Similar Polygons

Lesson 7

Addressing

8.G.A.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.

8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Let’s look at sides and angles of similar polygons!

All, Some, None:
Congruence and Similarity

Warm Up

Choose whether each statement is true in *all* cases, in *some* cases, or in *no* cases.

1. If two figures are congruent, then they are similar.

   TRUE IN ALL CASES

2. If two figures are similar, then they are congruent.

   TRUE IN SOME CASES

3. If an angle is dilated with the center of dilation at its vertex, the angle measure may change.

   NEVER TRUE

Are They Similar?

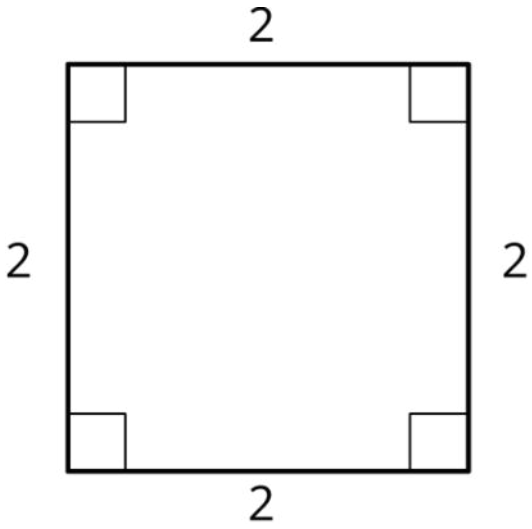
Activity 7.2

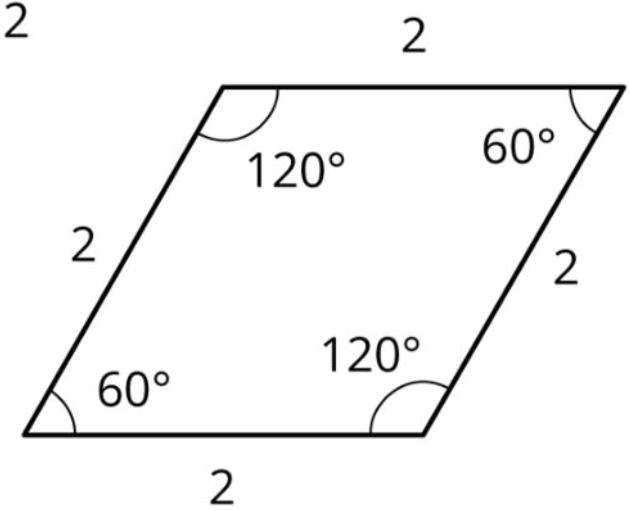
- Stronger and Clearer Each Time

In this activity, look at the polygons that are claimed to be similar.

What are some characteristics of similar polygons that are easy to recognize that can be used to confirm or deny the claims?

Begin with Quiet Work Time. (3 min)
Then we'll share as a class!



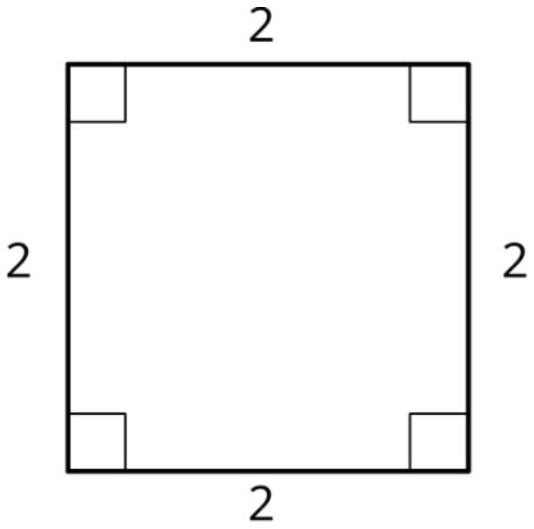


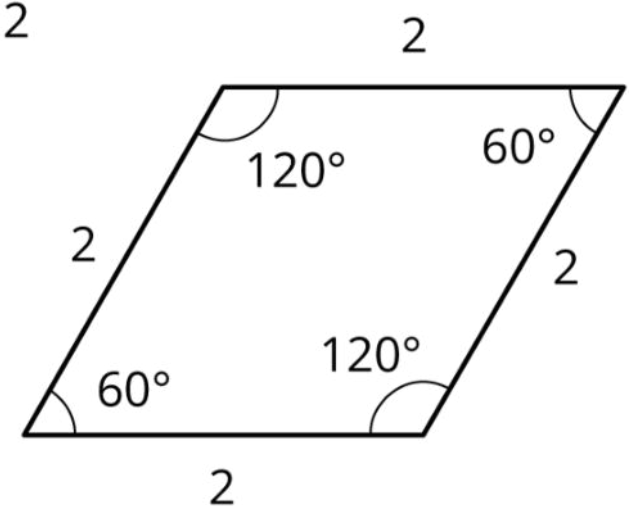
Priya says,

These polygons are similar because their side length are all the same.

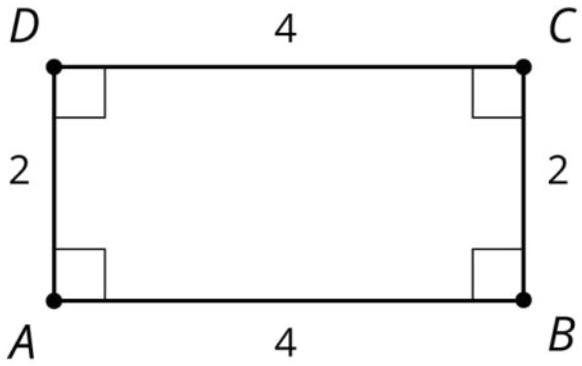
Clare says,

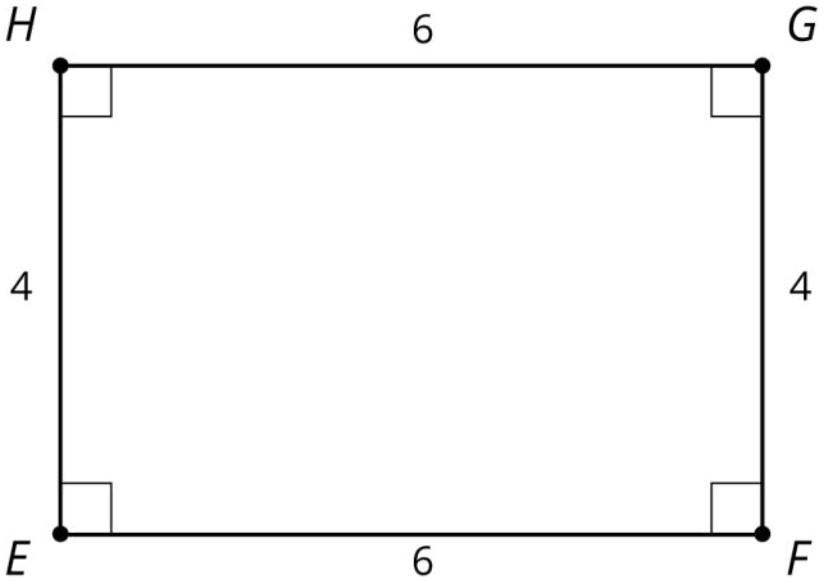
These polygons are not similar because the angles are different.





If corresponding angles aren't congruent, then the figures cannot be similar!



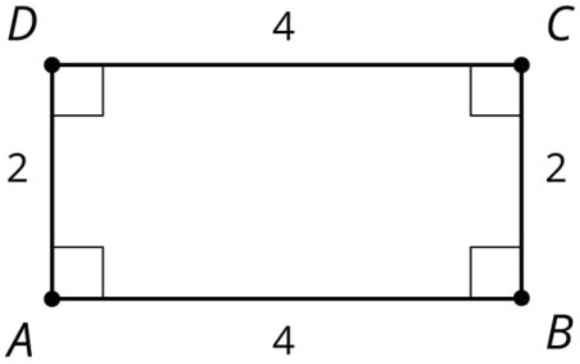


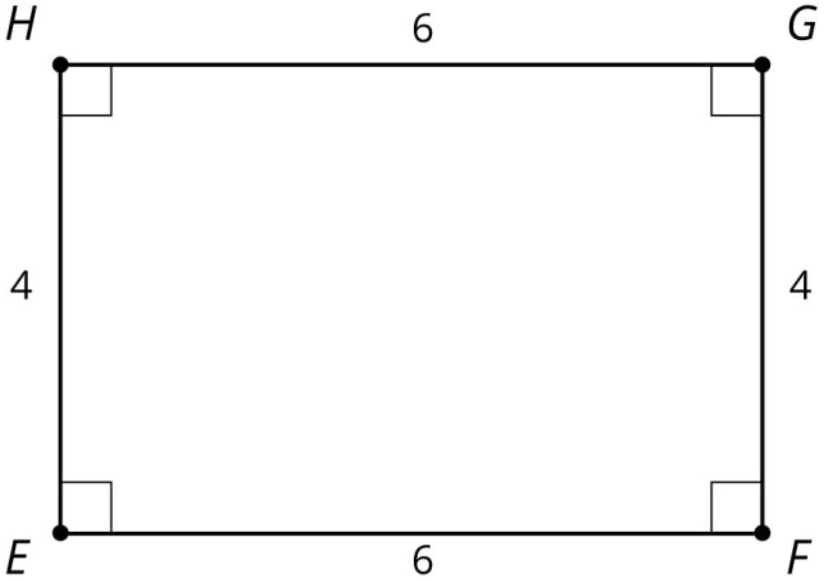
Jada says,

These rectangles are similar because all of the side lengths differ by 2.

Lin says,

These rectangles are similar. I can dilate AD *and* BC *using a scale factor of 2 and* AB *and* CD *using a scale factor of 1.5 to make the rectangles congruent. Then I can use a translation to line up the rectangles.*



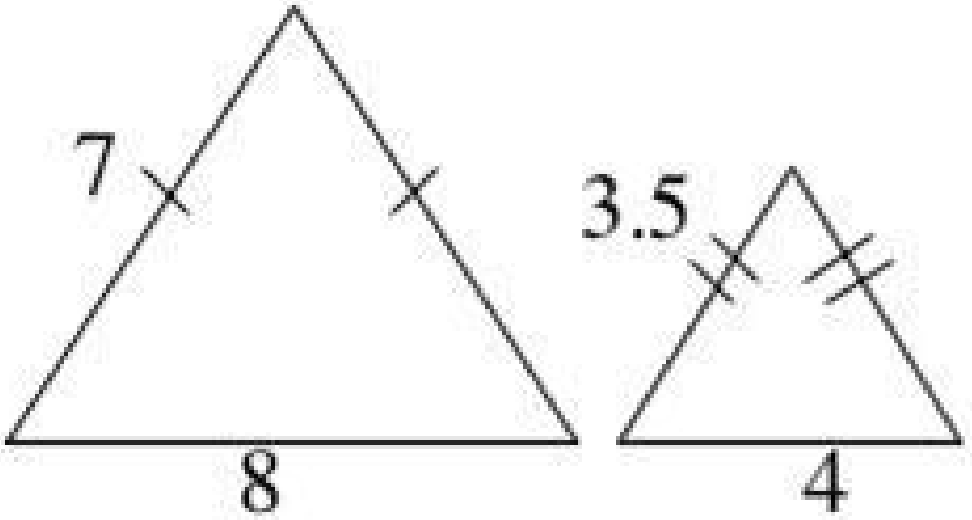


If the side lengths are not all scaled by the same value, then the figures cannot be similar!

For **similar** polygons...

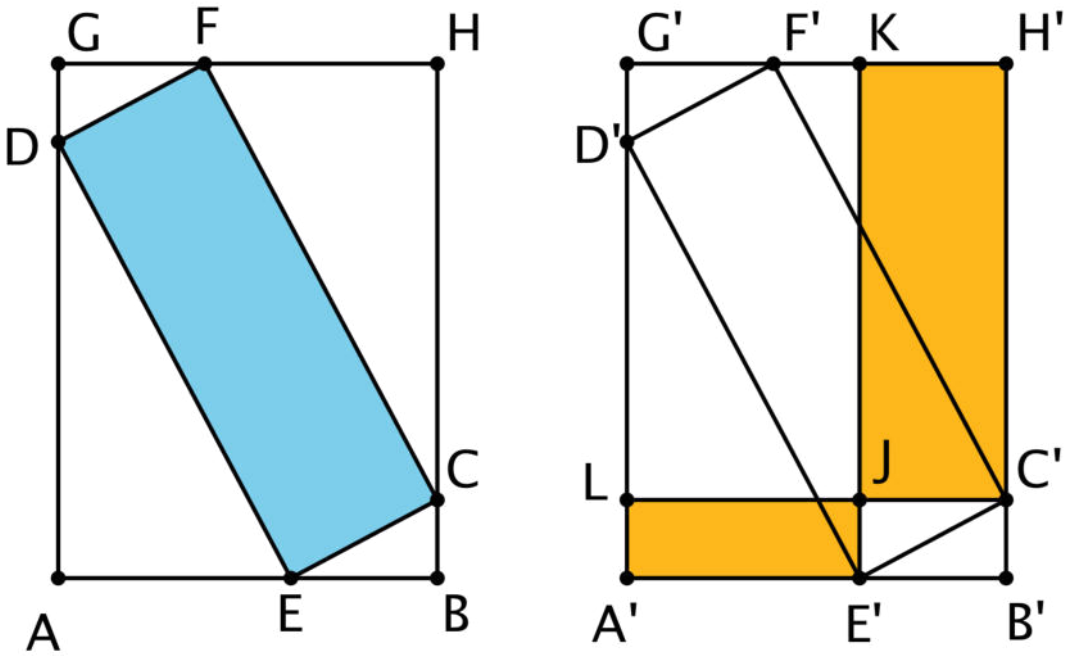
★ corresponding angles are congruent!

★ corresponding side lengths are proportional and use the same scale factor!



“Are you ready for more?”

Points *A* through *H* are translated to the right to create points *A’* through *H’*. All of the following rectangles *GHBA, FCED, KH’C’J,* and *LJE’A’*. Which is greater, the areas of the blue rectangle *DFCE* or the total area of yellow rectangles *KH’C’J* and *LJE’A’*?



Find Someone Similar

Activity 7.3

- Collect and Display

Each student will receive one card.

- Find someone else in the room who has a card with a polygon that is **similar but not congruent** to yours.

- When you have found your partner, work with them to **explain how you know** that the two polygons are similar!

How did you find your partner?
What did you look for?

Were the side lengths important?

Were the angles important?

True or False?

All squares are similar.

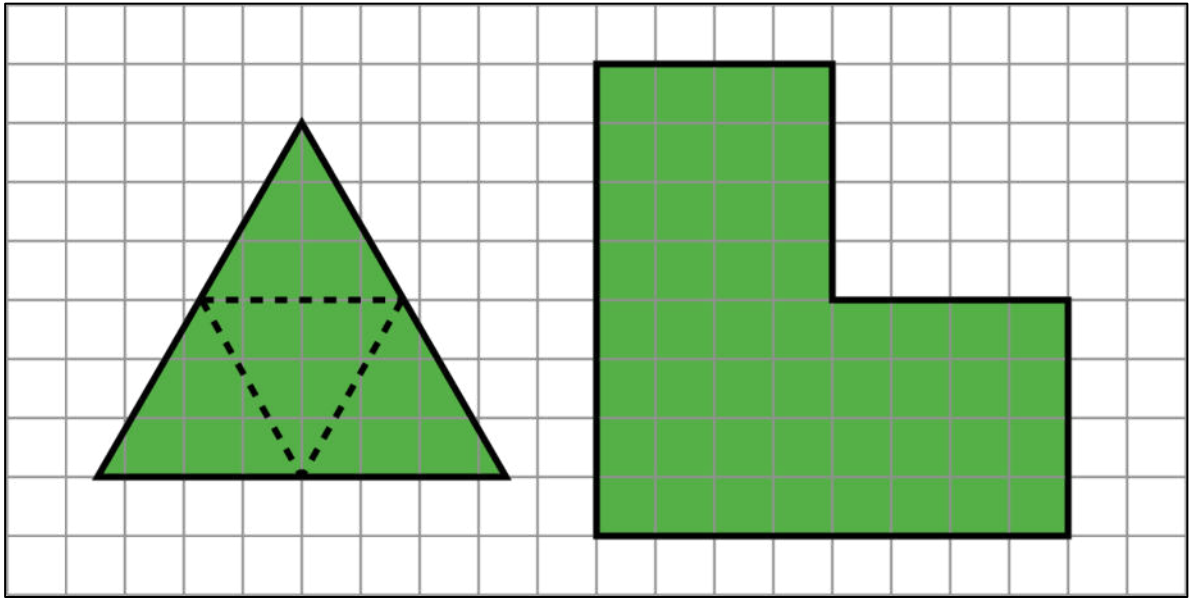
True or False?

All rhombuses are similar.

“Are you ready for more?”

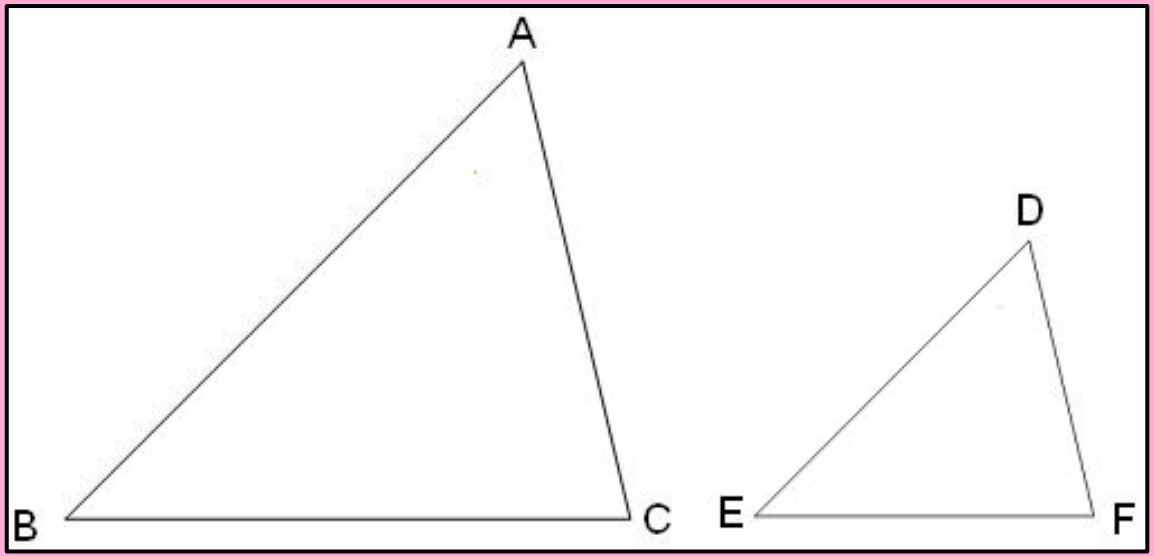
On the left is an equilateral triangle where dashed lines have been added, showing how you can partition an equilateral triangle into smaller similar triangles.

Find a way to to this for the figure on the right, partitioning it into smaller figures which are each similar to that original shape. What’s the fewest number of pieces you can use? the most?



BIG IDEA #1

Similar figures have congruent corresponding **angles** ***and*** **proportional corresponding side lengths**.

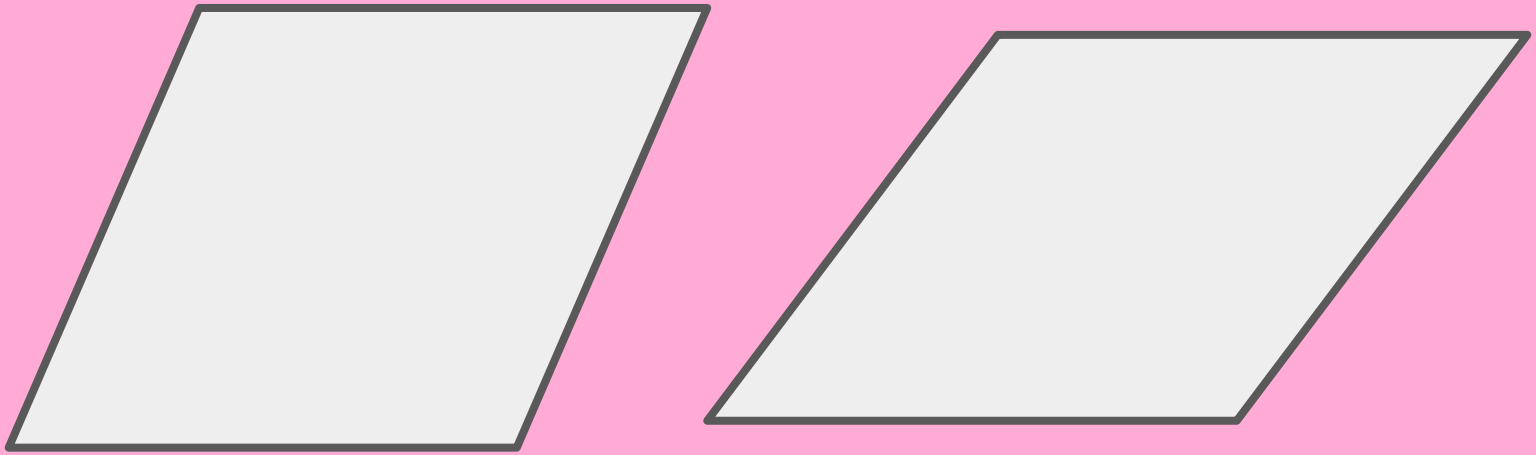


BIG IDEA #2

For some figures (like rectangles or squares), it is sufficient to focus on **side lengths** since corresponding angles are automatically congruent.

BIG IDEA #3

For some figures (like rhombuses), it is sufficient to focus on **angles** since corresponding side lengths are automatically proportional.



Today's Goals

- ❑ I can use angle measures and side lengths to conclude that two polygons are not similar.
- ❑ I know the relationship between angle measures and side lengths in similar polygons.

How Do You Know?

Cool Down