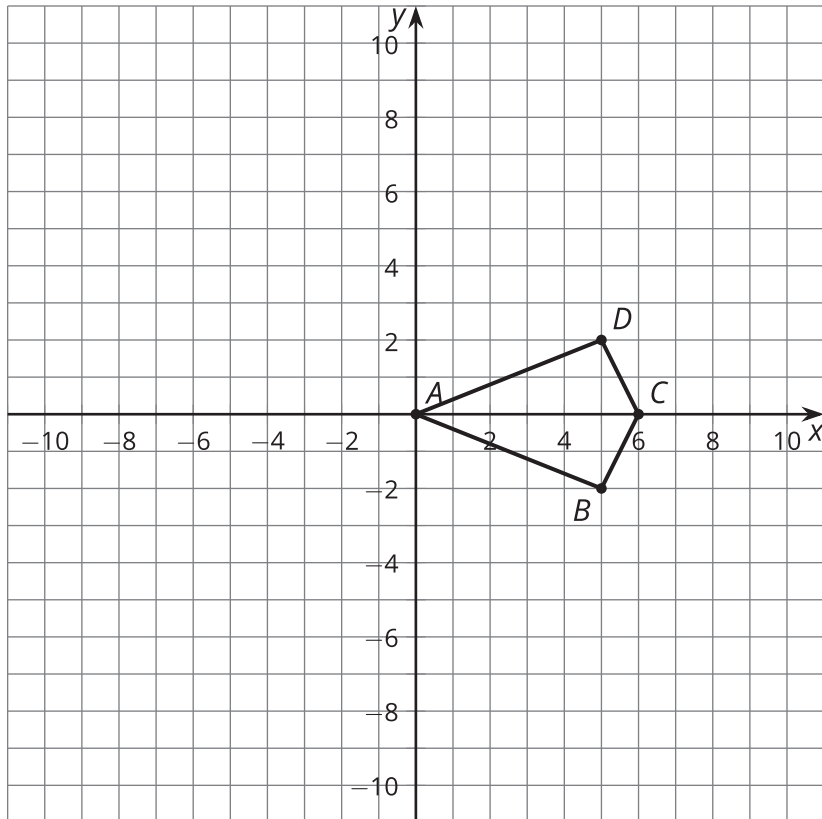


# Unit 6 Lesson 11: Perpendicular Lines in the Plane

## 1 Revisiting Transformations (Warm up)

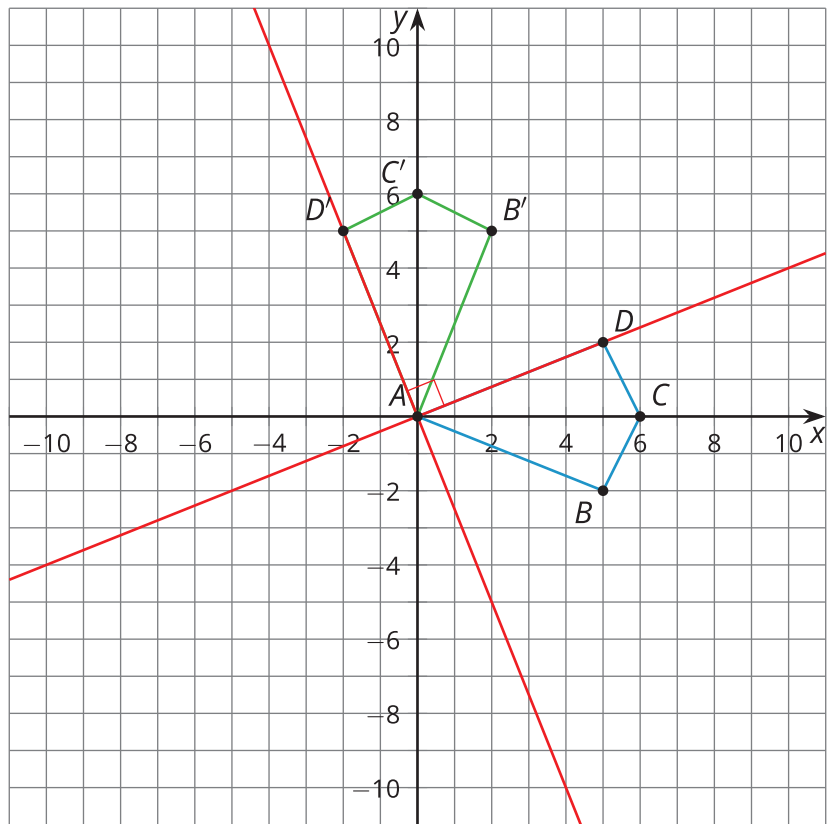
### Student Task Statement

The image shows quadrilateral  $ABCD$ .



Apply the transformation rule  $(x, y) \rightarrow (-y, x)$  to quadrilateral  $ABCD$ . What is the effect of the transformation rule?

# Activity Synthesis



## 2 Make a Conjecture

### Student Task Statement

1. Complete the table with the slope of each segment from the warm-up.

	original figure slope	image slope	product
$AB$			
$BC$			
$CD$			
$DA$			

2. The image in the warm-up is a 90-degree rotation of the original figure, so each line in the original figure is perpendicular to the corresponding line in the image. Use your slope calculations to make a conjecture about slopes of perpendicular lines.

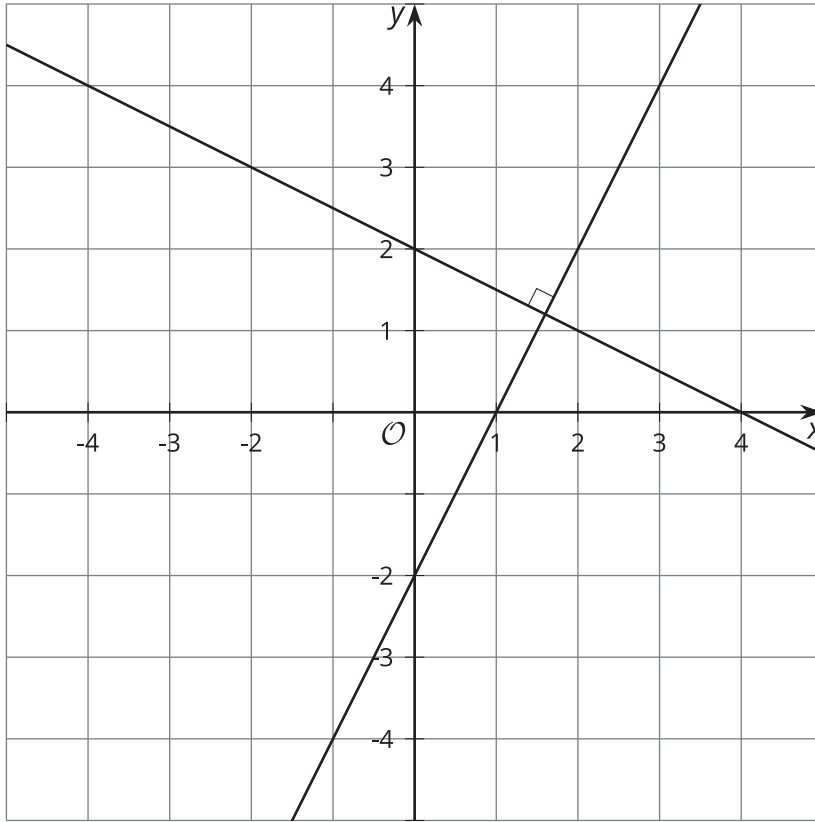
### 3 Prove It

#### Student Task Statement

Let's prove our conjecture about slopes of perpendicular lines for the case where the lines pass through the origin.

1. Find the slope of a line passing through the point  $(a, b)$  and the origin. Assume the line is not horizontal or vertical.
2. Suppose the line is rotated using the transformation rule  $(x, y) \rightarrow (-y, x)$ . Find the coordinates of the images of the points  $(a, b)$  and the origin.
3. How does the original line relate to the image?
4. Find the slope of the image.
5. Compare your slopes. What did you just prove?

### Activity Synthesis



### Images for Activity Synthesis

