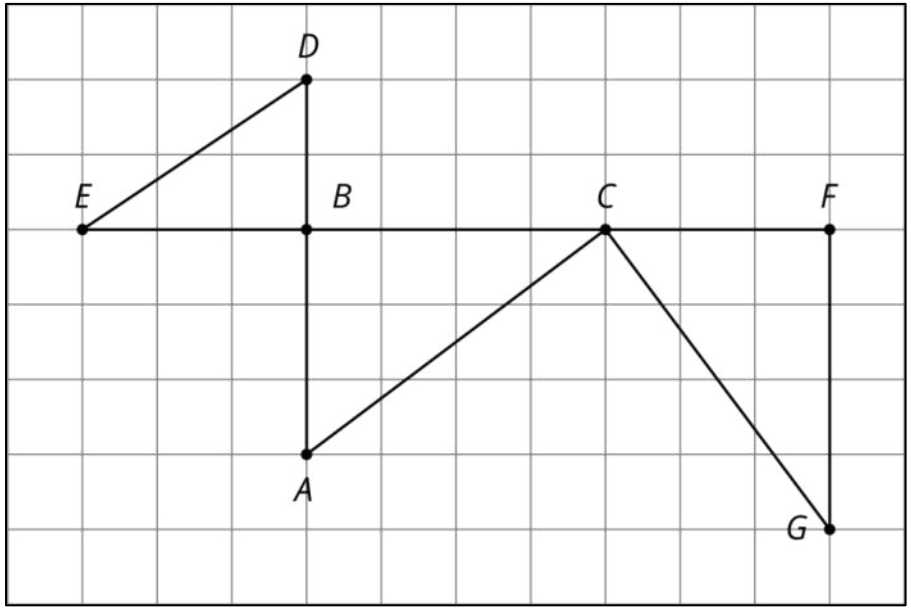
Why is it that triangle *ABC* cannot be taken to triangle *DBE*?



Can triangle *ABC* be taken to triangle *CFG* with only a translation?

What about with only a reflection?

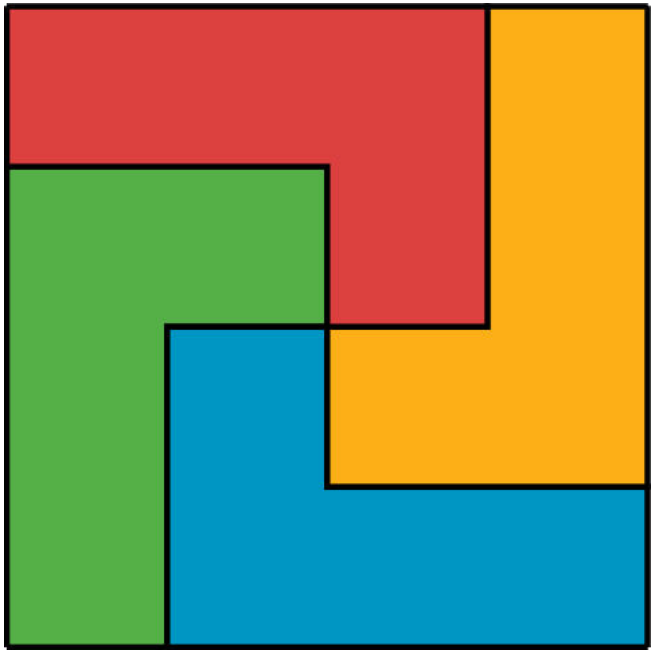
What about a single rotation?



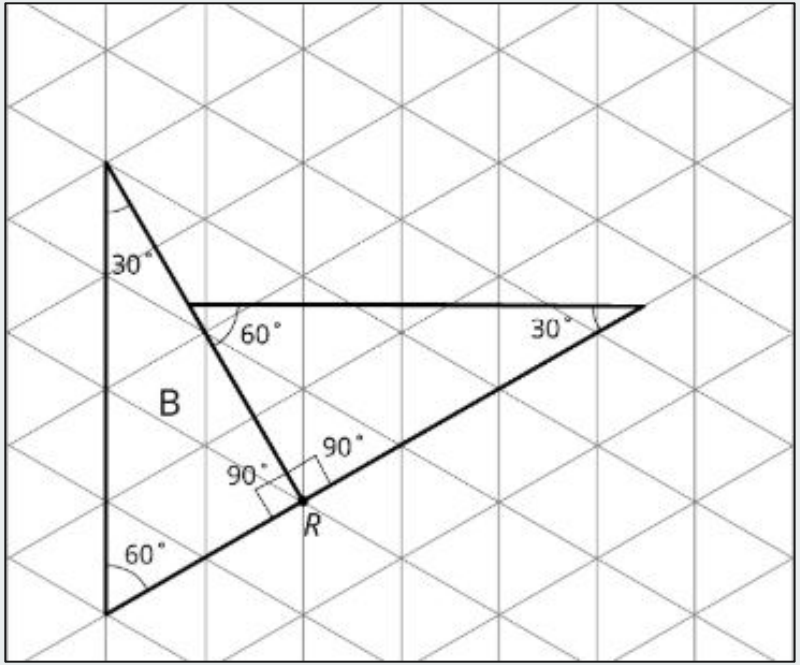
“Are you ready for more?”

A square is made up of an L-shaped region and three transformations of the region.

If the perimeter of the square is 40 units, what is the perimeter of each L-shaped region?



rigid transformation



transformation where all pairs of corresponding lengths and angle measures in the figure and its image are equal

★ Translations, reflections, and rotations are all **rigid transformations**.

Think of ways you could look at two shapes and tell that one is not the image of the other under a rigid transformation.

If two shapes have different side lengths or angle measures then there is no rigid transformation taking one shape to the other.

What are some good ways to tell whether one shape can be taken to another with a sequence of rigid transformations?

- Measure all of the side lengths and angle measures and ensure that corresponding measurements are equal.
- Use tracing paper to see if one shape matches up exactly with the other.

What are the three basic types of rigid transformations?

- rotations
- translations
- refections

Today's Goal

- ❏ I can describe the effects of a **rigid transformation** on the lengths and angles in a polygon.

Translated Trapezoid

Cool Down 7.4