7.5 Communicate about Transformations

YOU WILL NEED
• grid paper
• a compass
• a ruler

GOAL
Discuss mathematical ideas using mathematical terms.

LEARN ABOUT the Math

Nick asked Pavlo to check an entry in his math portfolio. In the entry, Nick described how the yellow triangle was transformed to create the blue triangle.
How can Nick improve his description?

Nick’s Entry

I knew that it couldn’t be just a slide.
I thought that a 90° turn was used because \( \angle C' \) is horizontal but \( \angle C \) is vertical.
I used a 90° turn, and the triangle ended up in the second quadrant.
Then I saw that I just had to reflect across the y-axis. This worked.

Pavlo’s Questions and Suggestions

- How did you know this?
- Why did you say “slide” instead of “translation”?
- What did you mean by “it”?
- Why did you think a 90° turn had to be used?
- Why did you say “turn” instead of “rotation”?
- What was your centre of rotation?
- Did you rotate clockwise or counterclockwise?
- You might want to draw a diagram and describe the coordinates after each transformation.
- How did you know that you could reflect?

A. What other questions could you ask to help Nick improve his description?

B. Rewrite Nick’s description in response to Pavlo’s questions and suggestions. Use the Communication Checklist.

Reflecting

C. How did Pavlo’s questions and suggestions help Nick improve his communication about the transformed triangle?

D. Which parts of the Communication Checklist did Nick cover well?
Example | Describing a transformation

Describe how the yellow triangle was transformed to create the green triangle.

### Ashley’s Solution

I noticed that $C'$ is to the right of $A'$. To get $C$ to the right of $A$, I rotated $\triangle ABC$ $90^\circ$ ccw around vertex $A$.

- $A(-4, -1) \rightarrow (-4, -1)$
- $B(-2, -4) \rightarrow (-1, 1)$
- $C(-4, -4) \rightarrow (-1, -1)$

To get the rotated image of $\triangle ABC$ into the 1st quadrant, I translated it 5 units to the right and 1 unit up.

- $(-4, -1) \rightarrow (1, 0)$
- $(-1, 1) \rightarrow (4, 2)$
- $(-1, -1) \rightarrow (4, 0)$

This is one way to describe the transformation. Looking over my work, I can see other ways to describe the transformation.
A Checking
1. a) Plot four different points on a Cartesian coordinate system. 
   Connect the points to create a polygon. 
   b) Transform your polygon to another position on the grid. 
   c) Use mathematical language to describe the transformation.

B Practising
2. Improve Diane’s description of the transformation, using the 
   Communication Checklist to help you.

3. Describe the transformation $\triangle ABC \rightarrow \triangle A'B'C'$ in question 2 
   in a different way than Diane did.

4. a) Draw a parallelogram in the third quadrant of a Cartesian 
   coordinate system. 
   b) Draw a congruent parallelogram in another quadrant. 
   c) Describe how you would transform your parallelogram in 
      part (a) to create your parallelogram in part (b). 
   d) Use the Communication Checklist to check your answer in 
      part (c). How could you improve your description?