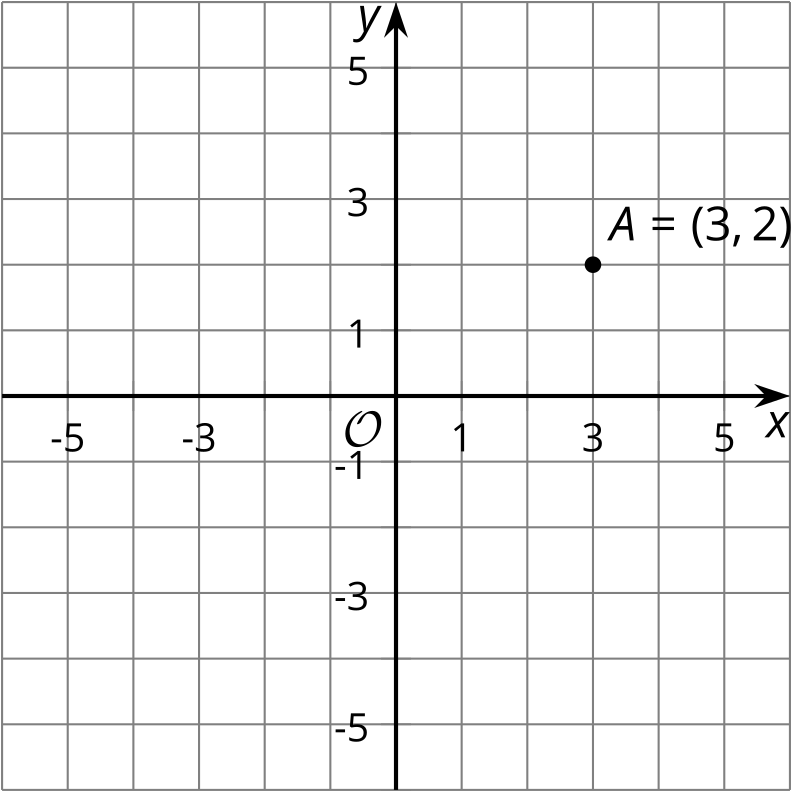
## Lesson 2: Transformations as Functions

* Let’s compare transformations to functions.

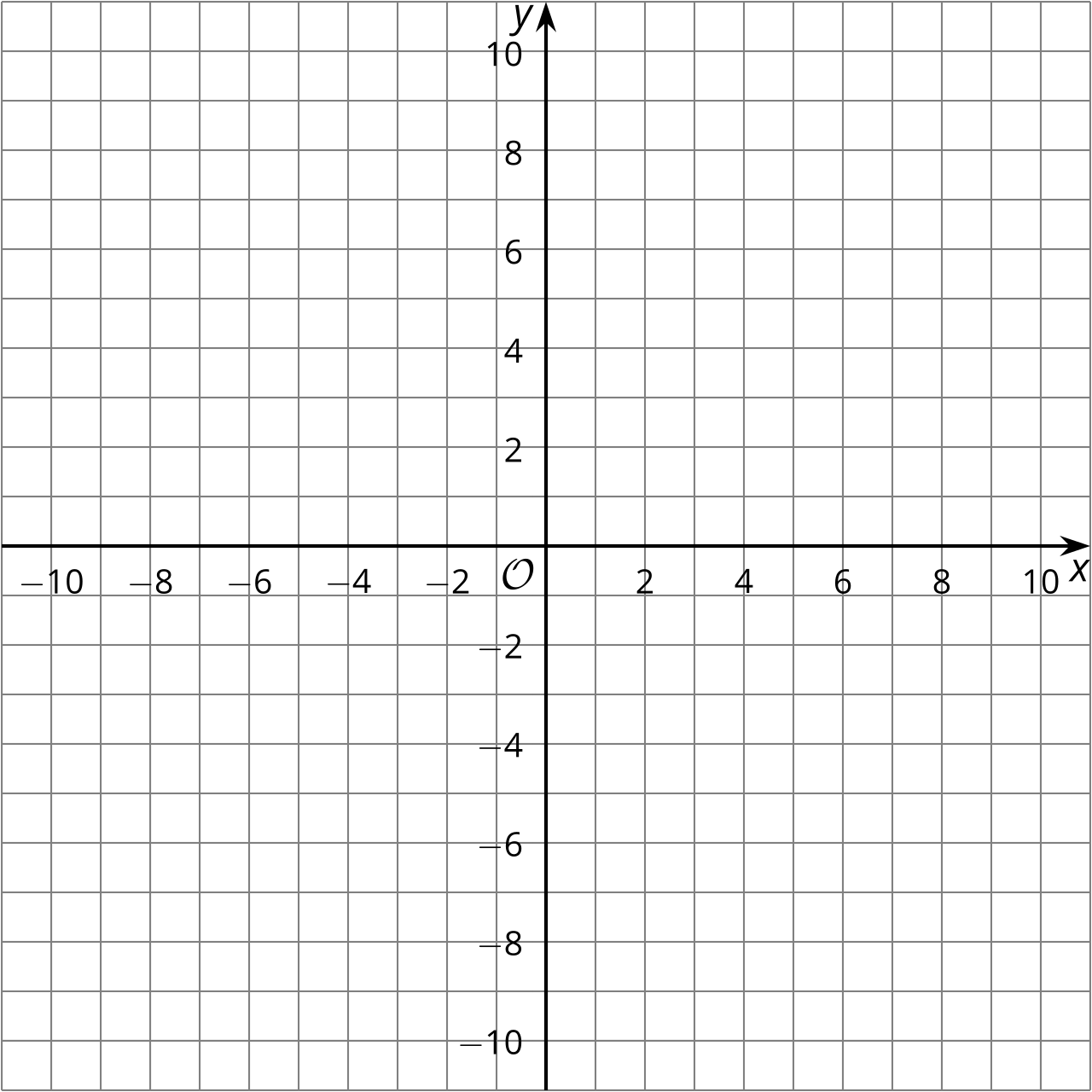
### 2.1: Math Talk: Transforming a Point

Mentally find the coordinates of the image of under each transformation.



* Translate by the directed line segment from to .
* Translate by the directed line segment from to .
* Reflect across the -axis.
* Rotate 180 degrees clockwise using the origin as a center.

### 2.2: Inputs and Outputs

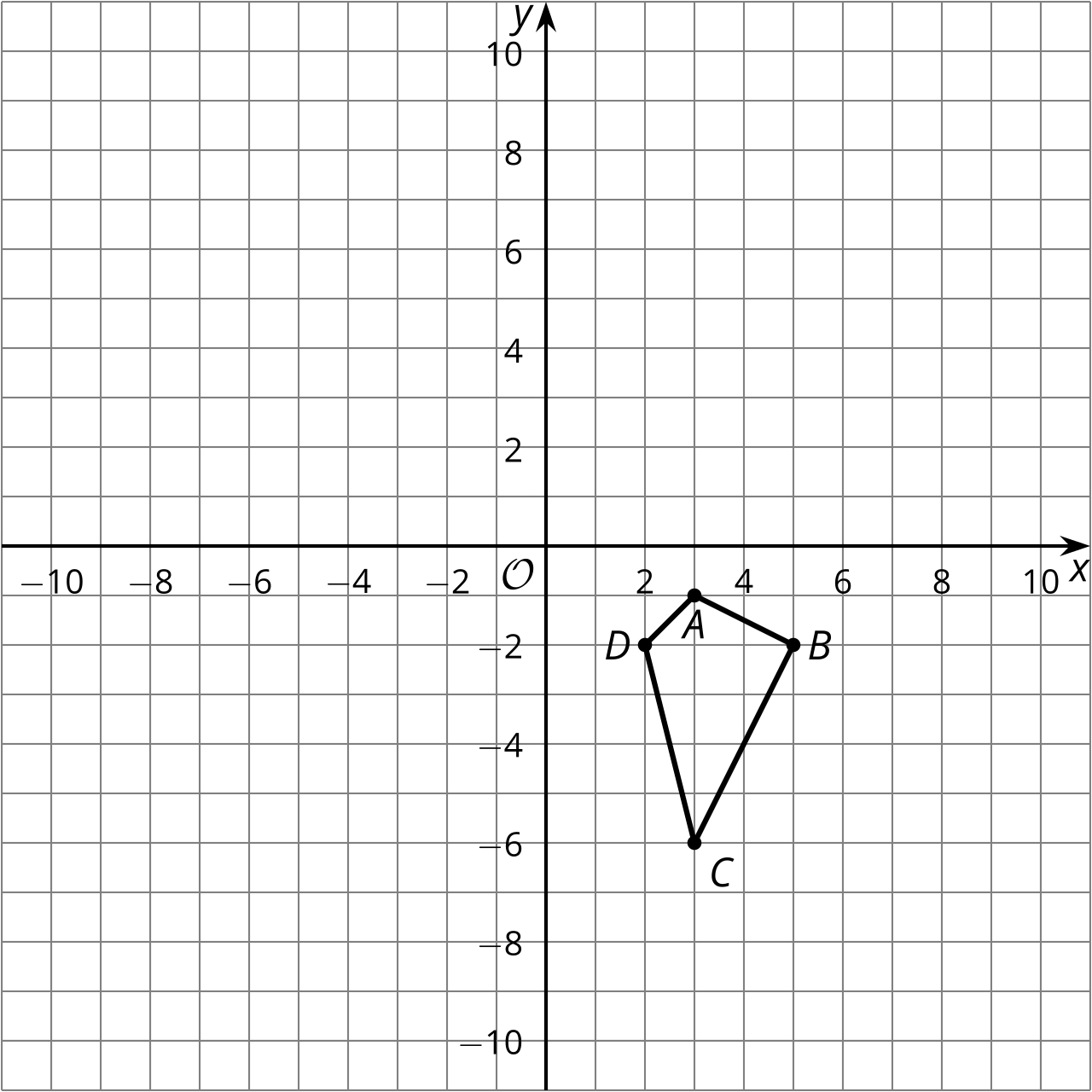


1. For each point , find its image under the transformation .
2. Next, sketch triangle and its image on the grid. What transformation is ?
3. For each point in the table, find .

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

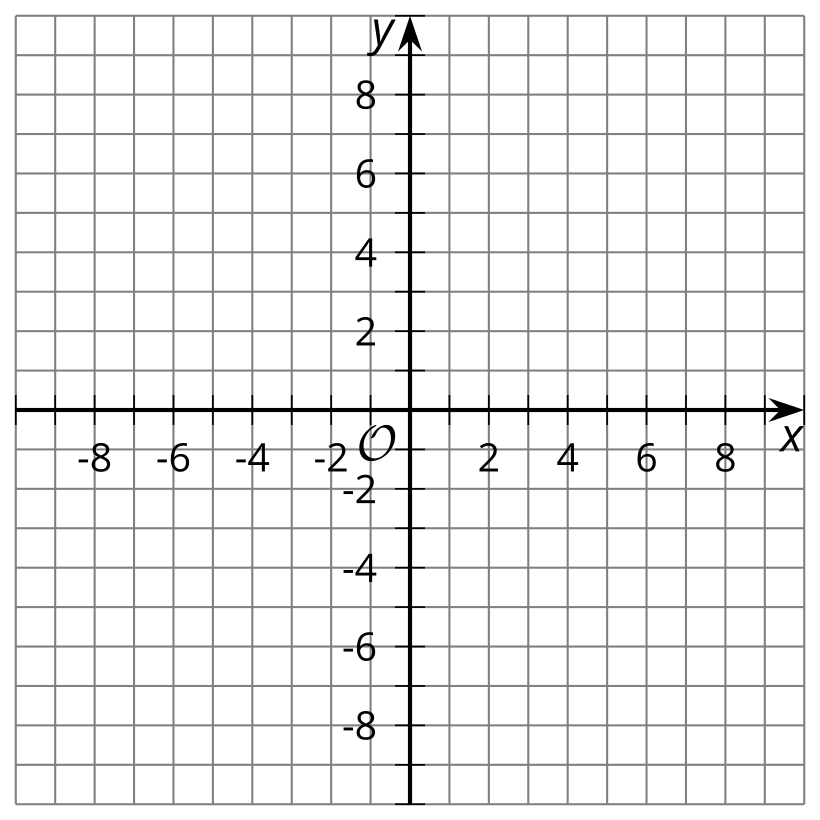
1. Next, sketch the original figure (the column) and image (the ( column). What transformation is ?

### 2.3: What Does it Do?



1. Here are some transformation rules. Apply each rule to quadrilateral  and graph the resulting image. Then describe the transformation.
   1. Label this transformation :
   2. Label this transformation :
   3. Label this transformation :

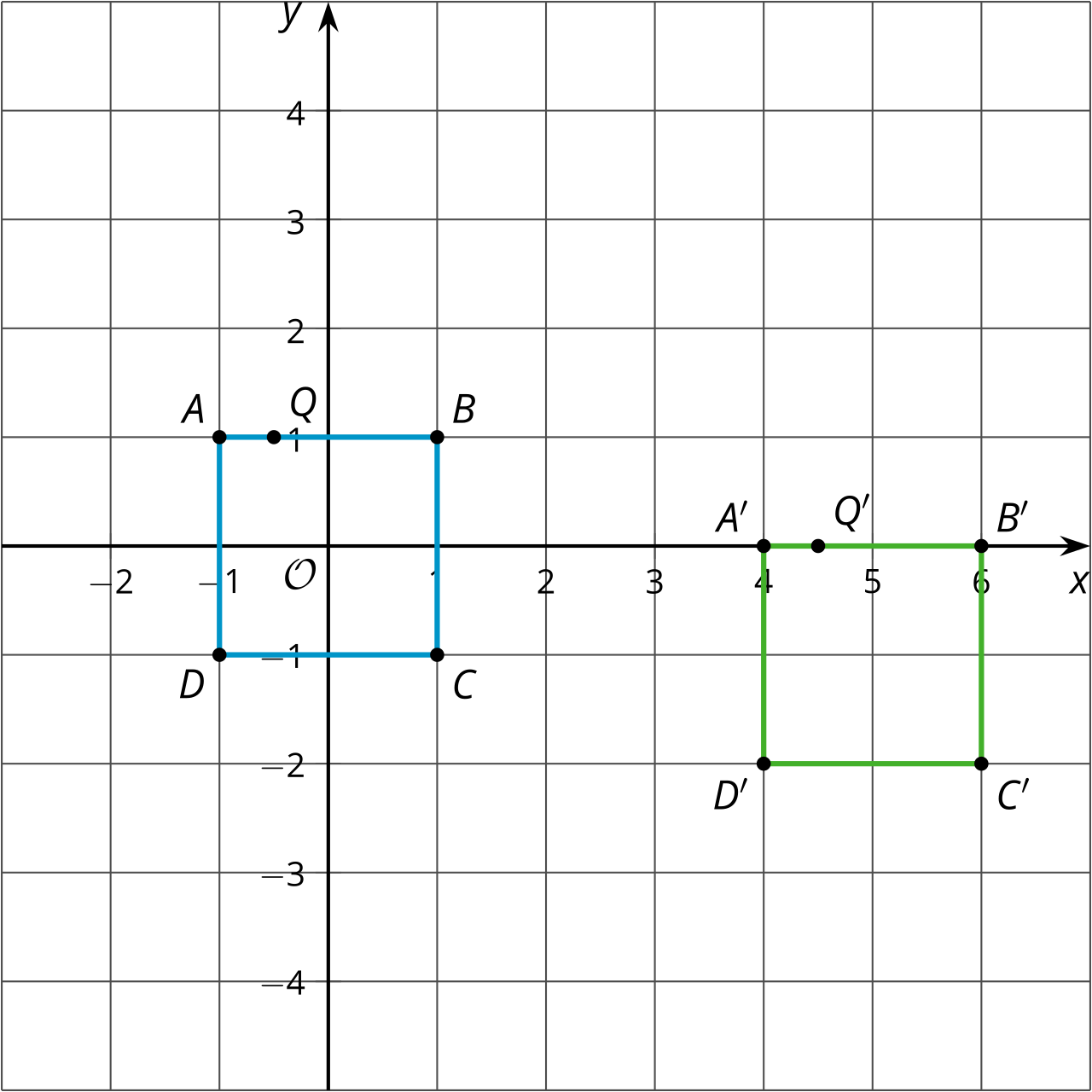
#### Are you ready for more?



1. Plot the quadrilateral with vertices and . Label this quadrilateral .
2. Plot the quadrilateral with vertices and . Label this quadrilateral .
3. How are the coordinates of quadrilateral related to the coordinates of quadrilateral ?
4. What single transformation takes quadrilateral to quadrilateral ?

### Lesson 2 Summary

Square has been translated by the directed line segment from to . The result is square .



Here is a list of coordinates in the original figure and corresponding coordinates in the image. Do you see the rule for taking points in the original figure to points in the image?

| original figure | image |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

This table looks like a table that shows corresponding inputs and outputs of a function. A transformation is a special type of function that takes points in the plane as inputs and gives other points as outputs. In this case, the function’s rule is to add 5 to the -coordinate and subtract 1 from the -coordinate.

We write the rule this way: .



© CC BY 2019 by Illustrative Mathematics®