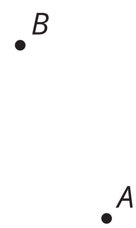
Unit 2, Lesson 17

Using Equations for Lines

Let’s write equations for lines.

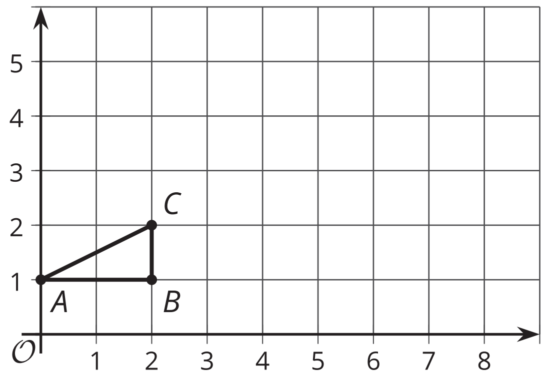
17.1 Missing Center

A dilation with scale factor 2 sends A to B. Where is the center of the dilation?



17.2 Dilations and Slope Triangles

Here is triangle ABC.

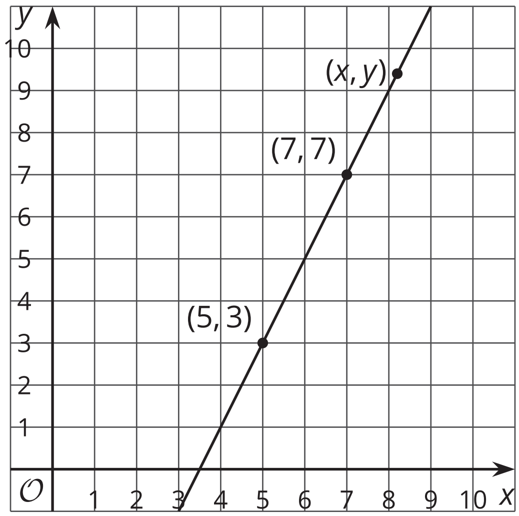


1. Draw the dilation of triangle ABC with center $(0, 1)$ and scale factor 2.
2. Draw the dilation of triangle ABC with center $(0, 1)$ and scale factor 2.5.
3. For which scale factor does the dilation with center $(0, 1)$ send point C to $(9, 5.5)$? Explain your reasoning.

4. What are the coordinates of point C after a dilation with center $(0, 1)$ and scale factor s?

17.3 Writing Relationships from Two Points

Here is a line.



1. Using what you know about similar triangles, find an equation for the line in the diagram.

2. What is the slope of this line? Does it appear in your equation?

3. Is $(9, 11)$ also on the line? Explain your reasoning.

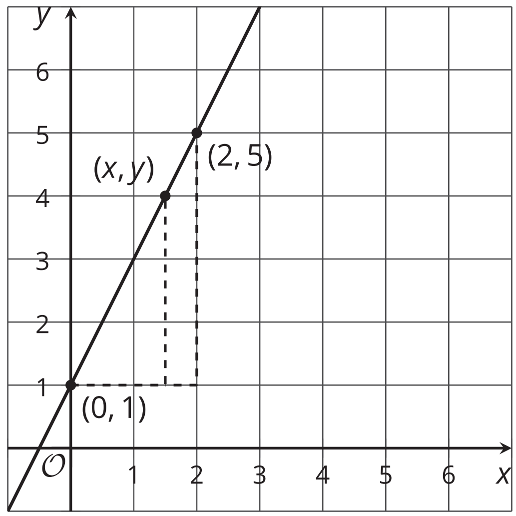
4. Is $(100, 193)$ also on the line? Explain your reasoning.

Are you ready for more?

There are many different ways to write an equation for a line like the one in the *Student Task* you just completed. Does $\frac{y-3}{x-6} = 2$ represent that line? What about $\frac{y-6}{x-4} = 5$? What about $\frac{y+5}{x-1} = 2$? Explain your reasoning.

Lesson 17 Summary

Here is a line with a few of the points labeled.



We can use what we know about slope to decide if a point lies on a line.

First, use points and slope triangles to write an equation for the line.

- The slope triangle with vertices $(0, 1)$ and $(2, 5)$ gives a slope of $\frac{5-1}{2-0} = 2$.
- The slope triangle with vertices $(0, 1)$ and (x, y) gives a slope of $\frac{y-1}{x}$.
- Since these slopes are the same, $\frac{y-1}{x} = 2$ is an equation for the line.

To check whether or not the point $(11, 23)$ lies on this line, we can check that $\frac{23-1}{11} = 2$. Since $(11, 23)$ is a solution to the equation, it's on the line!