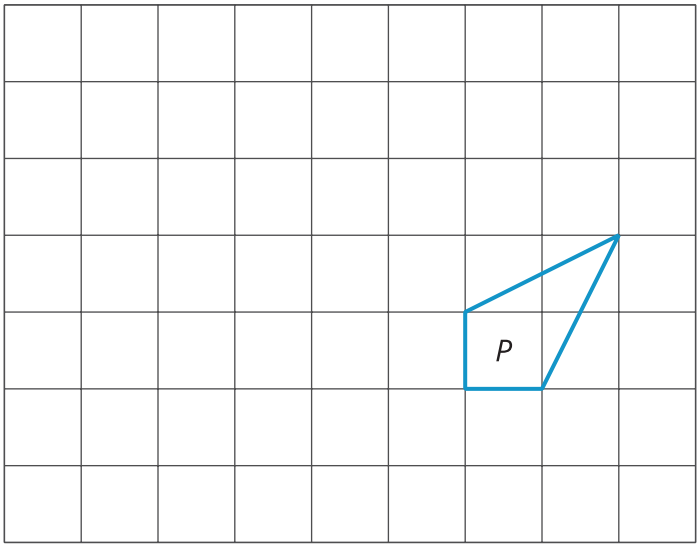
# Describing Transformations

Let's transform some polygons in the coordinate plane.

## 5.1 What Do You Want to Know?




$P'$ is the image of $P$ after some transformations.

What specific information do you need to be able to solve the problem?

# 5.2 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 be able to answer the question.
2. Ask your partner for the specific information that you need. "Can you tell me _____?"
3. Explain to your partner how you are using the information to solve the problem. "I need to know _____ because . . . ."

   Continue to ask questions until you have enough information to solve the problem.
4. Once you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card and discuss your reasoning.

If your teacher gives you the data card:

1. Silently read your card. Wait for your partner to ask for information.
2. Before telling your partner any information, ask, "Why do you need to know _____?"
3. Listen to your partner's reasoning and ask clarifying questions. Only give information that is on your card. Do not figure out anything for your partner!

   These steps may be repeated.
4. Once your partner says they have enough information to solve the problem, read the problem card and solve the problem independently.
5. Share the data card, and discuss your reasoning.

## Are you ready for more?

Sometimes two transformations, one performed after the other, have a simpler 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 $20^\circ$ counterclockwise around the origin followed by rotating $80^\circ$ clockwise around the origin, we could simply rotate $60^\circ$ clockwise around the origin.

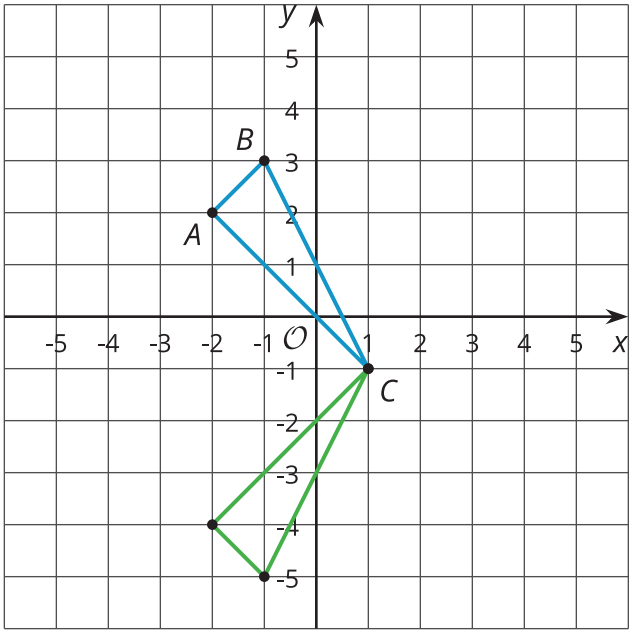
Can you find a simple description of reflecting across the $x$-axis followed by reflecting across the $y$-axis?

## Lesson 5 Summary

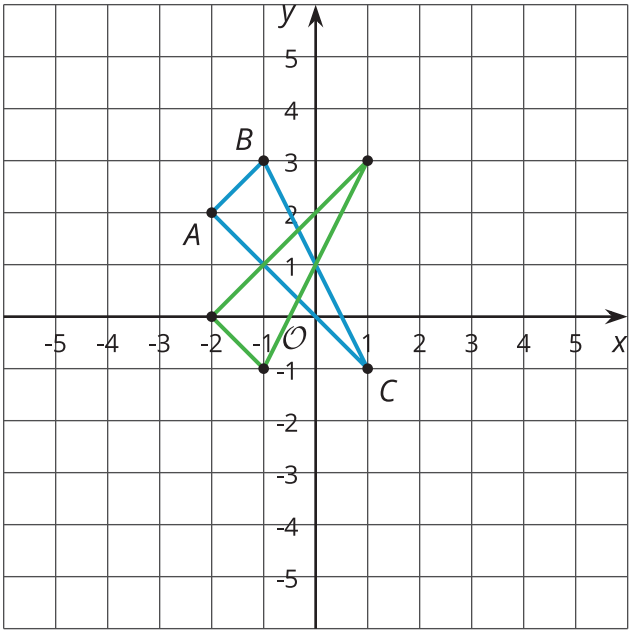
When describing a sequence of transformations, there are several pieces of information that are important to know. For a translation, we need to know distance and direction. For a rotation, we need the center of rotation, direction, and amount of rotation. For a reflection, we need a line of reflection. There is one more piece of information that is helpful though.

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.




Here is triangle $ABC$ reflected over the $x$-axis and then translated up 2 units.




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