Name Key Class Date

4-3

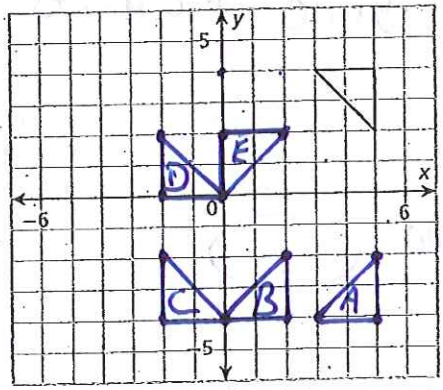
COMMON CORE CC.8.G.2

Transformations and Congruence

Essential question: *What is the connection between transformations and figures that have the same shape and size?*

1 EXPLORE Combining Transformations

Apply the indicated series of transformations to the triangle. Each transformation is applied to the image of the previous translation, not the original figure. Label each image with the letter of the transformation applied.



A Reflection across the x-axis

B $(x, y) \rightarrow (x - 3, y)$

C Reflection across the y-axis

D $(x, y) \rightarrow (x, y + 4)$

E Rotation 90° clockwise around the origin

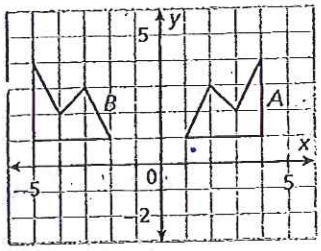
F Compare the size and shape of the final image to that of the original figure.

All have the same size & shape, just a different orientation.

Two figures are said to be **congruent** if one can be obtained from the other by a sequence of translations, reflections, and rotations. Congruent figures have the same size and shape.

When you are told that two figures are congruent, there must be a sequence of translations, reflections, and/or rotations that transforms one into the other.

2 EXAMPLE Congruent Figures



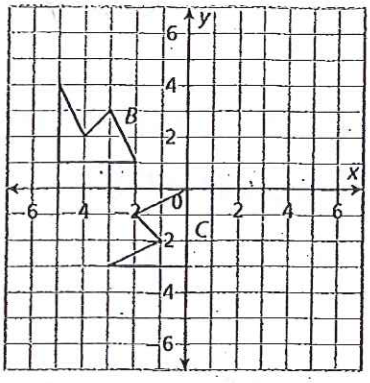
A Identify a sequence of transformations that will transform figure A into figure B.

$(x, y) \rightarrow (-x, y)$ and $(x, y) \rightarrow (x + 1, y)$

B Identify another sequence of transformations that transforms figure A into figure B.

$(x, y) \rightarrow (x + 1, y)$ and $(x, y) \rightarrow (-x, y)$

C Any sequence of transformations that changes figure *B* into figure *C* will need to include a rotation. Identify a rotation around the origin that would result in the figure being oriented as figure *C*.

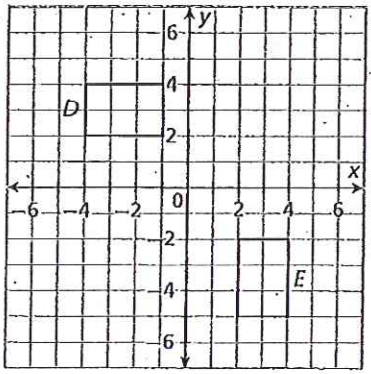


90° clockwise / counterclockwise

D After the rotation you identified in C, what transformation is necessary to result in figure *C*?

Translate the rotated figure → 1 unit and ↑ 2 units.

E A sequence of transformations that changes figure *D* to figure *E* will need to include a rotation. Describe a rotation around the origin that would result in the figure being oriented as figure *E*.



90° clockwise / counterclockwise

F After the rotation you identified in E, what are the coordinates of the vertices of the rotated figure?

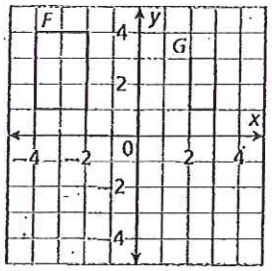
Possible Answers (2, 4) (4, 1) (4, 4) (2, 1)

G After the rotation you identified in E, what transformation is necessary to result in figure *E*?

Translate the rotated figure ↓ 6 units

TRY THIS!

1. Explain whether the figures are congruent.



No; they are NOT the same size.

2. Describe a sequence of translations, reflections, or rotations that would transform figure *F* into figure *G*.

You can't do it. There is no sequence.