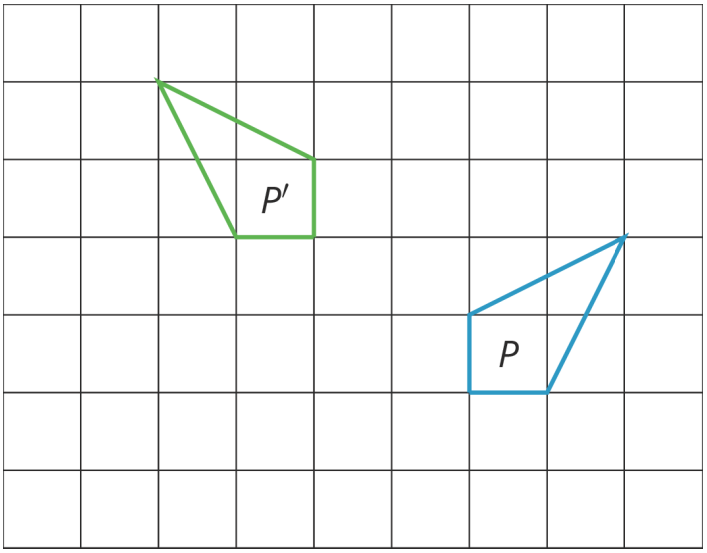
NAME DATE PERIOD

Unit 1, Lesson 6: Describing Transformations

Let's transform some polygons in the coordinate plane.

6.1: Finding a Center of Rotation

Andre performs a 90-degree counterclockwise rotation of Polygon P and gets Polygon P', but he does not say what the center of the rotation is. Can you find the center?



NAME DATE PERIOD

6.2: Info Gap: Transformation Information

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the *problem card*:

1. Silently read your card and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need.
3. Explain to your partner how you are using the information to solve the problem.
4. Solve the problem and explain your reasoning to your partner.

If your teacher gives you the *data card*:

1. Silently read the information on your card.
2. Ask your partner "What specific information do you need?" and wait for your partner to *ask* for information. *Only* give information that is on your card. (Do not figure out anything for your partner!)
3. Before telling your partner the information, ask "Why do you need that information?"
4. After your partner solves the problem, ask them to explain their reasoning and listen to their explanation.

Pause here so your teacher can review your work. Ask your teacher for a new set of cards and repeat the activity, trading roles with your partner.

Are you ready for more?

Sometimes two transformations, one performed after the other, have a nice description as a single transformation. For example, instead of translating 2 units up followed by translating 3 units up, we could simply translate 5 units up. Instead of rotating 20 degrees counterclockwise around the origin followed by rotating 80 degrees clockwise around the origin, we could simply rotate 60 degrees clockwise around the origin.

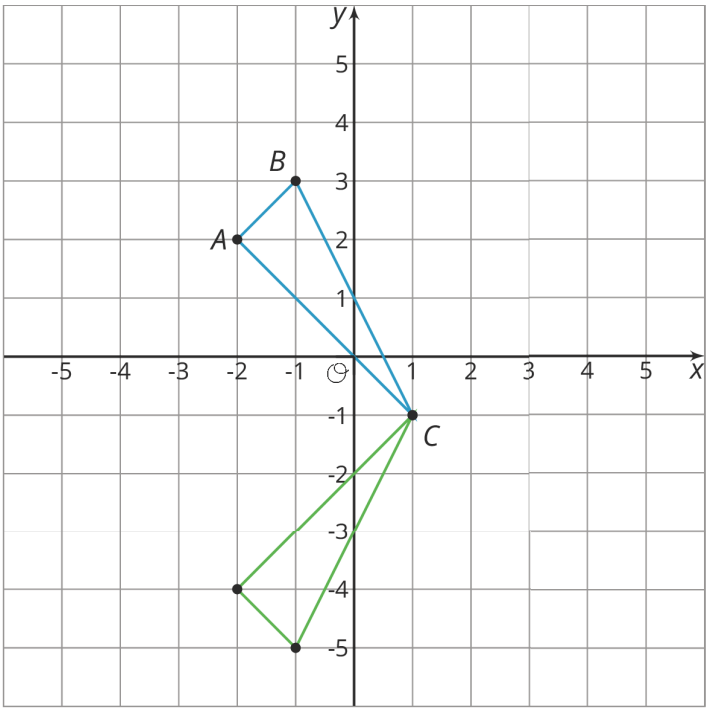
Can you find a simple description of reflecting across the x-axis followed by reflecting across the y-axis?

NAME DATE PERIOD

Lesson 6 Summary

The center of a rotation for a figure doesn't have to be one of the points on the figure. To find a center of rotation, look for a point that is the same distance from two corresponding points. You will probably have to do this for a couple of different pairs of corresponding points to nail it down.

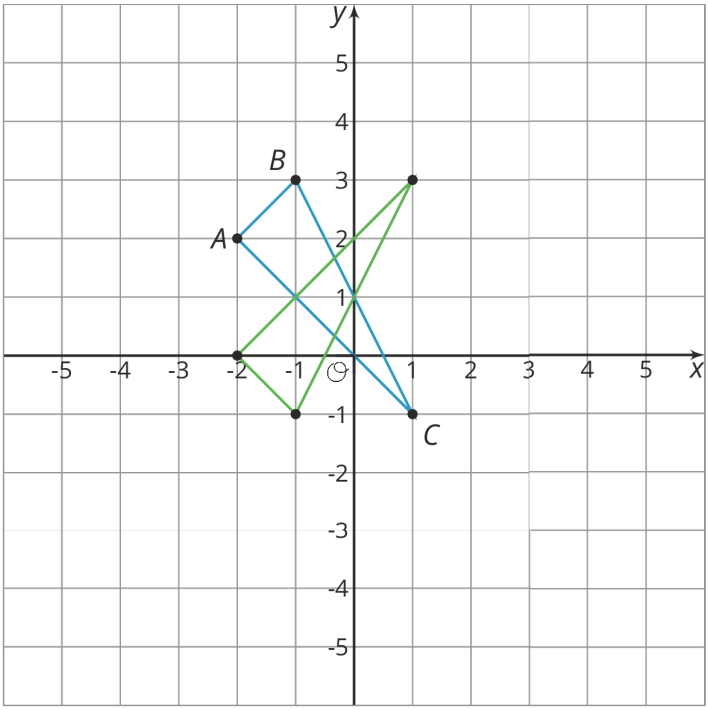
When we perform a sequence of transformations, the order of the transformations can be important. Here is triangle ABC translated up two units and then reflected over the x-axis.



NAME DATE PERIOD

Here is triangle ABC reflected over the x-axis and then translated up two units.

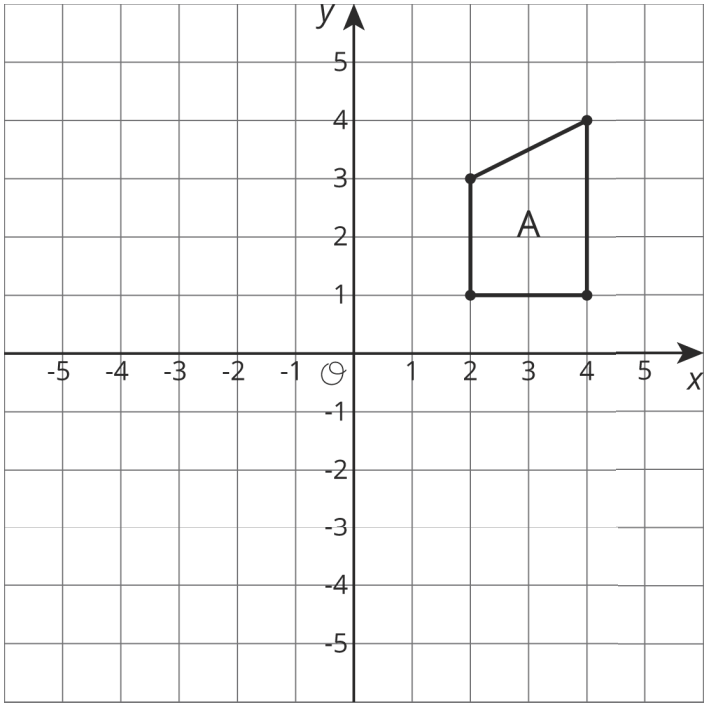
Triangle ABC ends up in different places when the transformations are applied in the opposite order!



NAME DATE PERIOD

Unit 1, Lesson 6: Describing Transformations

1. Here is Trapezoid A in the coordinate plane:



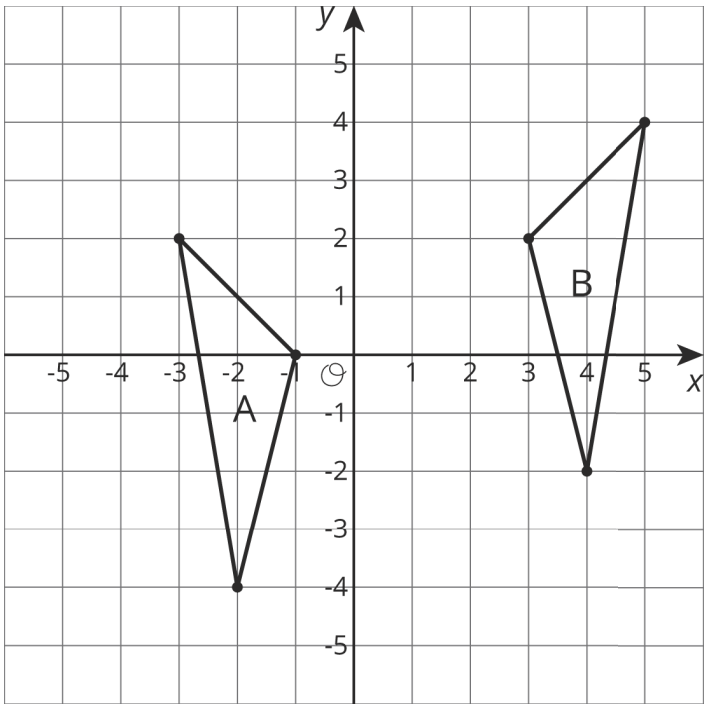
   a. Draw Polygon B, the image of A, using the y-axis as the line of reflection.
   b. Draw Polygon C, the image of B, using the x-axis as the line of reflection.
   c. Draw Polygon D, the image of C, using the x-axis as the line of reflection.

2. The point $(-4, 1)$ is rotated 180 degrees counterclockwise using center $(-3, 0)$. What are the coordinates of the image?

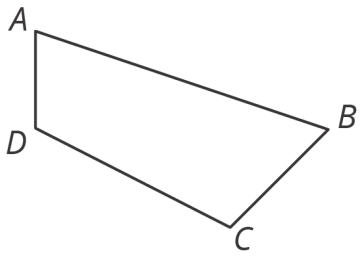
   A. $(-5, -2)$
   B. $(-4, -1)$
   C. $(-2, -1)$
   D. $(4, -1)$

3. Describe a sequence of transformations for which Triangle B is the image of Triangle A.

NAME DATE PERIOD



4. Here is quadrilateral $ABCD$.



Draw the image of quadrilateral $ABCD$ after each transformation.

a. The translation that takes B to D.

b. The reflection over segment BC.

c. The rotation about point A by angle DAB, counterclockwise.

(from Unit 1, Lesson 2)