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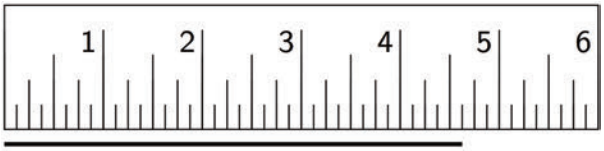
Unit 1, Lesson 7: No Bending or Stretching

Let's compare measurements before and after translations, rotations, and reflections.

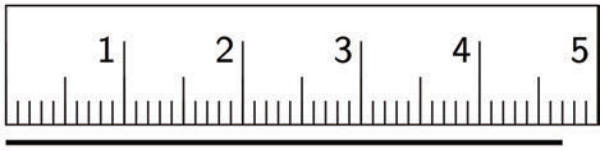
7.1: Measuring Segments

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

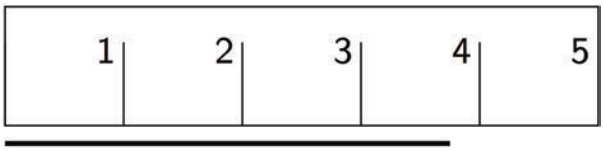
1. Find the length of this segment to the nearest $\frac{1}{8}$ of a unit.



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.

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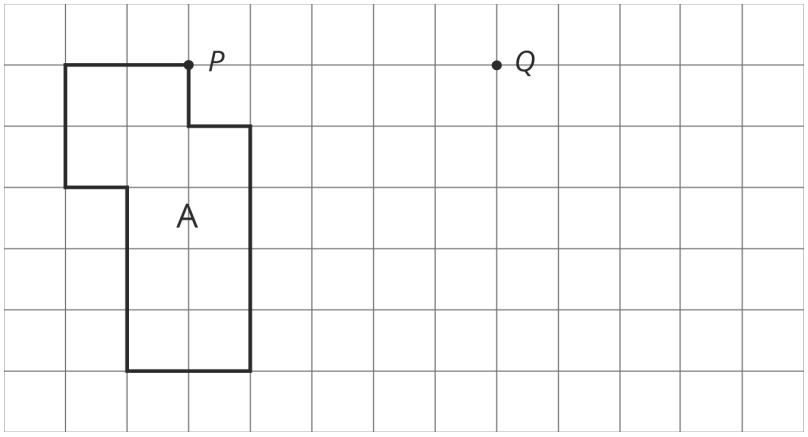
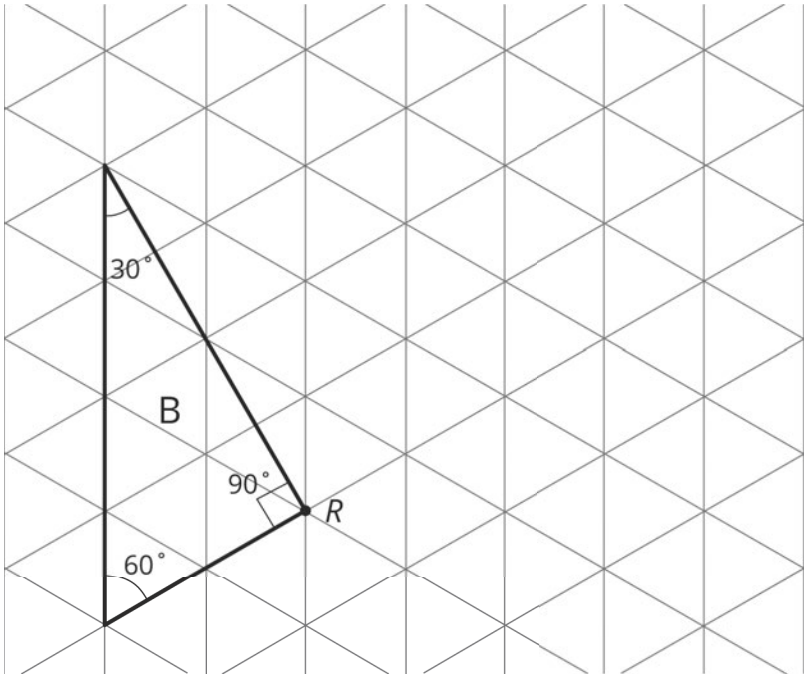
7.2: Sides and Angles

m.openup.org/1/8-1-7-2

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.



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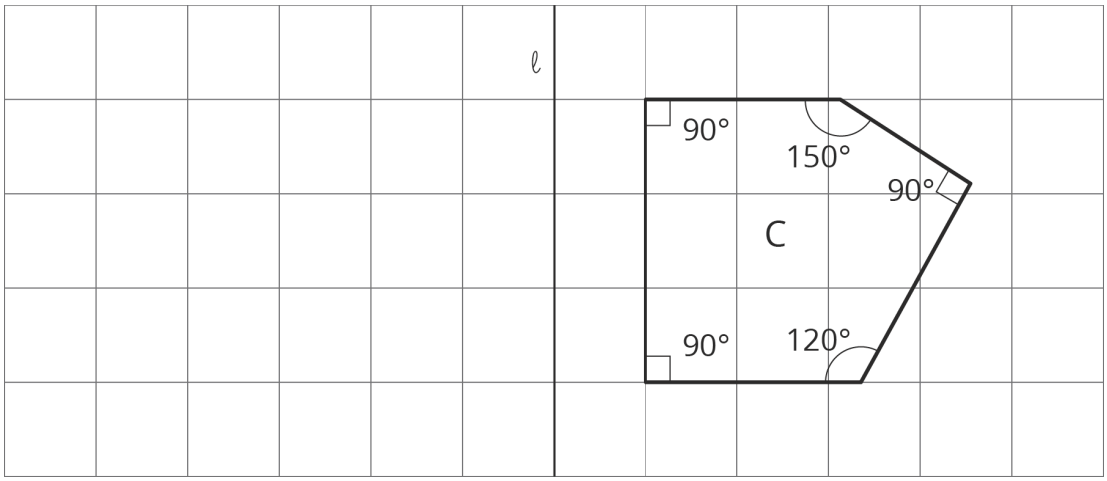
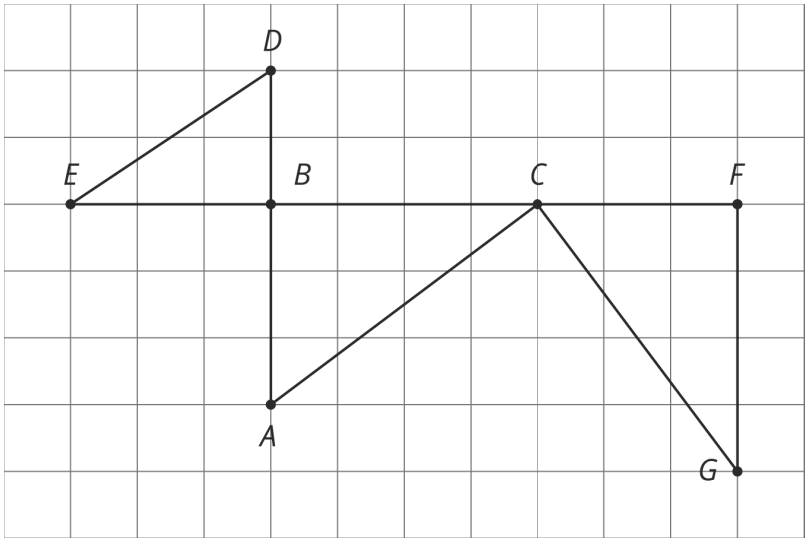
3. Reflect Pentagon C across line ℓ.
   a. In the image, write the length of each side, in grid units, next to the side. You may need to make your own ruler with tracing paper or a blank index card.
   b. In the image, write the measure of each angle in the interior.



7.3: Which One?

m.openup.org/1/8-1-7-3

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



You can use a **rigid transformation** to take triangle ABC to *one* of the other triangles.

1. Which one? Explain how you know.

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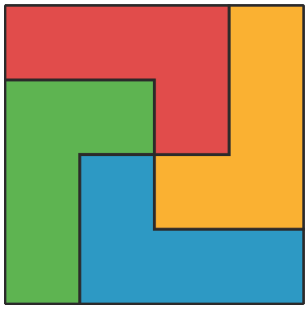
2. Describe a rigid transformation that takes ABC to the triangle you selected.

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?



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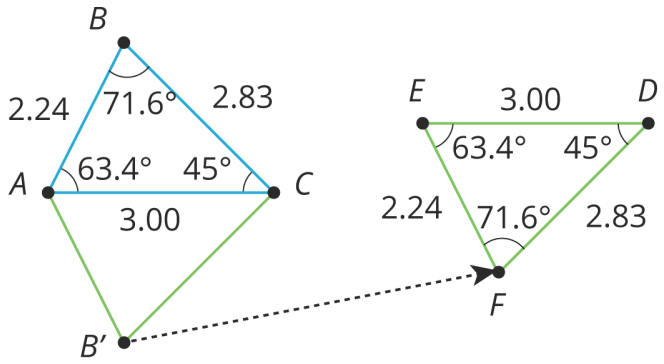
Lesson 7 Summary

The transformations we've learned about so far, translations, rotations, reflections, and sequences of these motions, are all examples of **rigid transformations**. A rigid transformation is a move that doesn't change measurements on any figure.

Earlier, we learned that a figure and its image have corresponding points. With a rigid transformation, figures like polygons also have **corresponding sides** and **corresponding angles**. These corresponding parts have the same measurements.

For example, triangle EFD was made by reflecting triangle ABC across a horizontal line, then translating. Corresponding sides have the same lengths, and corresponding angles have the same measures.



measurements in triangle ABC	corresponding measurements in image EFD
$AB = 2.24$	$EF = 2.24$
$BC = 2.83$	$FD = 2.83$
$CA = 3.00$	$DE = 3.00$
$m\angle ABC = 71.6^\circ$	$m\angle EFD = 71.6^\circ$
$m\angle BCA = 45.0^\circ$	$m\angle FDE = 45.0^\circ$
$m\angle CAB = 63.4^\circ$	$m\angle DEF = 63.4^\circ$

Lesson 7 Glossary Terms

- corresponding

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- rigid transformation

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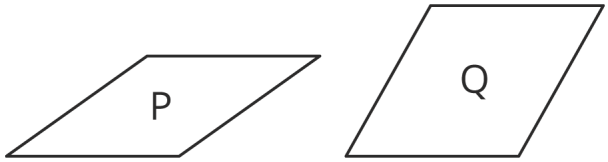
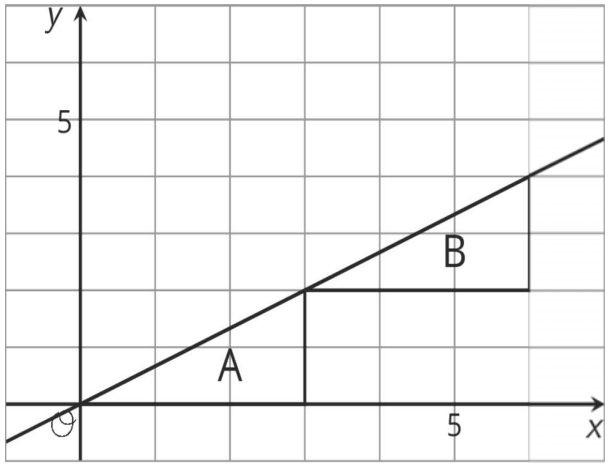
Unit 1, Lesson 7: No Bending or Stretching

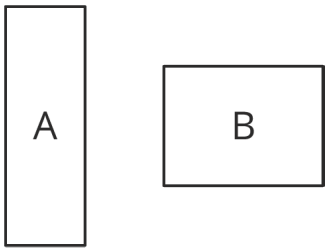
1. Is there a rigid transformation taking Rhombus P to Rhombus Q? Explain how you know.



2. Describe a rigid transformation that takes Triangle A to Triangle B.



3. Is there a rigid transformation taking Rectangle A to Rectangle B? Explain how you know.



4. For each shape, draw its image after performing the transformation. If you get stuck, consider using tracing paper.

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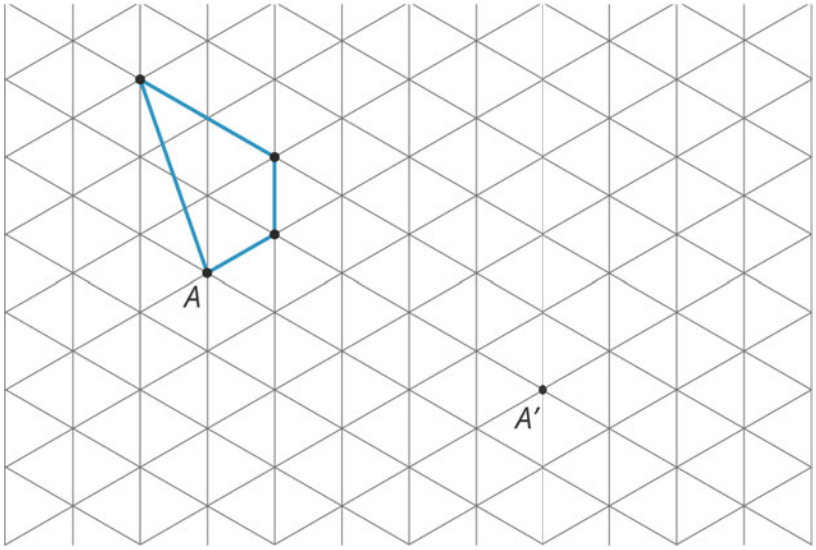
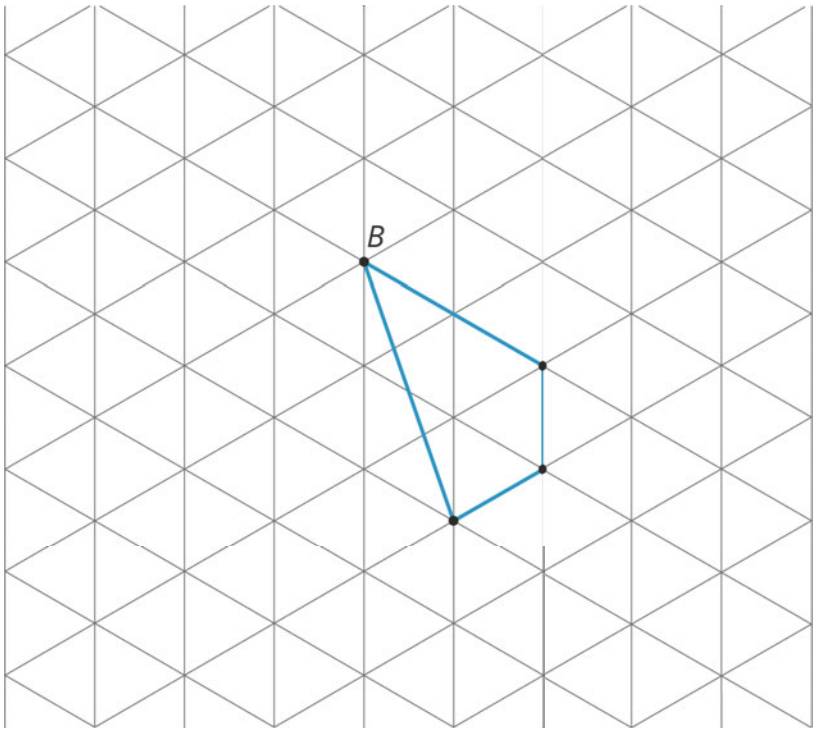
a. Translate the shape so that A goes to A'.



b. Rotate the shape 180 degrees counterclockwise around B.



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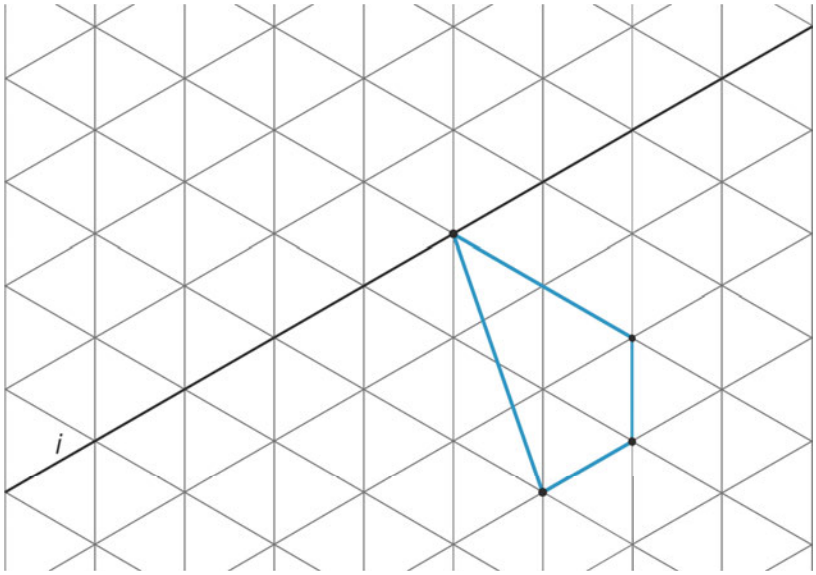
c. Reflect the shape over the line shown.



(from Unit 1, Lesson 4)