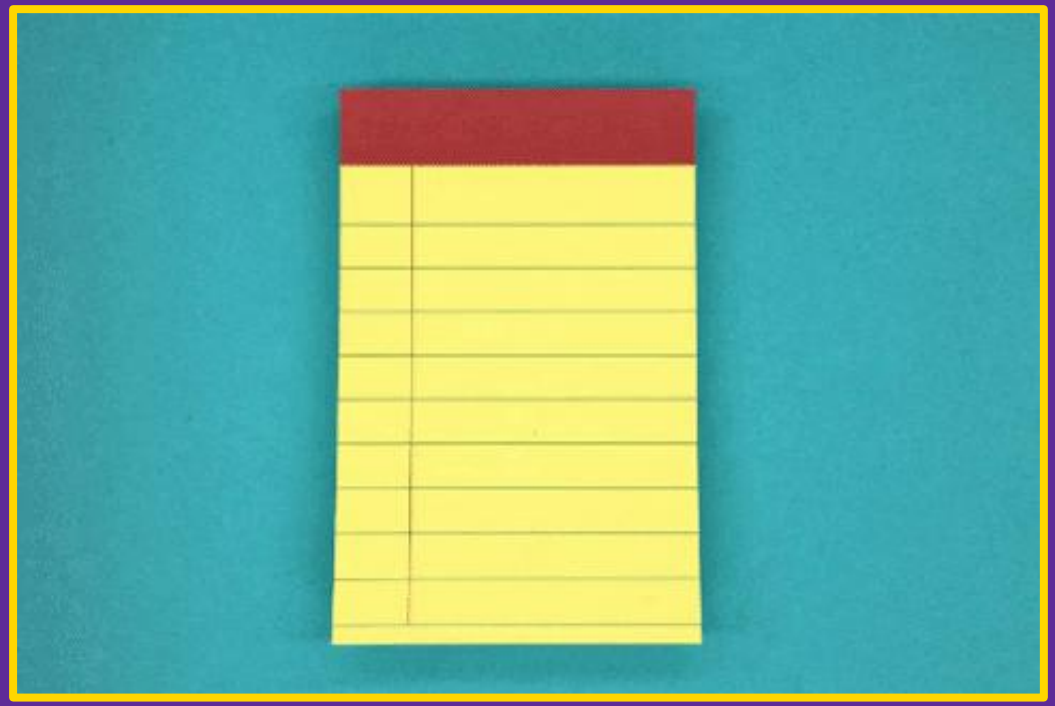
Using Equations for Lines

Lesson 12

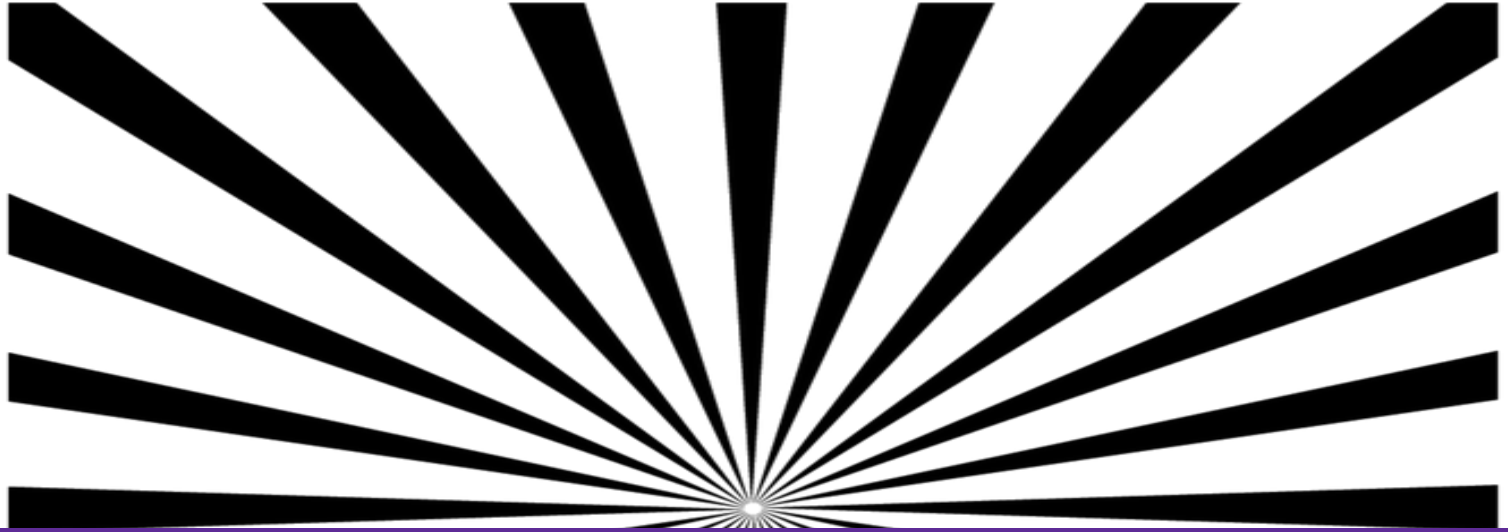
Addressing	**8.EE.B.6** Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. **8.G.A** Understand congruence and similarity using physical models, transparencies, or geometry software. **8.G.A.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
Building toward	**8.EE.B.6** Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.

Let's write equations for lines!



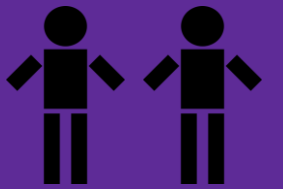
Today's Goal

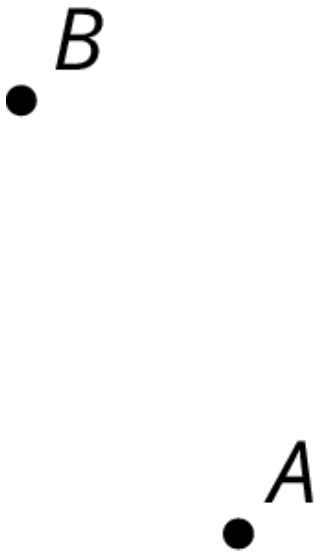
- ❑ I can find an **equation for a line** and use that to decide which points are on that line.



Missing Center

Warm Up 12.1





A dilation with scale factor 2 sends A to B.

Where is the center of the dilation?

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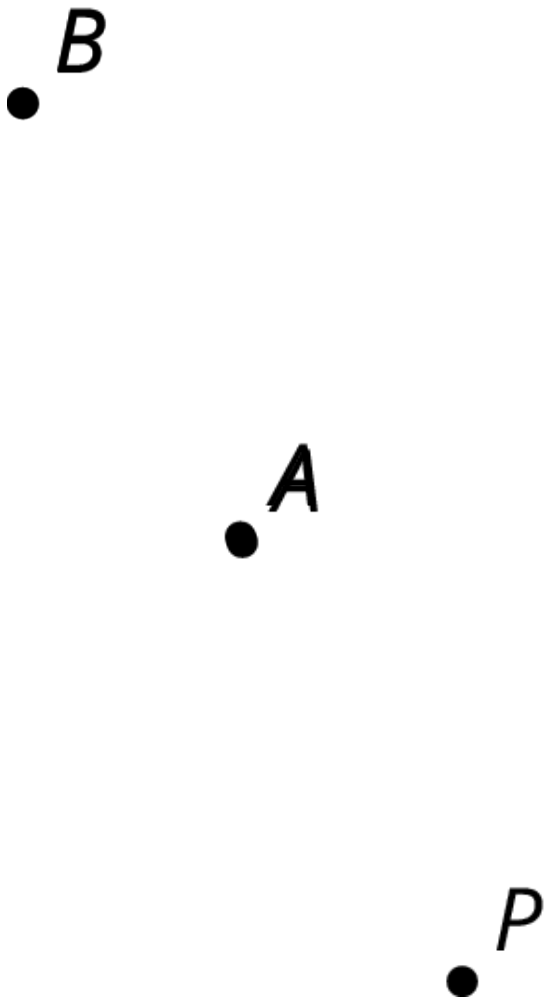

A dilation with scale factor 2 sends *A* to *B*.

Where is the center of the dilation?

What do you know about the center of dilation that helps to solve this problem?

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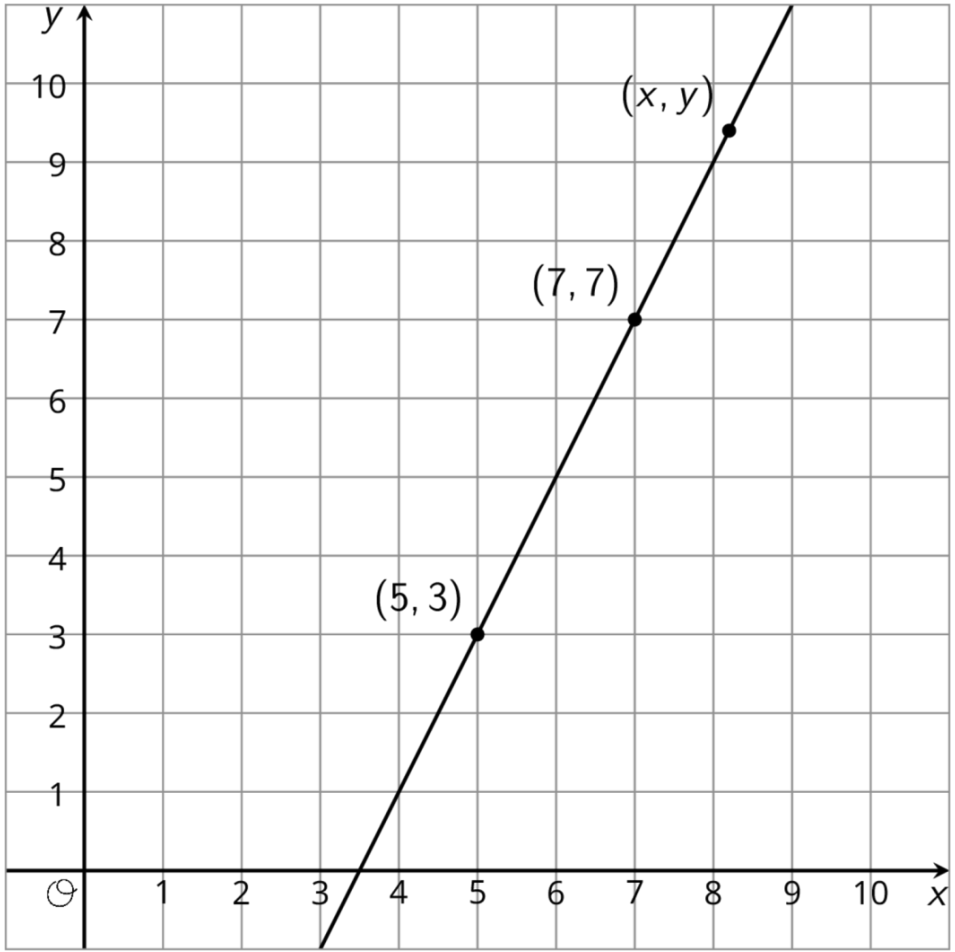
Writing Relationships from Two Points

Activity 12.2

- Think Pair Share
- Clarify, Critique, Correct

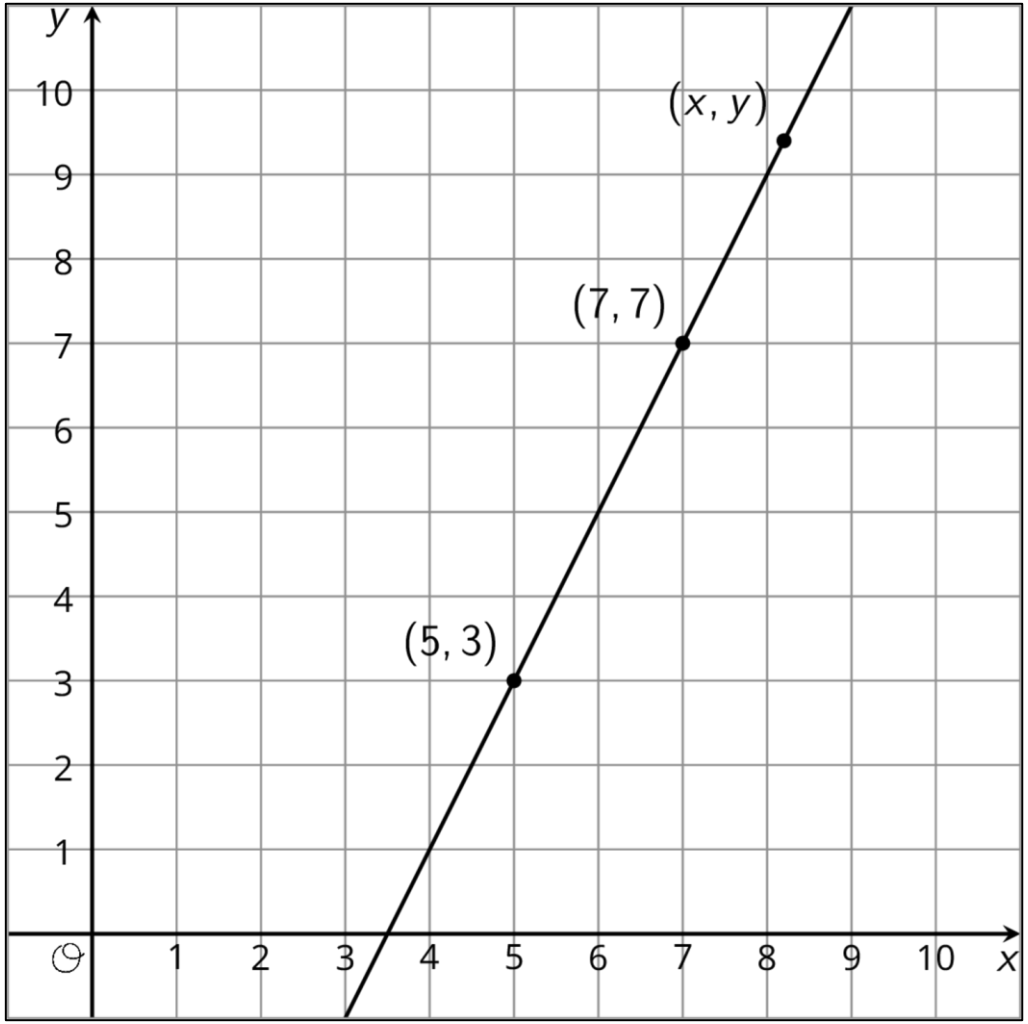


Begin working on your own (2-3 min)

Share your reasoning with your team.

How did you come up with your equation?

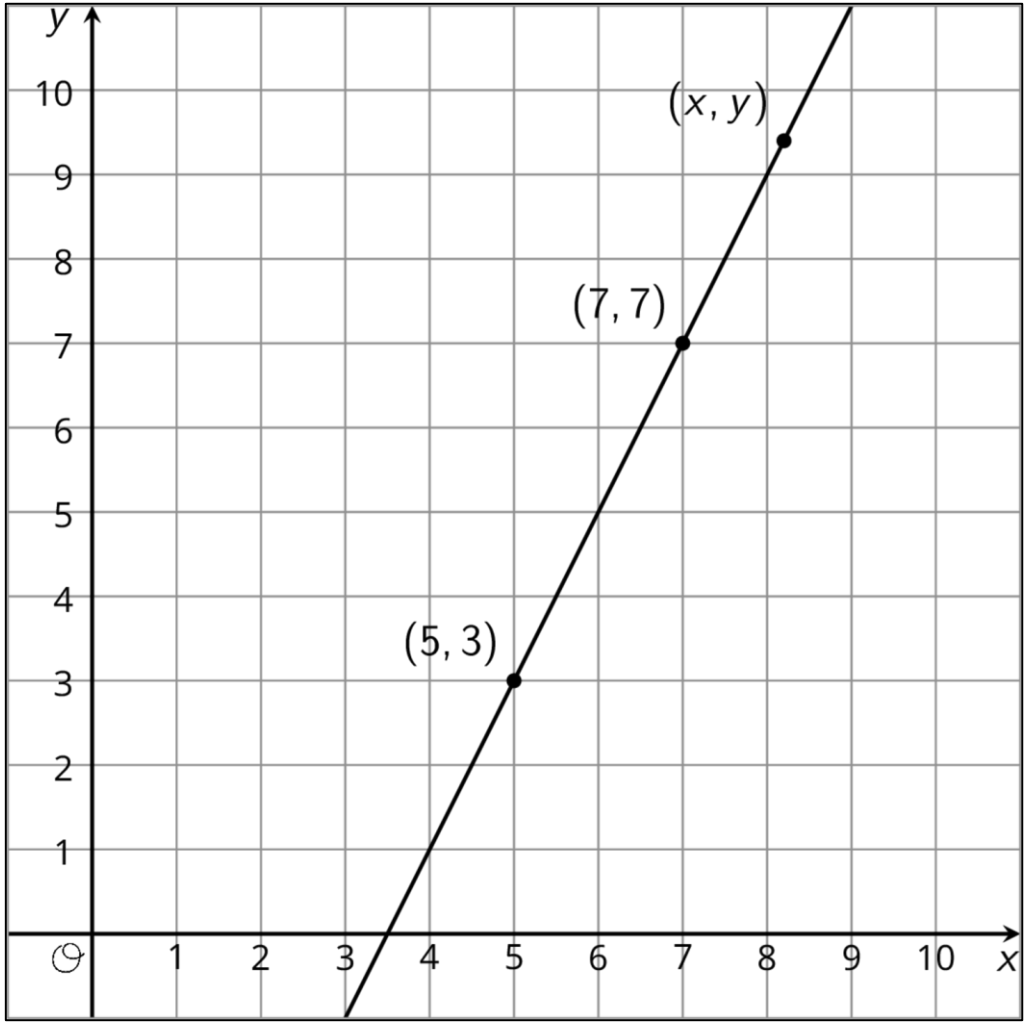
What is the slope of this line? Does it appear in your equation?



How did the equation help determine whether or not the points lie on the line?

$$\frac{y-7}{x-7} = 2$$

$$\frac{y-3}{x-5} = 2$$



“Are you ready for more?”

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

Dilations and Slope Triangles

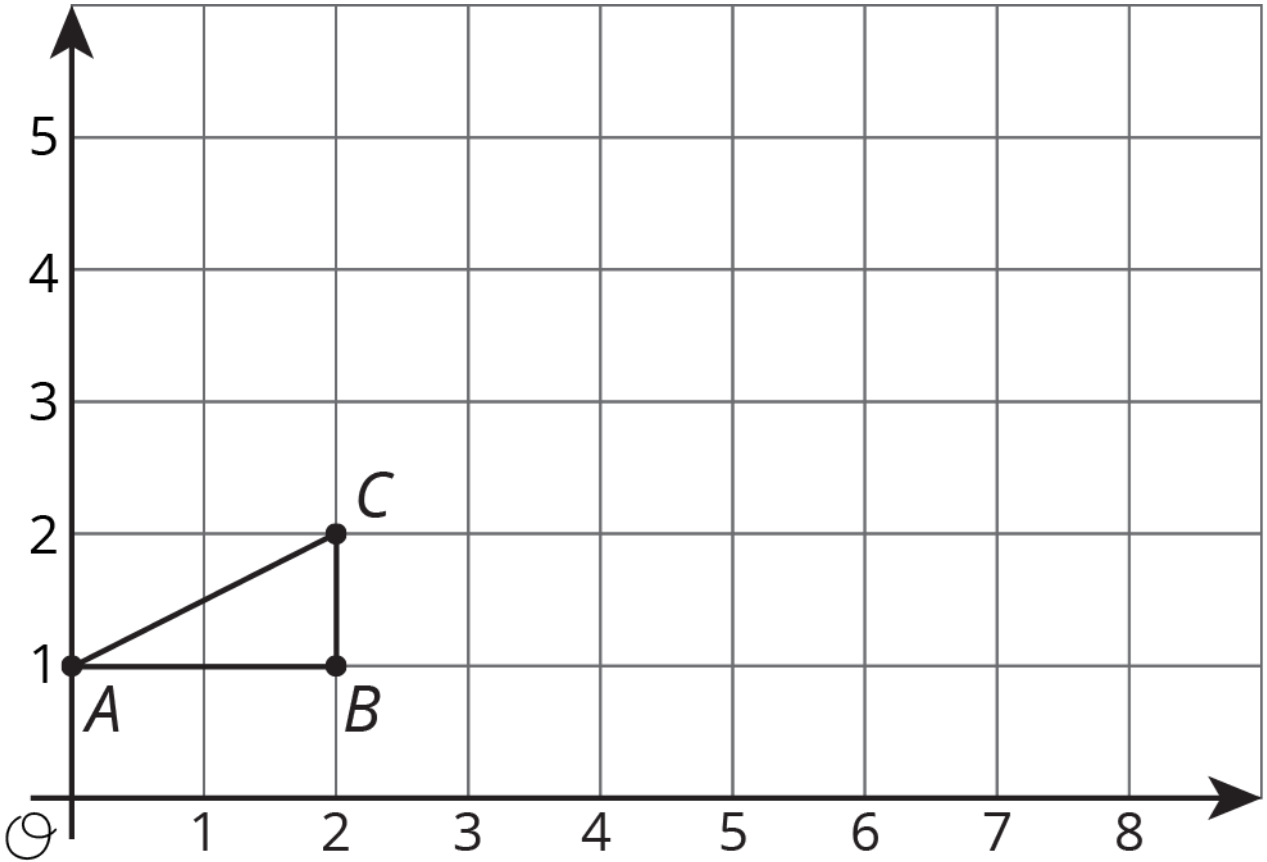
Activity 12.3

- Compare and Connect
- 5 Practices

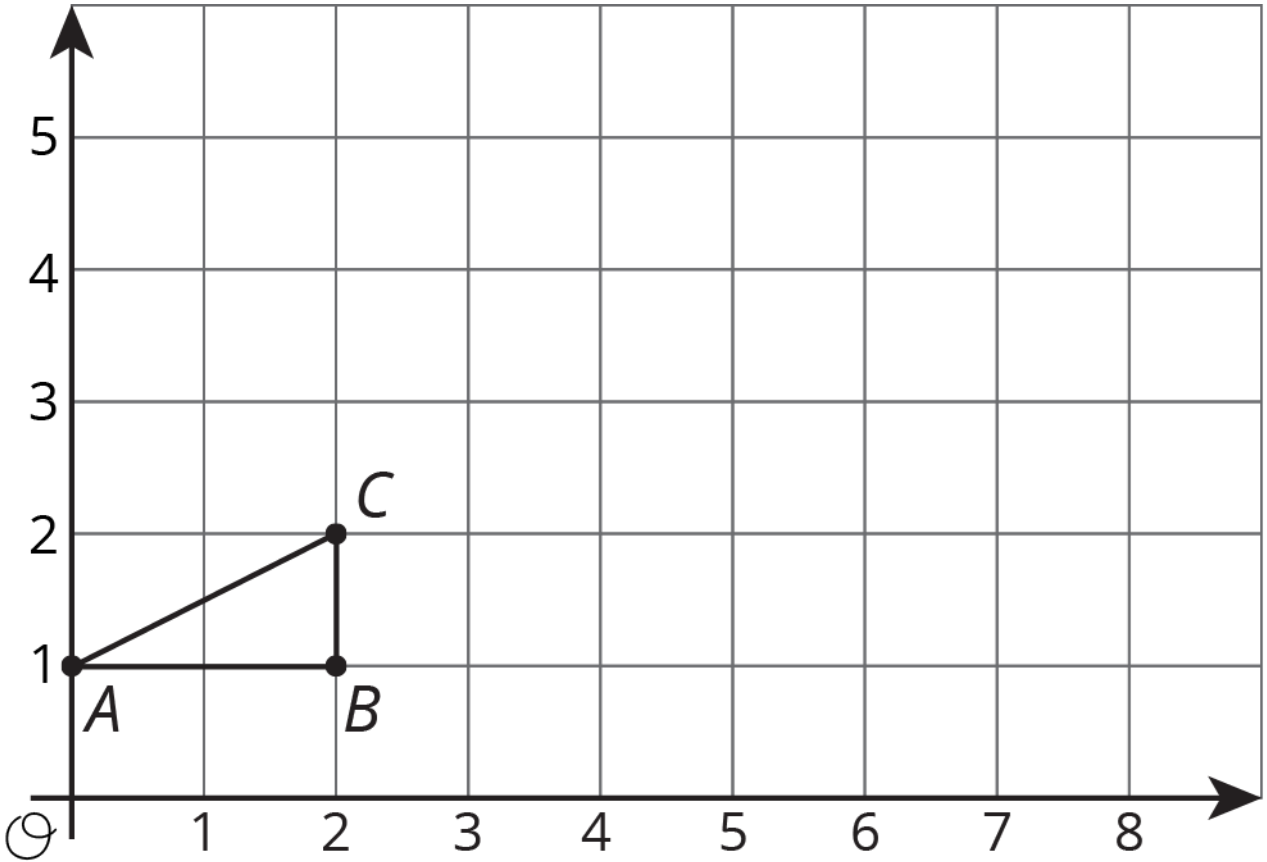
Begin with Quiet Work Time. (2-3 min)

Share your thinking with your team.

Where is *C* mapped by the dilation with center (0,1) and scale factor *s*?

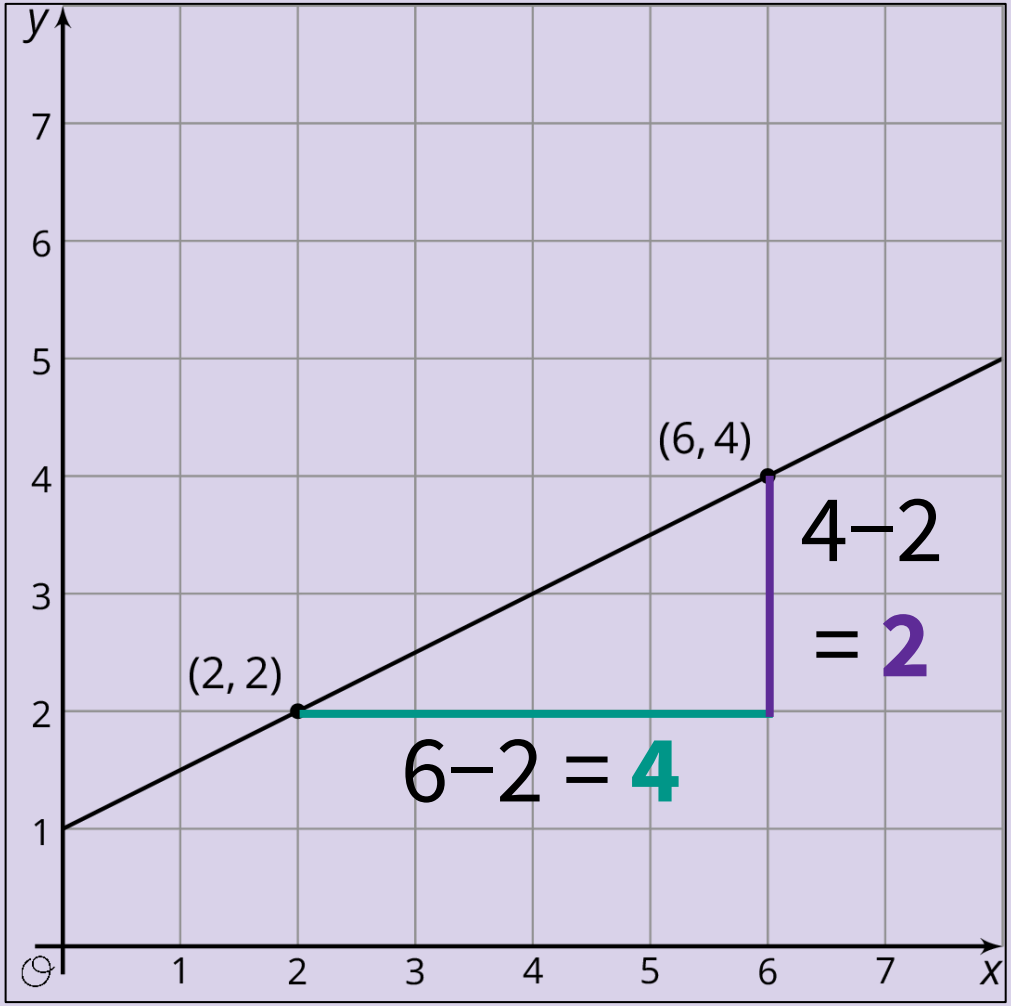


For which scale factor does the dilation with center (0,1) send *C* to (9, 5.5)? Explain how you know.



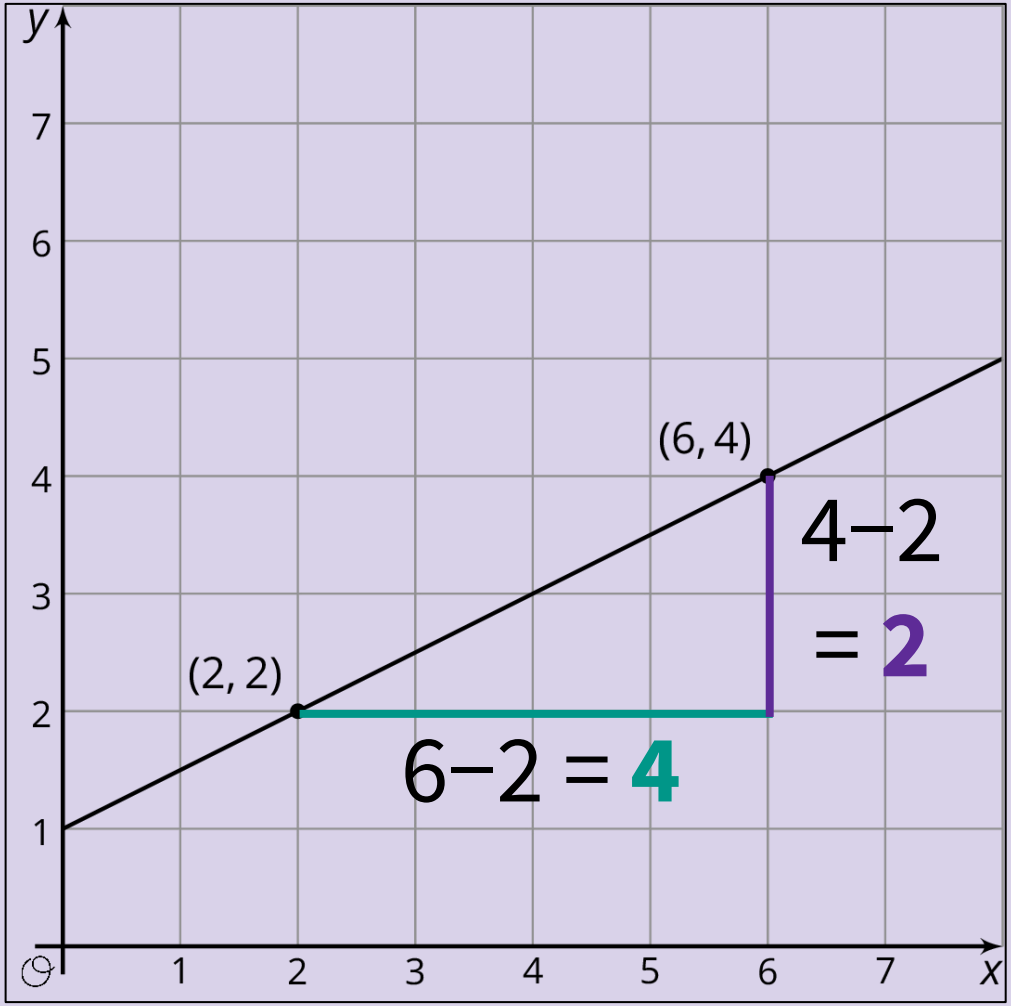
What is the slope of this line?

½ because a slope triangle for the two labeled points has **horizontal** side length 4 and **vertical** side length 2.



What is an equation for the line?

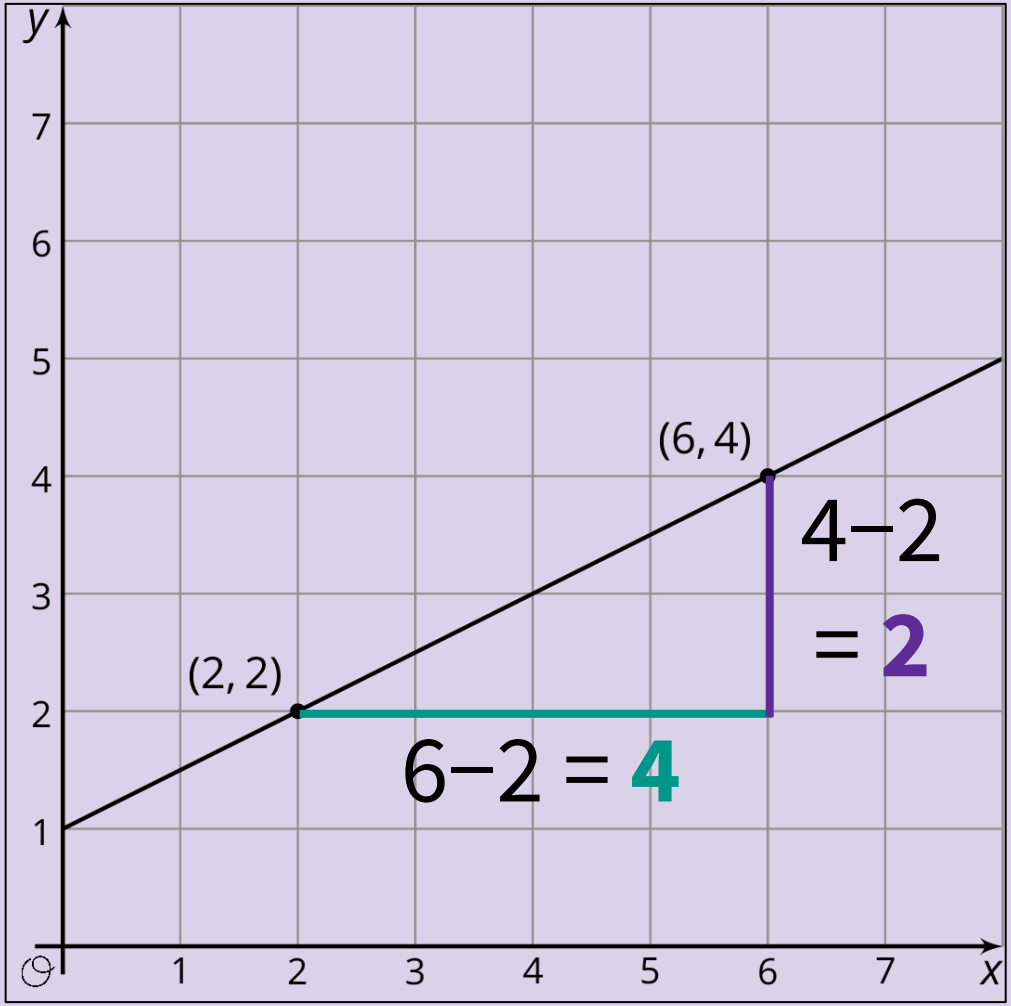
$$\frac{y-2}{x-2} = \frac{1}{2}$$



How can we find out whether or not the point (72, 37) is on this line?

$$\frac{y-2}{x-2} = \frac{1}{2}$$

$$\frac{37-2}{72-2} = \frac{1}{2}$$



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Cool Down