Describing Transformations

Lesson 6

CCSS Standards: Addressing	• 8.G.A.1 • 8.G.A.3

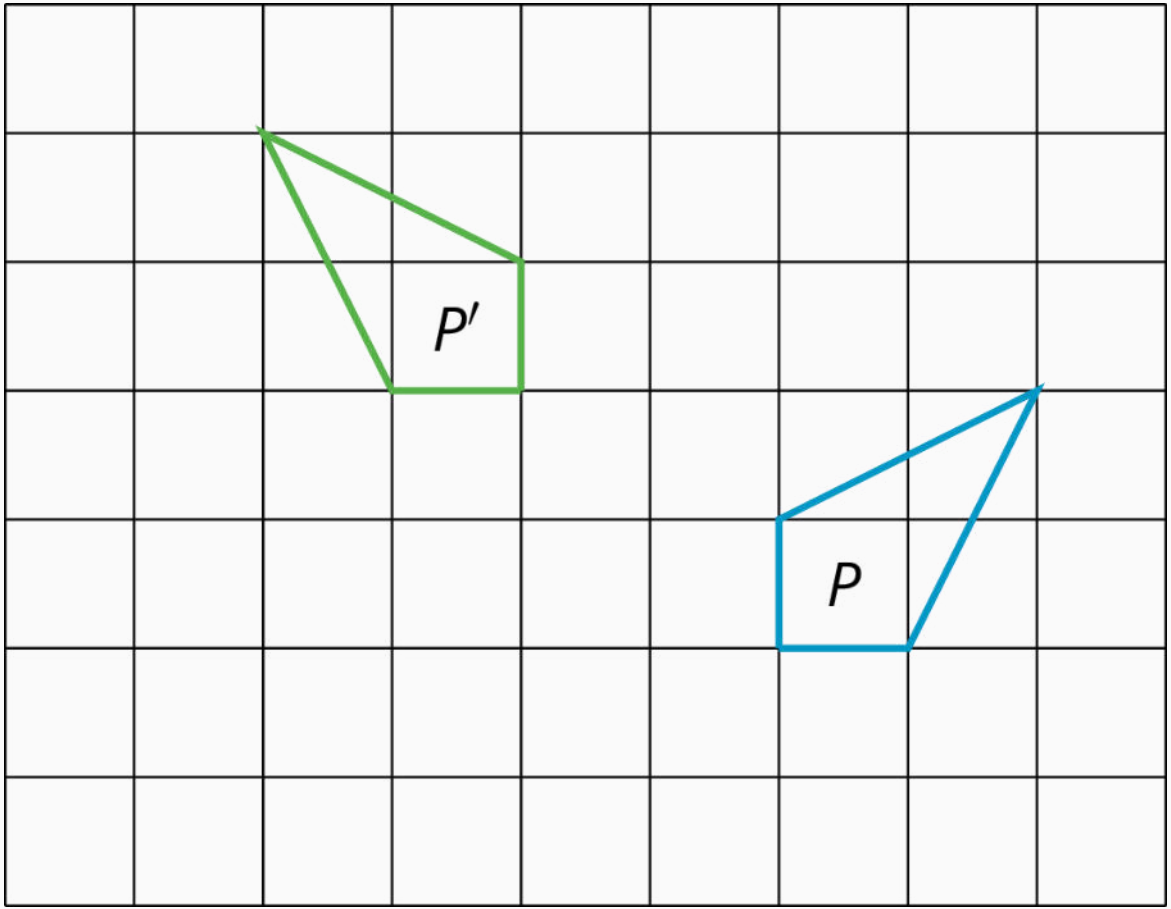
Let’s transform some polygons in the coordinate plane!

Finding a Center of Rotation

Warm-Up 6.1

Begin working with Quiet Work Time. (2 min)

Share your ideas with your team.



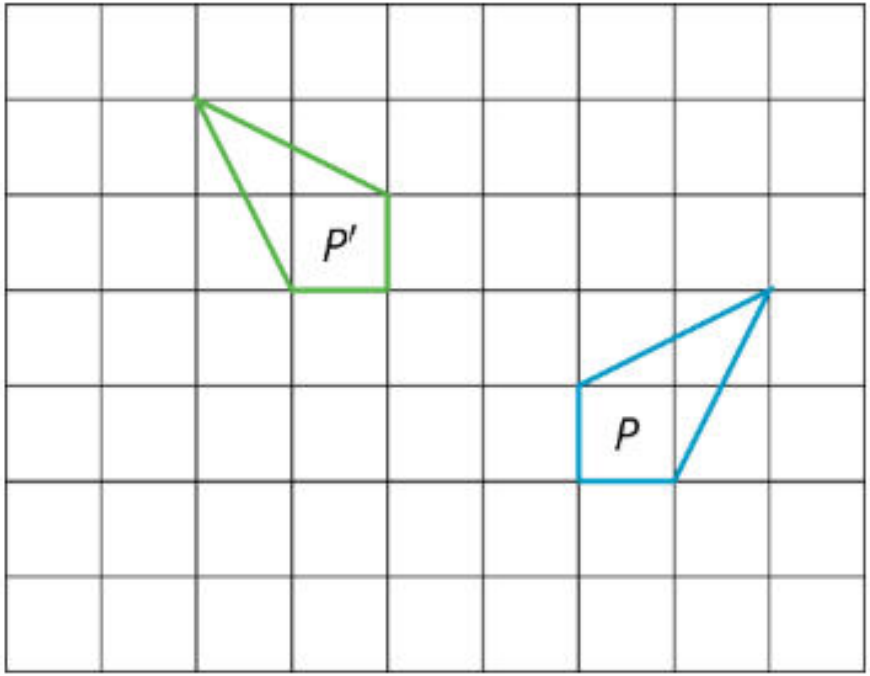
When performing a transformation, we should provide the information necessary for others to understand what we've done.

For a rotation, this means communicating…

- the center of the rotation,
- the direction of the rotation (clockwise or counterclockwise),
- the angle of rotation.

How did you identify the 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?



Info. Gap:
Transformation Information

Activity 6.2

Let’s continue to describe transformations using coordinates!

You will be given a problem card or a data card.

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Do not show your card to your partner.

If you have a data card:

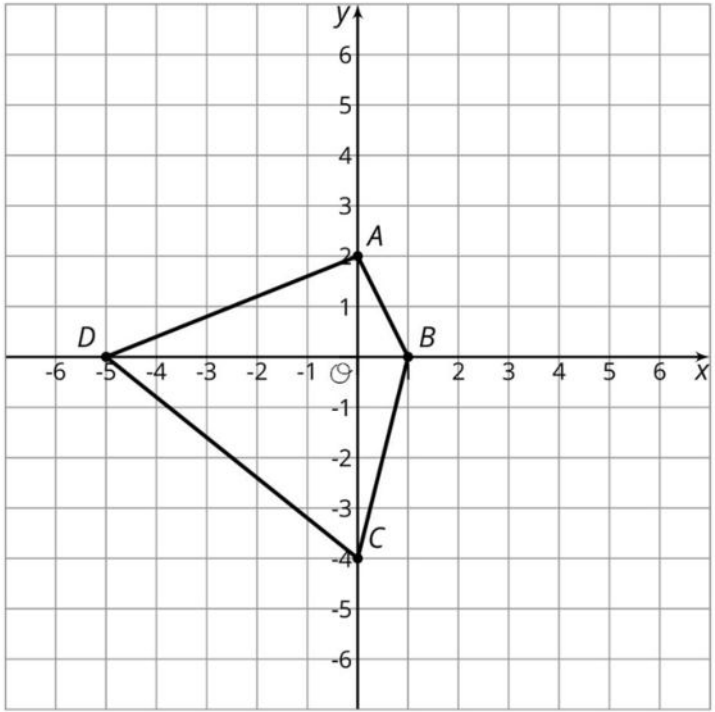
1. Silently read the info. on your card.
2. Ask your partner: **What info. do you need?** Wait for your partner to ask for info. Only give info. that is on your card.
3. Before telling your partner the info., ask, "**Why do you need that information?**"
4. After your partner solves the problem, ask them to explain their reasoning. Listen.

If you have a problem card:

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

Info Gap: Transformation Information

Problem Card 1



Polygon *A'B'C'D'* is the image of *ABCD* after some transformations.

Find *A'B'C'D'* .

Info Gap: Transformation Information

Data Card 1

Translation: 2 units up and 3 units to the right

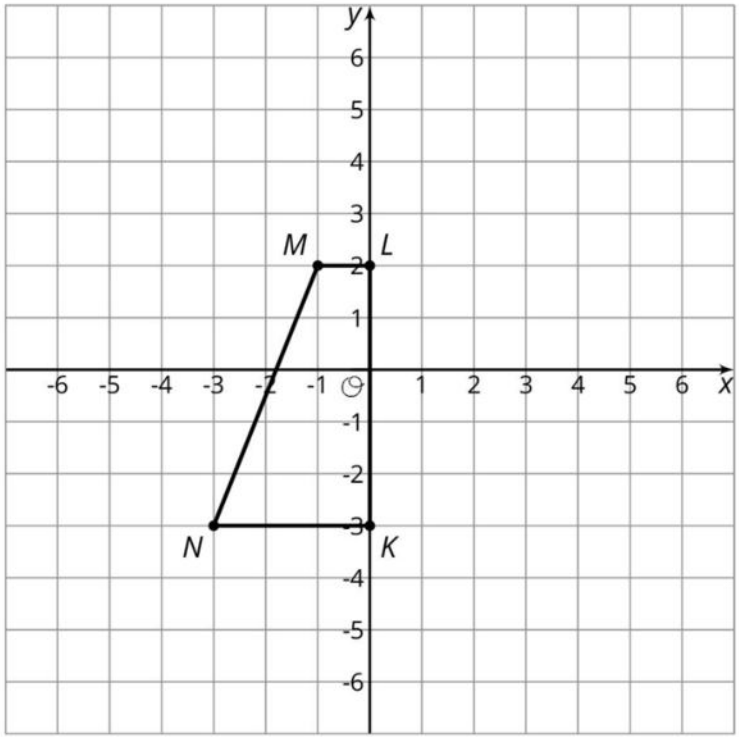
Rotation: none

Reflection: over x-axis

Order of Transformations: Translation first and then reflection

Info Gap: Transformation Information

Problem Card 2



Polygon *K'L'M'N'* is the image of *KLMN* after some transformations.

Find *K'L'M'N'*.

Info Gap: Transformation Information

Data Card 2

Translation: 1 unit left and 3 units down

Rotation: 90 degrees

Direction of rotation: clockwise

Center of rotation: (0,0)

Reflection: none

Order of transformations: Rotation first and then translation

How did using coordinates help in talking about the problem?

Was the order in which the transformations were applied important? Why?

One advantage of a coordinate plane is that it allows us to communicate information about translations precisely.

Here is what is needed for each type of transformation:

For a **translation**...

➔ the distance of vertical and horizontal components

For a **rotation**...

➔ the center of rotation, the direction of rotation, and the angle of rotation

For a **reflection**...

➔ the line of reflection

“Are you ready for more?

Sometimes two transformations, one performed after the other, have a nice description as a single transformation.

For example, 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?

Which of the three transformations we have studied so far is your favorite?

- translation
- reflection
- rotation

Write a few sentences explaining why! (3 min)

Share your explanations with a partner. Then we'll share out!

Today's Goal

- ❏ I can apply transformations to a polygon on a grid if I know the coordinates of its vertices.

Describing a Sequence of Transformations

Cool Down 6.3