Similarity

Lesson 6

Building on

7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

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.

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 explore similar figures!

Equivalent Expressions

Warm Up 6.1

Use what you know about operations and their properties to write 3 expressions equivalent to the expression shown:

$$10(2+3)-8\cdot 3$$

Begin with Quiet Work Time. (2 min)
Discuss your thinking with a partner.

Which expressions are you unsure about?

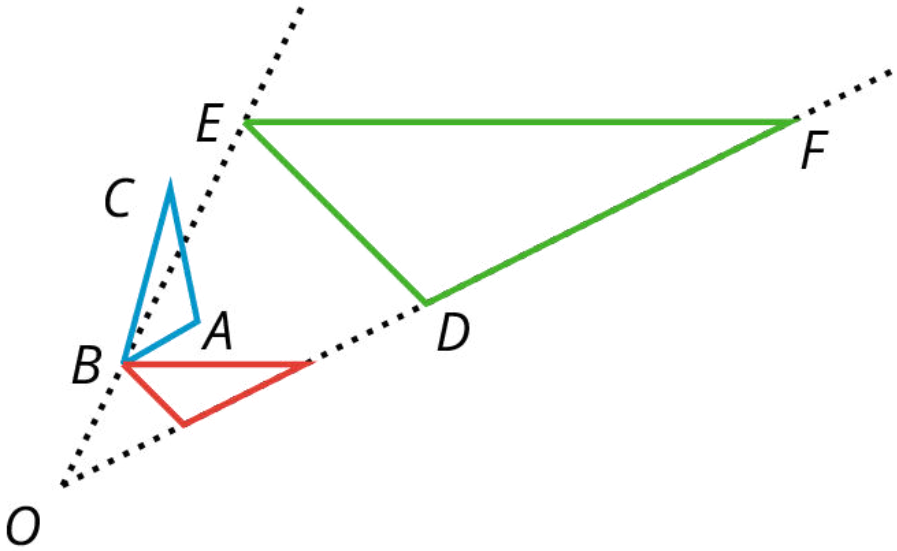
$$10(2+3)-8\cdot 3$$

Similarity Transformations (Part 1)

Activity 6.2

- Stronger and Clearer Each Time
- 5 Practices

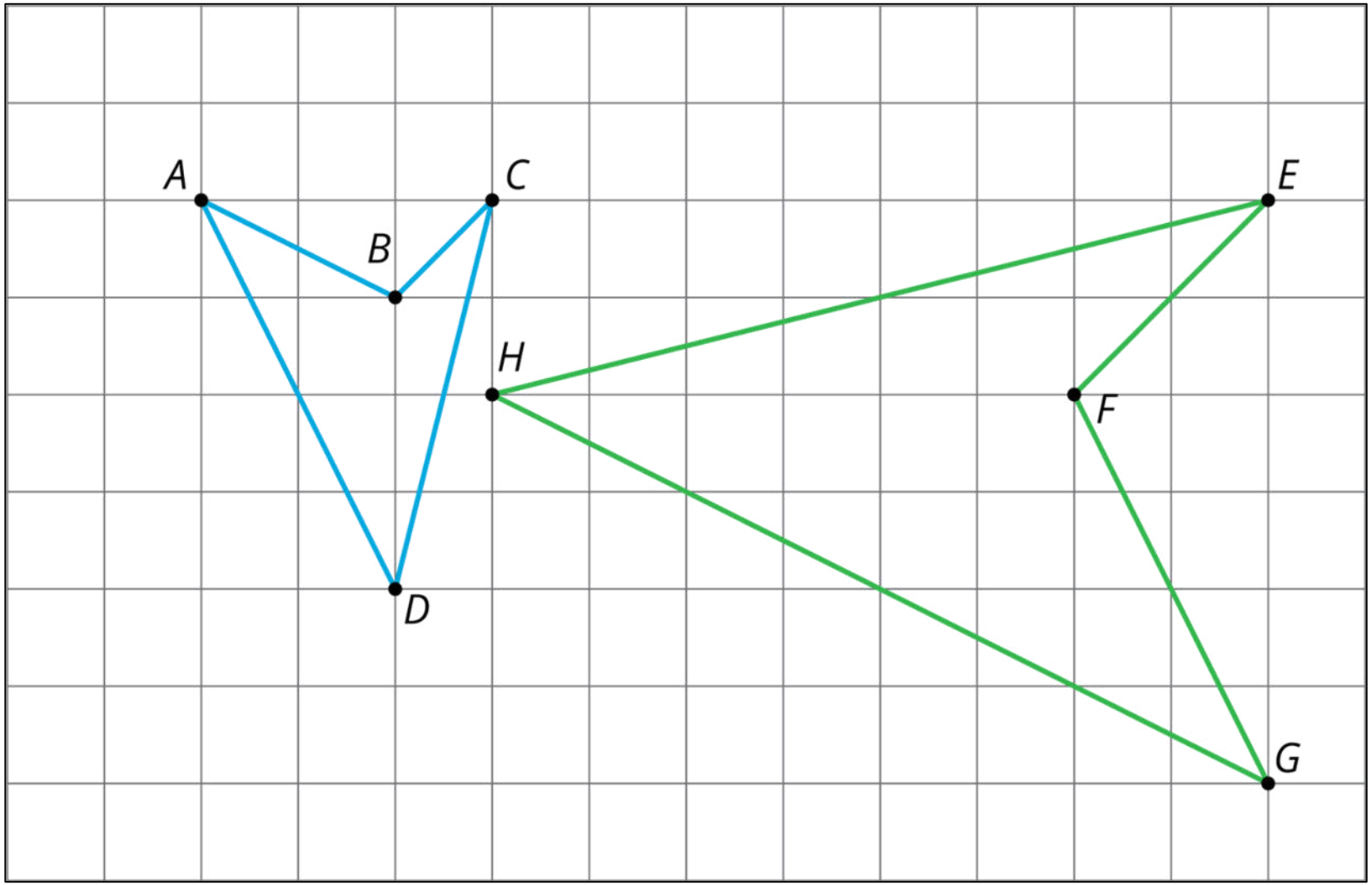
similar



Two figures are similar if one can fit exactly over the other after rigid transformations and dilations.

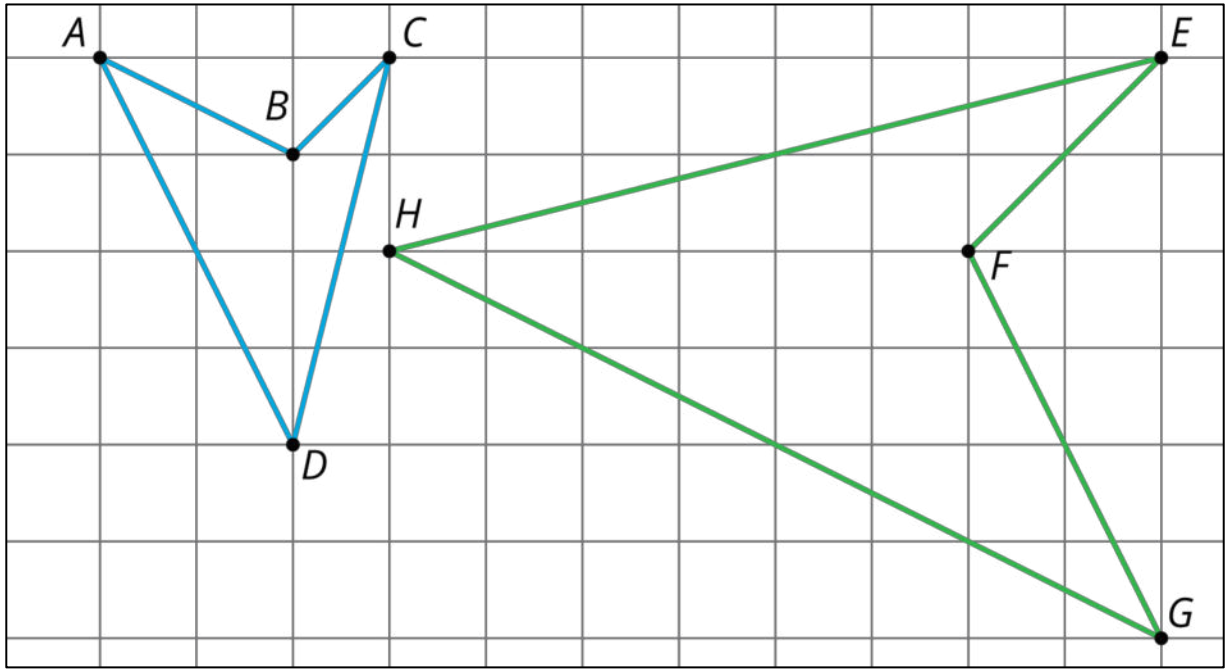
In the figure, triangle *ABC* is similar to triangle *DEF*.

ABC was rotated around point *B*, then dilated with center point *O*.


A
B
C
D
E
F
G
H

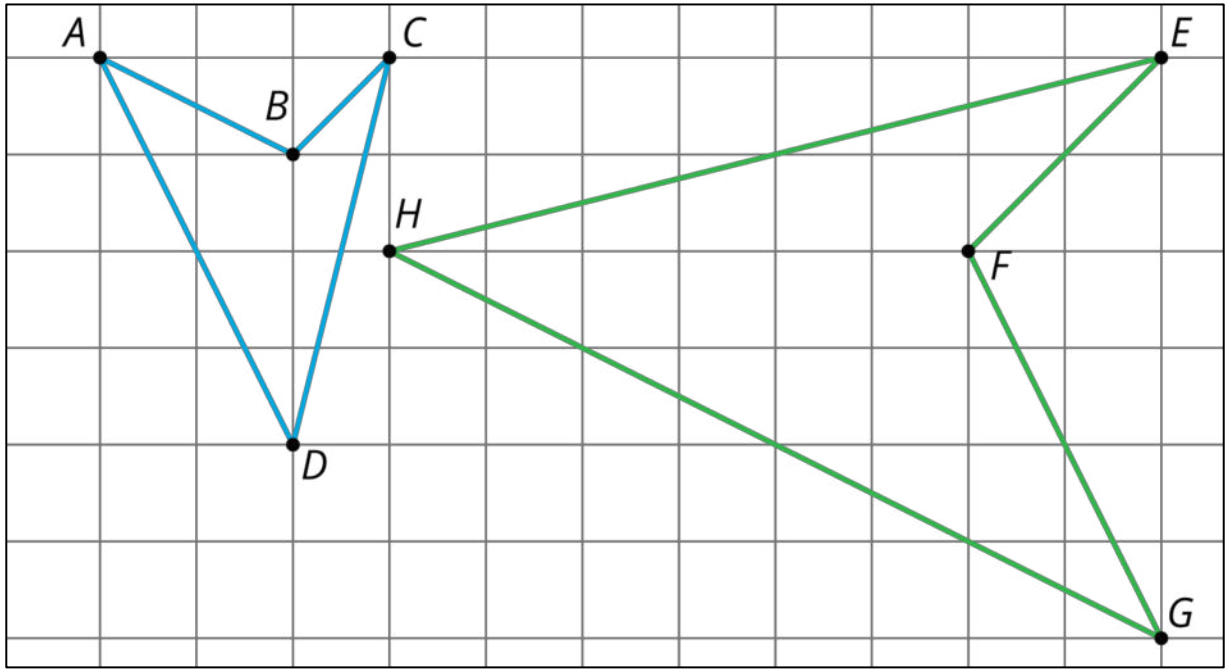
Method 1: Dilate, Translate, Rotate, Reflect

- ➔ **Dilate** using *D* as the center with scale factor 2.
- ➔ **Translate** *D* to *H*.
- ➔ **Rotate** *H* as the center clockwise by 90 degrees.
- ➔ **Reflect** using the line that contains *H* and *F*.



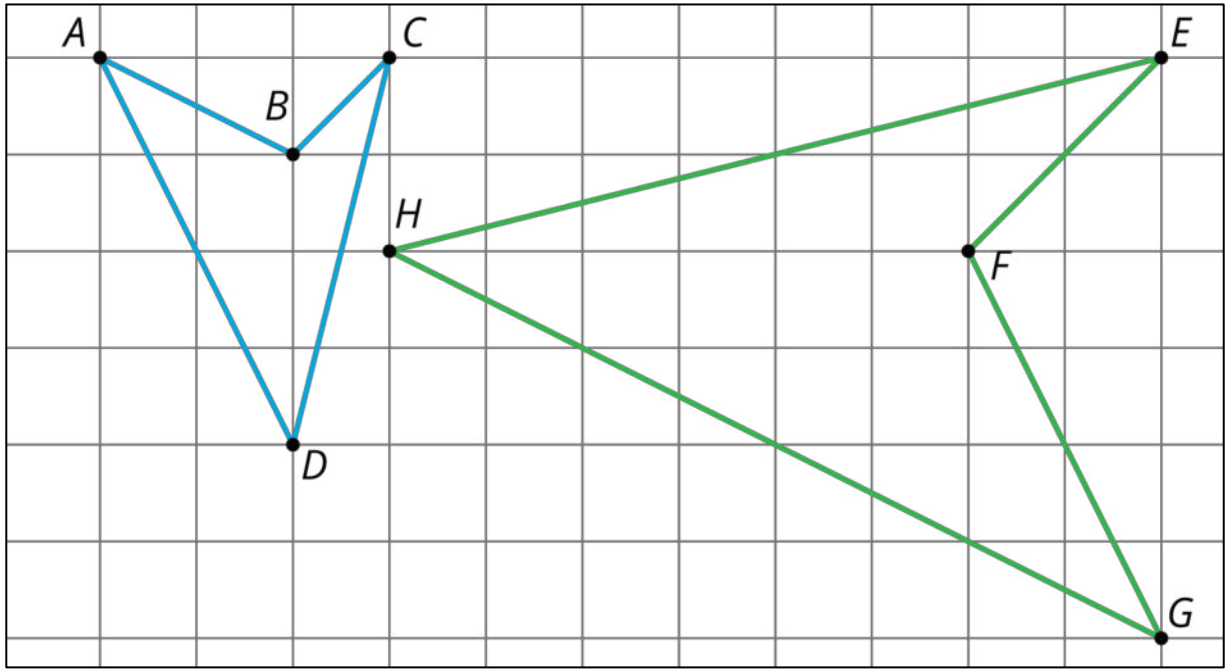
Method 2: Reflect, Translate, Rotate, Dilate

- ➔ **Reflect** using the line that contains *D* and *B*.
- ➔ **Translate** *D* to *H*.
- ➔ **Rotate** using *H* as the center clockwise by 90 degrees.
- ➔ **Dilate** using *H* as the center with a scale factor 2.

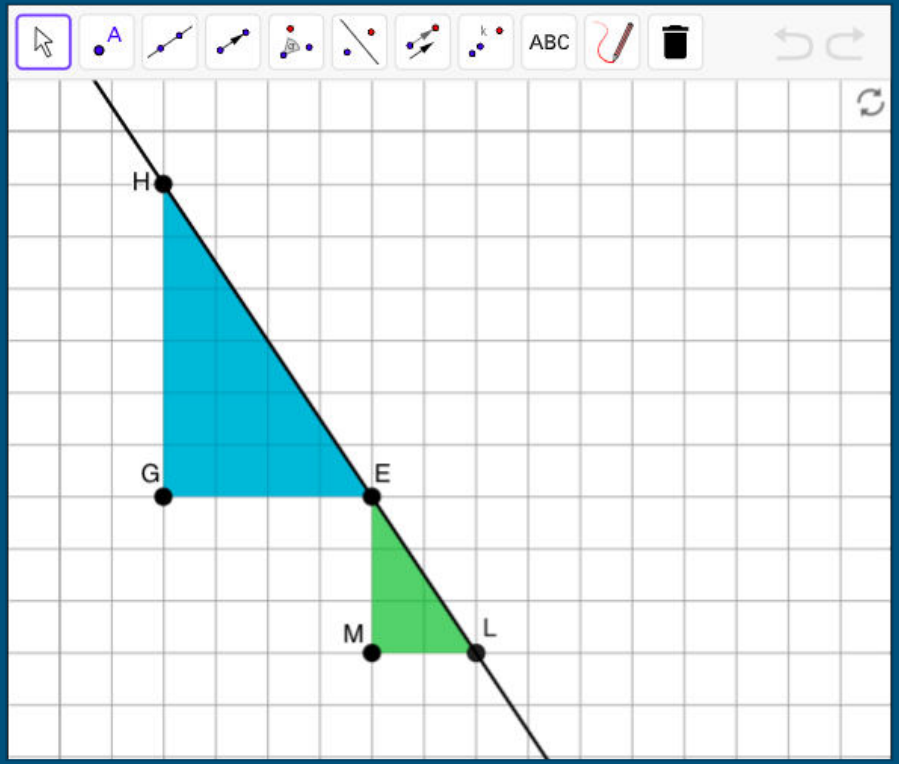


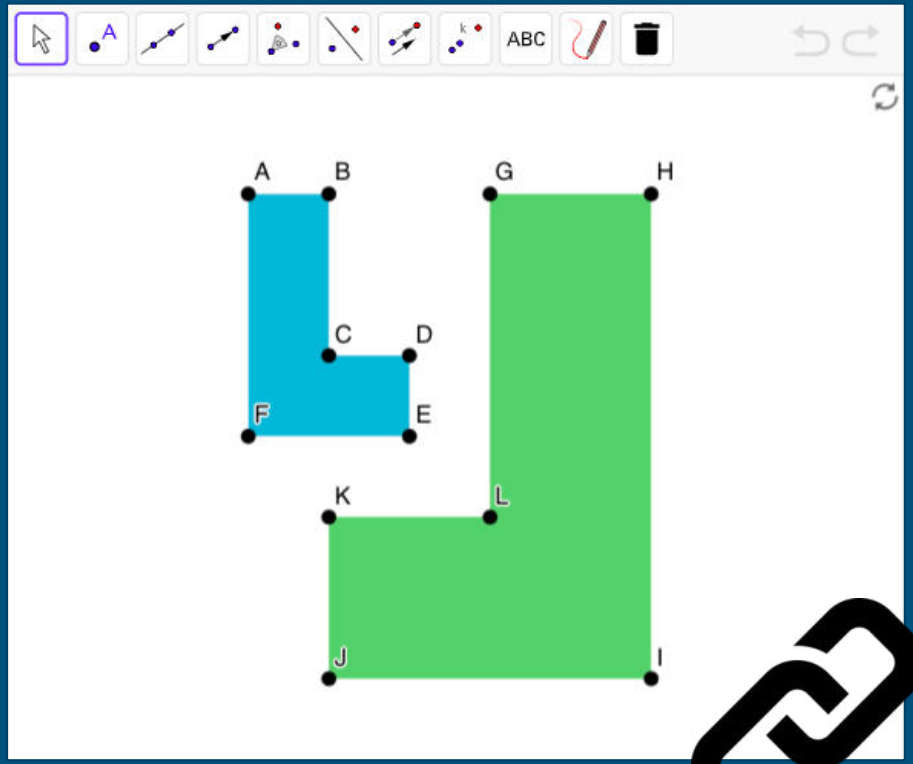
Method 3: Translate, Rotate, Reflect, Dilate

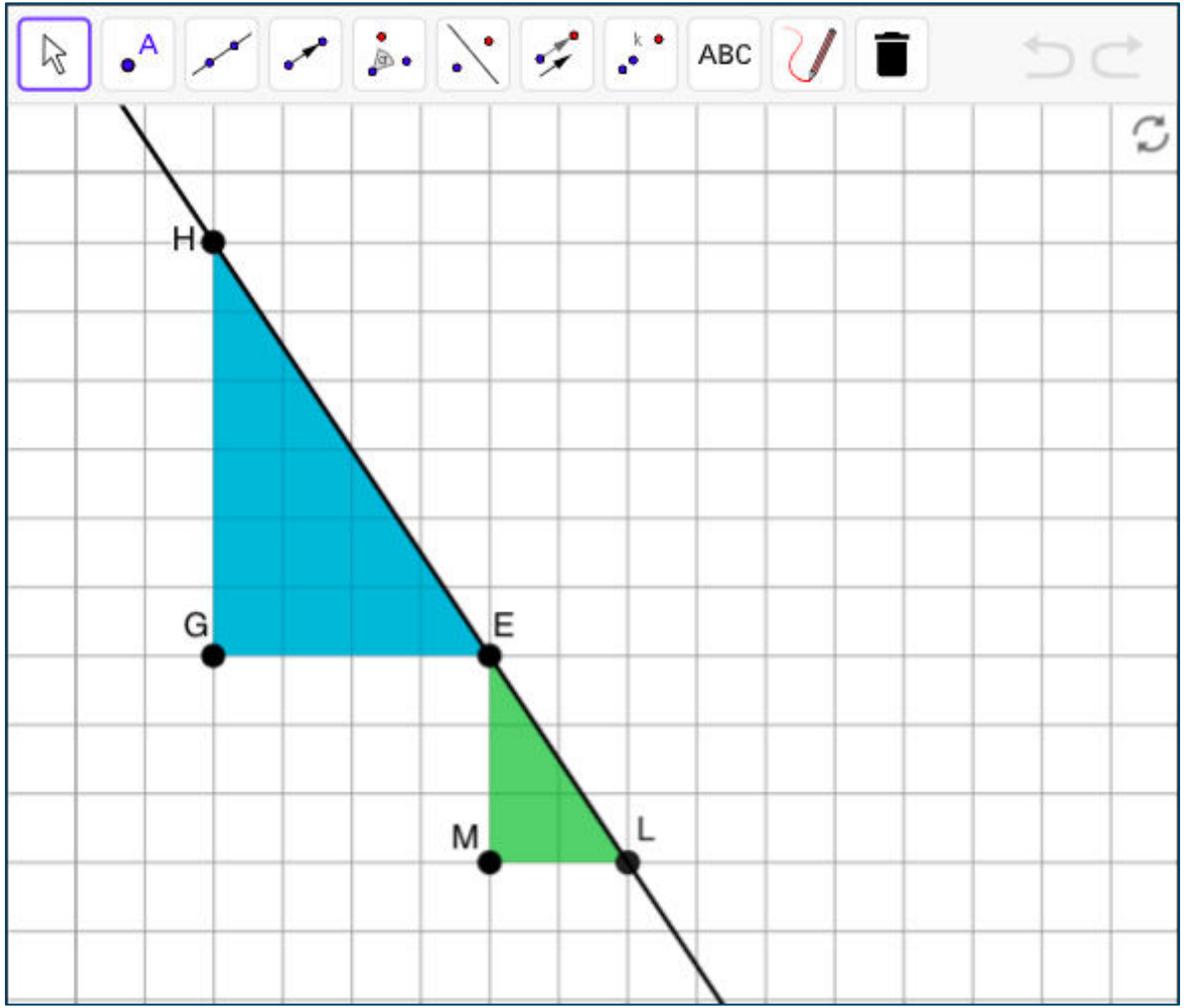
- ➔ **Translate** *B* to *F*.
- ➔ **Rotate** using *F* as the center clockwise by 90 degrees.
- ➔ **Reflect** using the line the contains *F* and *H*.
- ➔ **Dilate** using *F* as the center with scale factor 2.

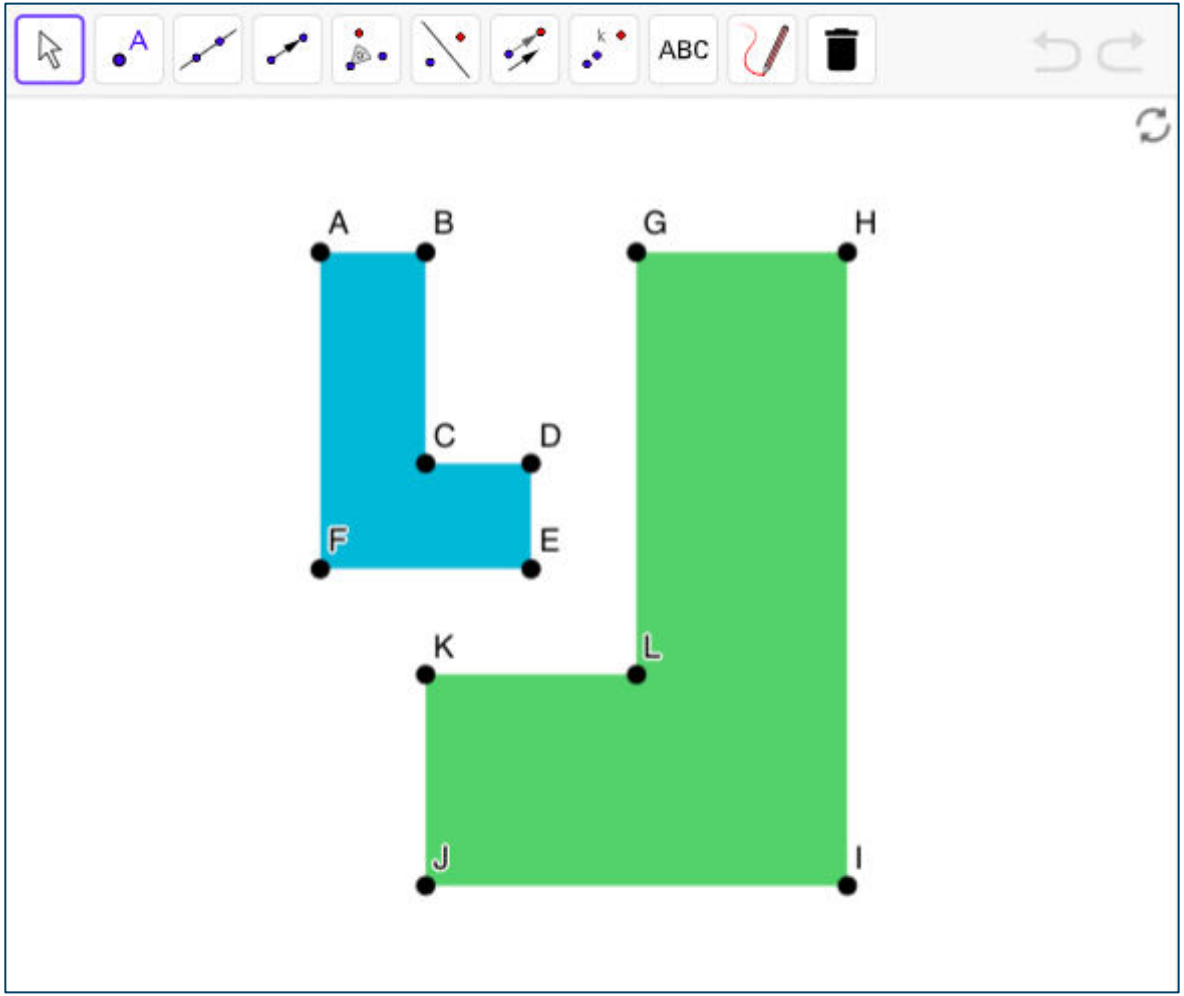


Please begin working!






A
k
ABC
H
G
E
M
L


A
B
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K
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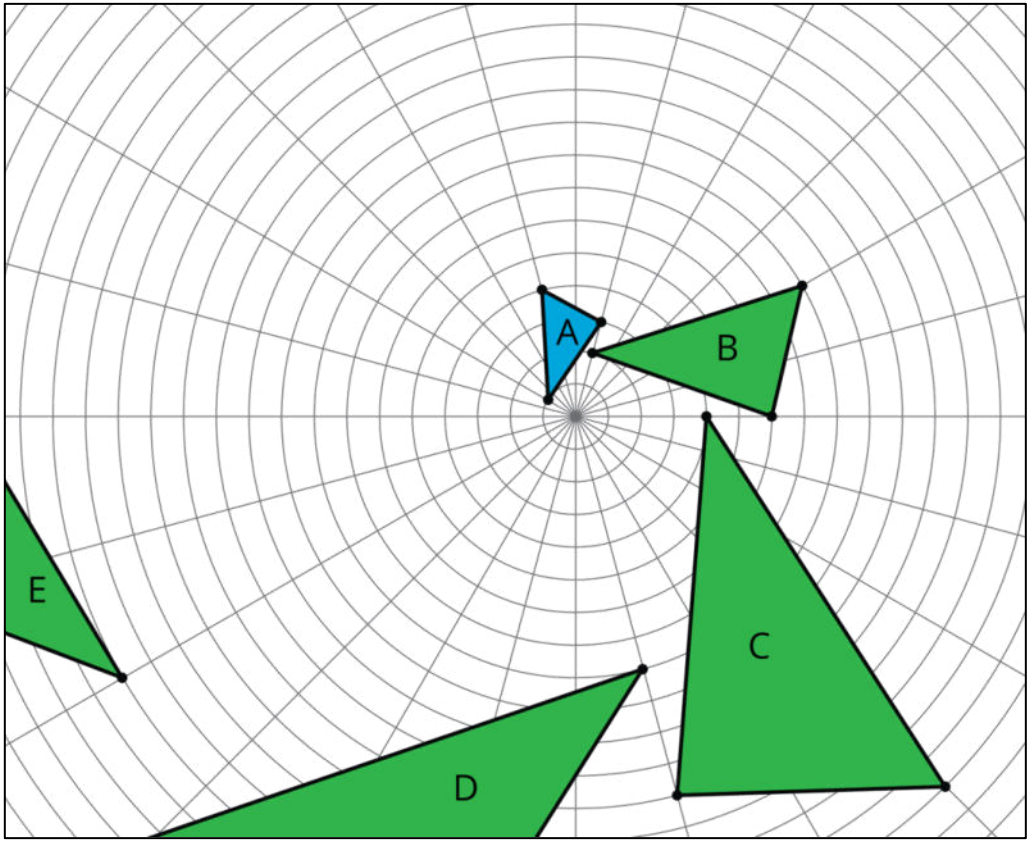
J
I

Are you ready for more?

The same sequence of transformations takes Triangle A to Triangle B, takes Triangle B to Triangle C, and so on. Describe a sequence of transformations with this property.

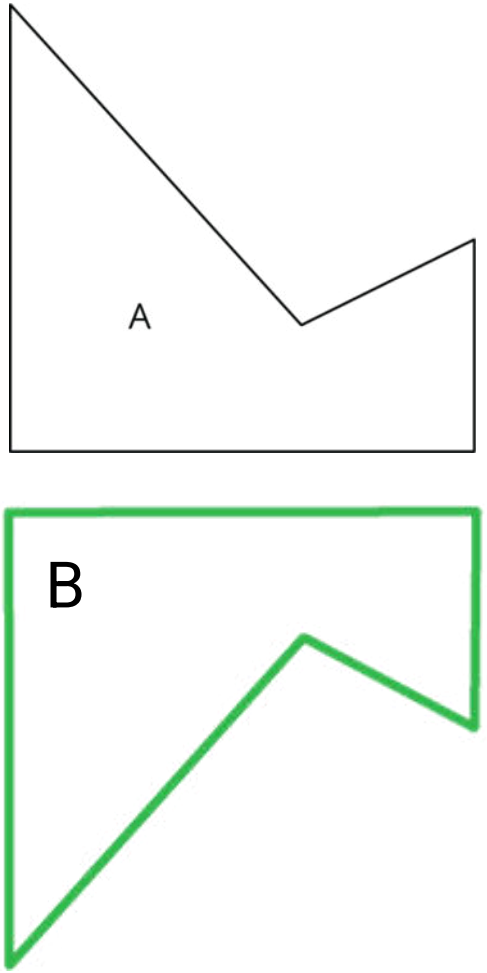


Similarity Transformations (Part 2)

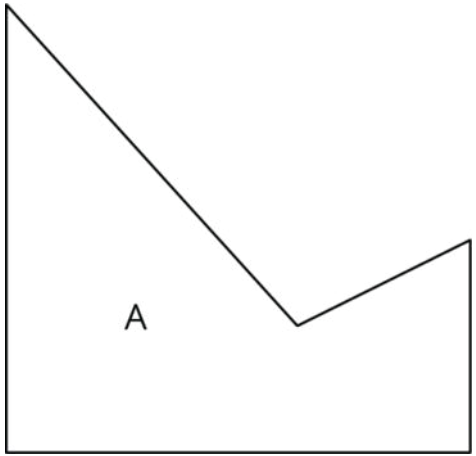
Activity 6.3
Compare and Connect

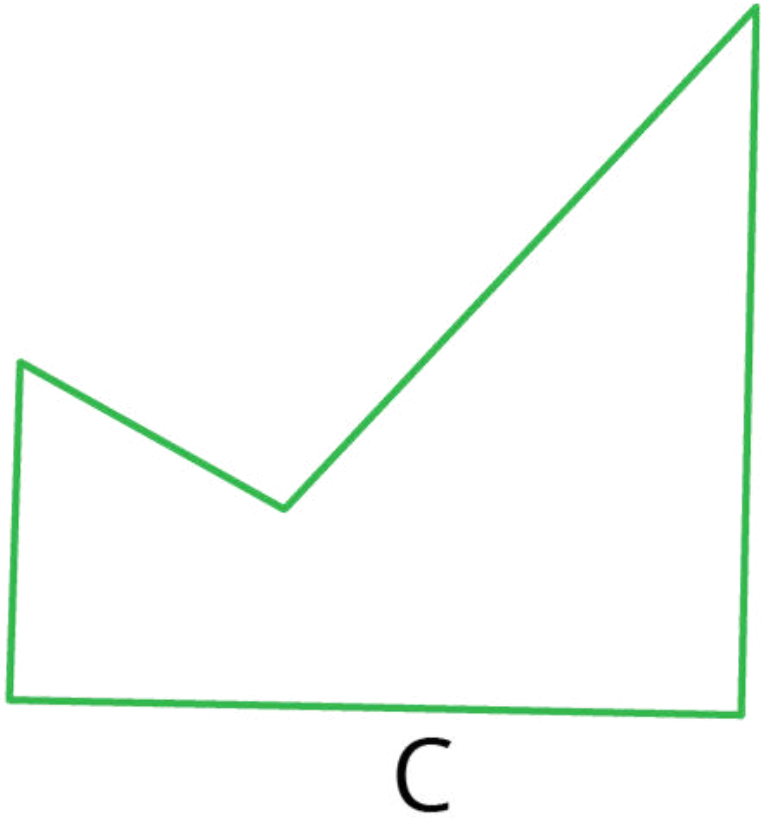
Sketch the resulting images similar to Figure A using the transformations given in the task.

A translation and a reflection. Label your sketch Figure B.

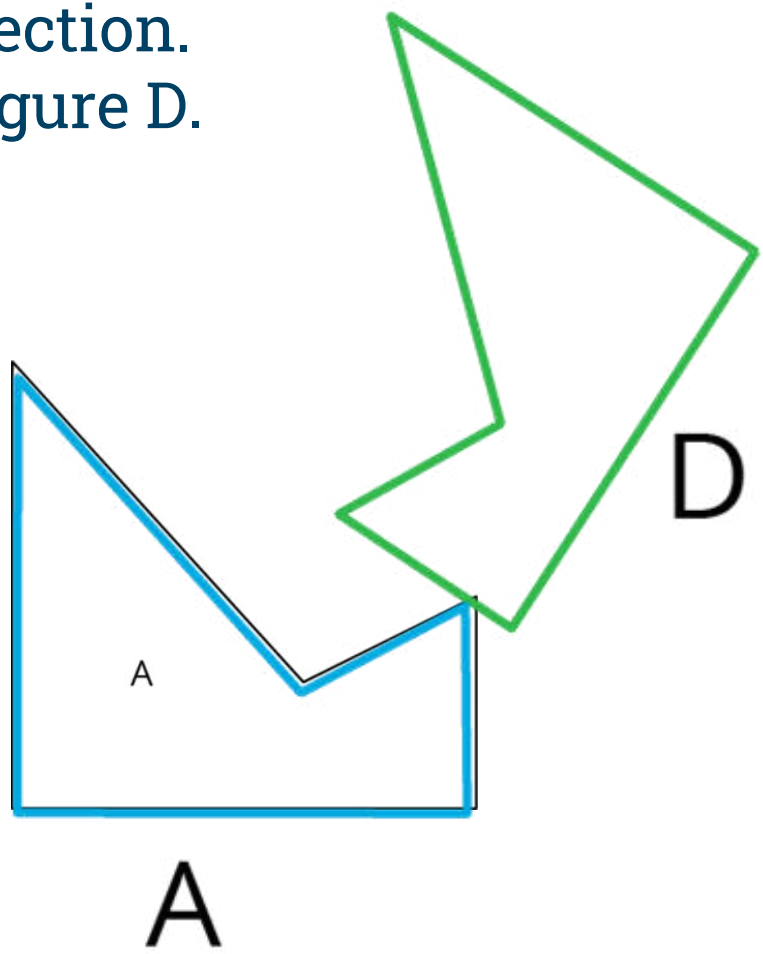


A reflection and a dilation with scale factor greater than 1.
Label your sketch Figure C.

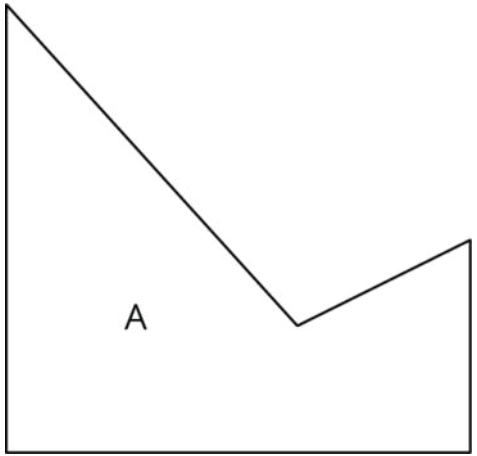


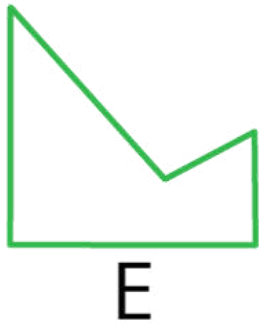


A rotation and a reflection.
Label your sketch Figure D.



A dilation with a scale factor less than 1 and a translation. Label your sketch Figure E.





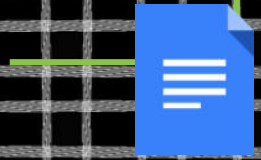
Generally...

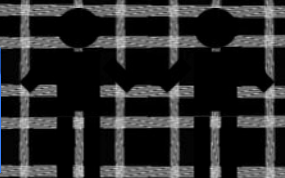
- ★ Dilations create larger or smaller copies depending on the scale factor.
- ★ Translations slide the first in a direction.
- ★ Rotations “tilt” or “turn” the figure.
- ★ Reflections change the “handedness” of a figure.

Methods for Translations and Dilations

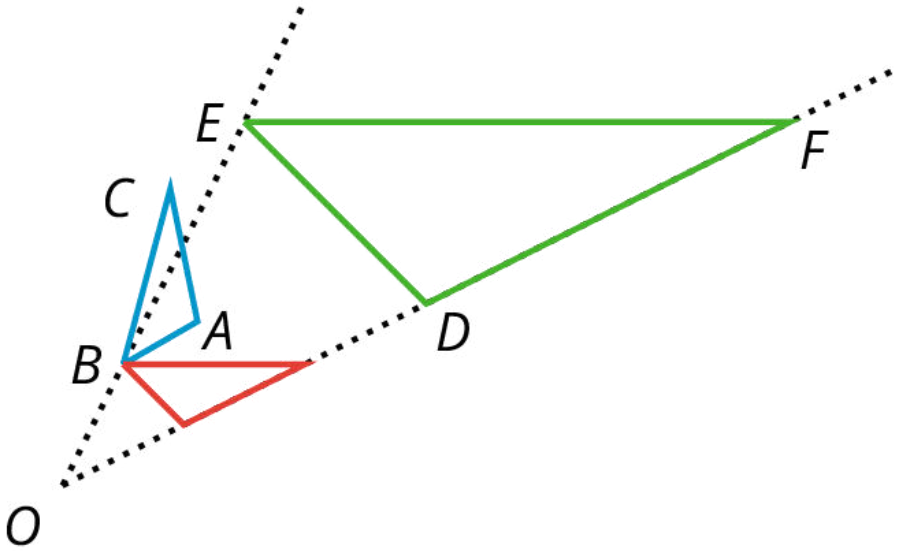
Activity 6.4

- **Clarify, Critique, Correct**





similar

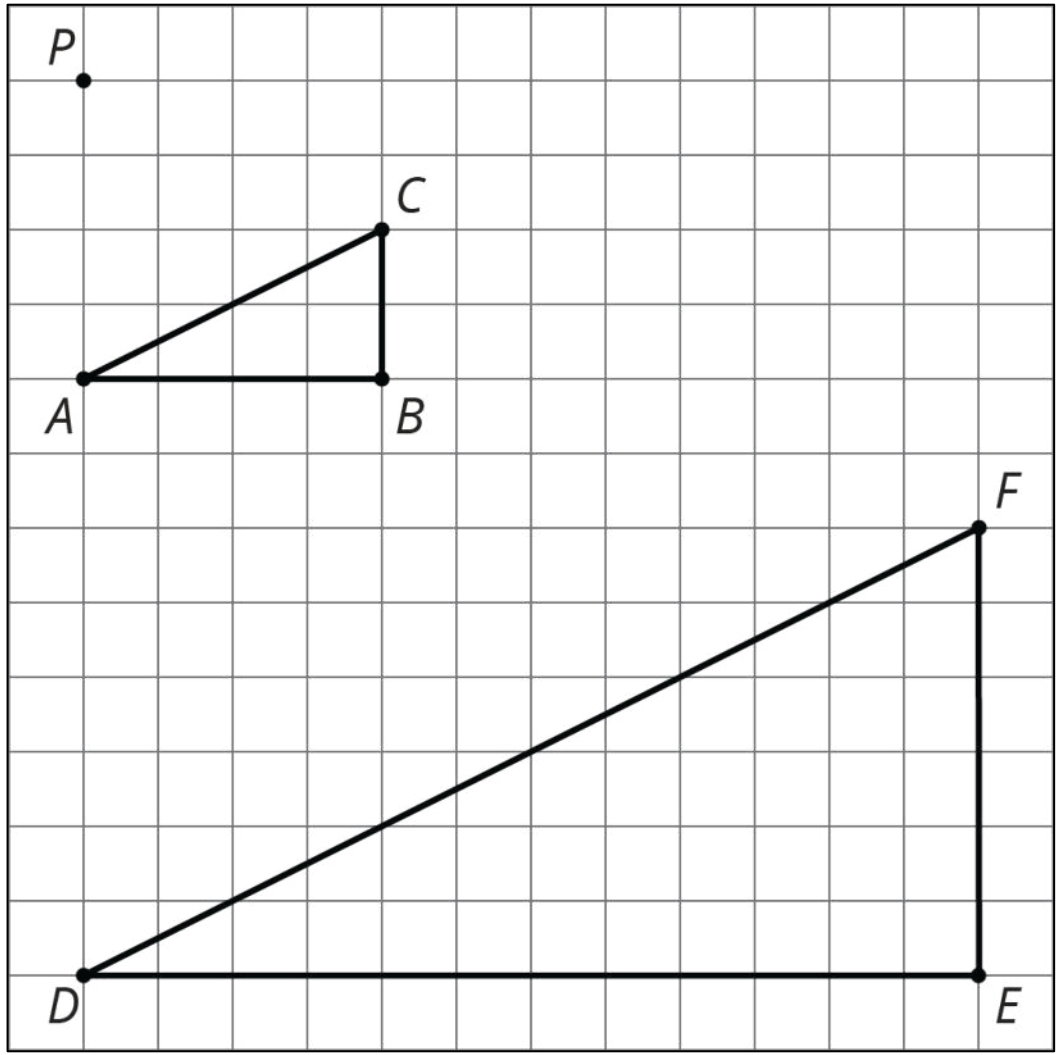


Remember:

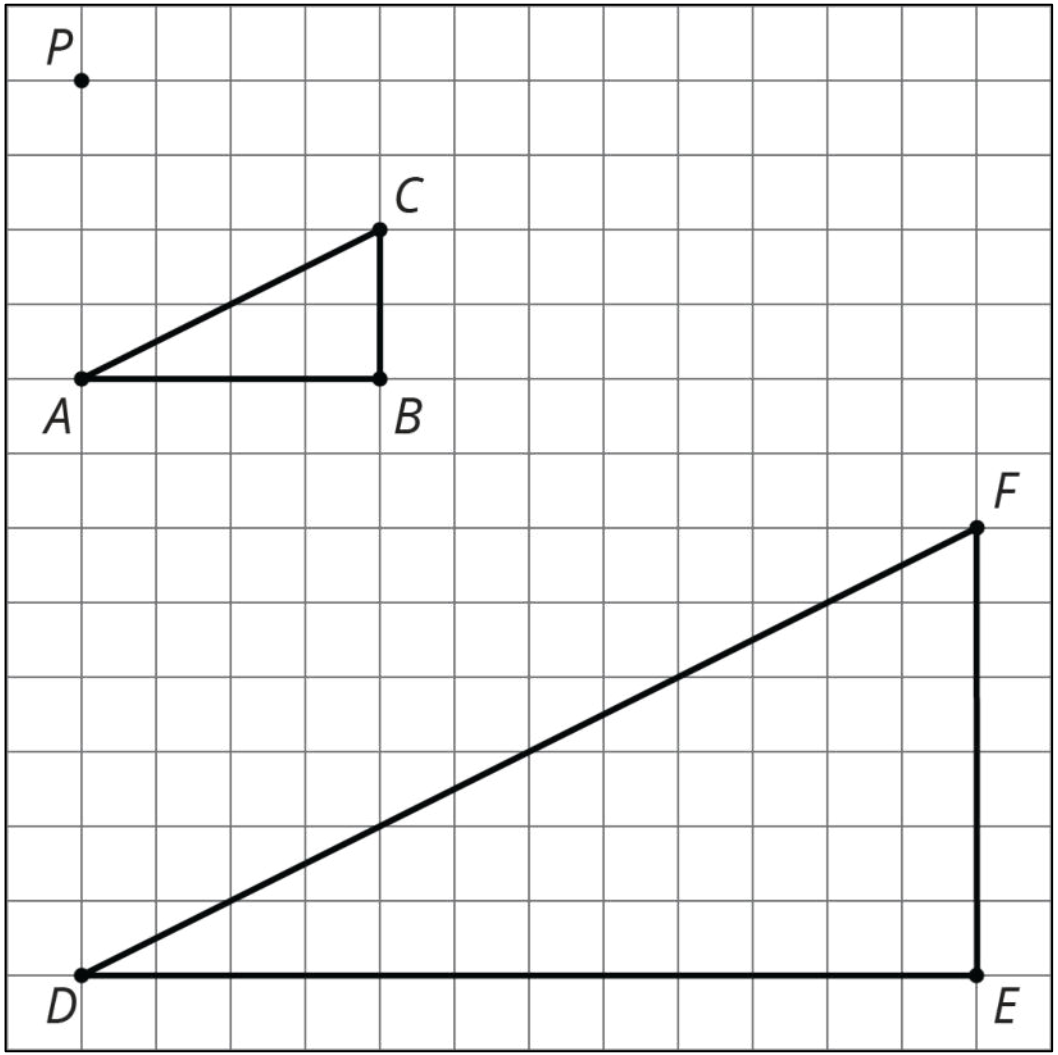
Two figures are similar if there is a sequence of translations, rotations, and dilations that takes one figure to another!

Find at least one way to show that triangle *ABC* and *DEF* are similar using only the transformations given on your cards.

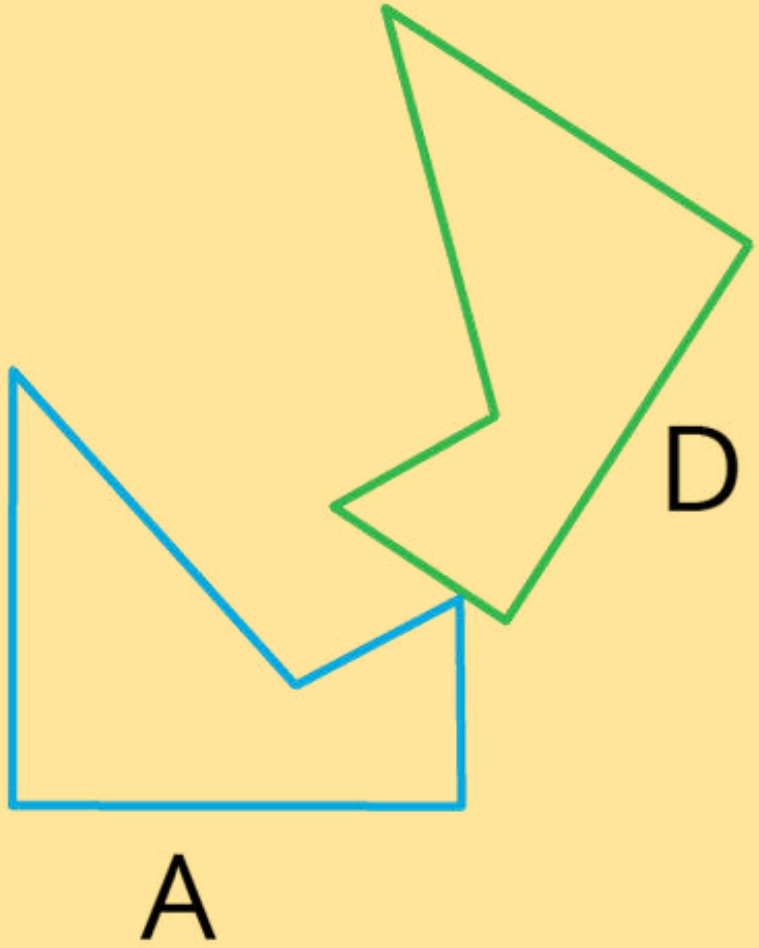
Please begin working as a team!


P
C
A
B
F
D
E

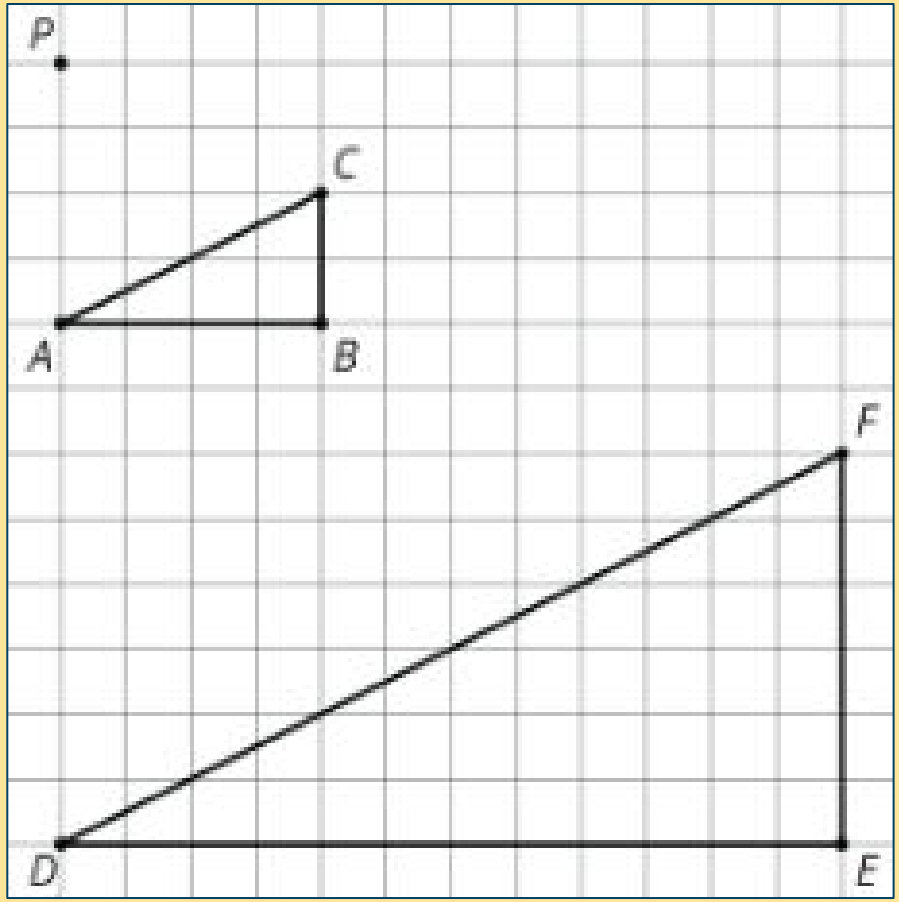
When showing two figures are similar, you can pick any point as the center of dilation if you know the scale factor because you can always adjust the position using a translation!



Two figures are **similar** if there is a sequence of translations, rotations, reflections, and dilations that maps one to another.

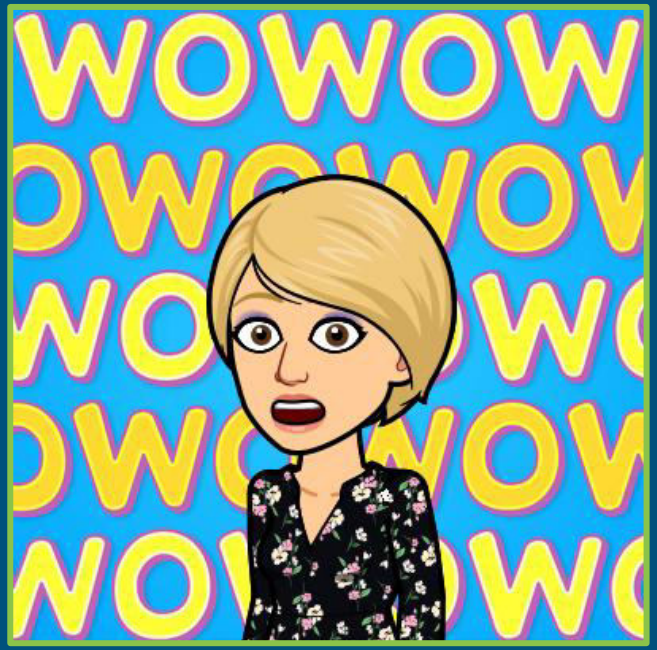


There’s more than one sequence of transformations that shows two figures are similar!



Today's Goals

- I can apply a sequence of transformations to one figure to get a similar figure.
- I can use a sequence of transformation to explain why two figures are similar.



Showing Similarity

Cool Down