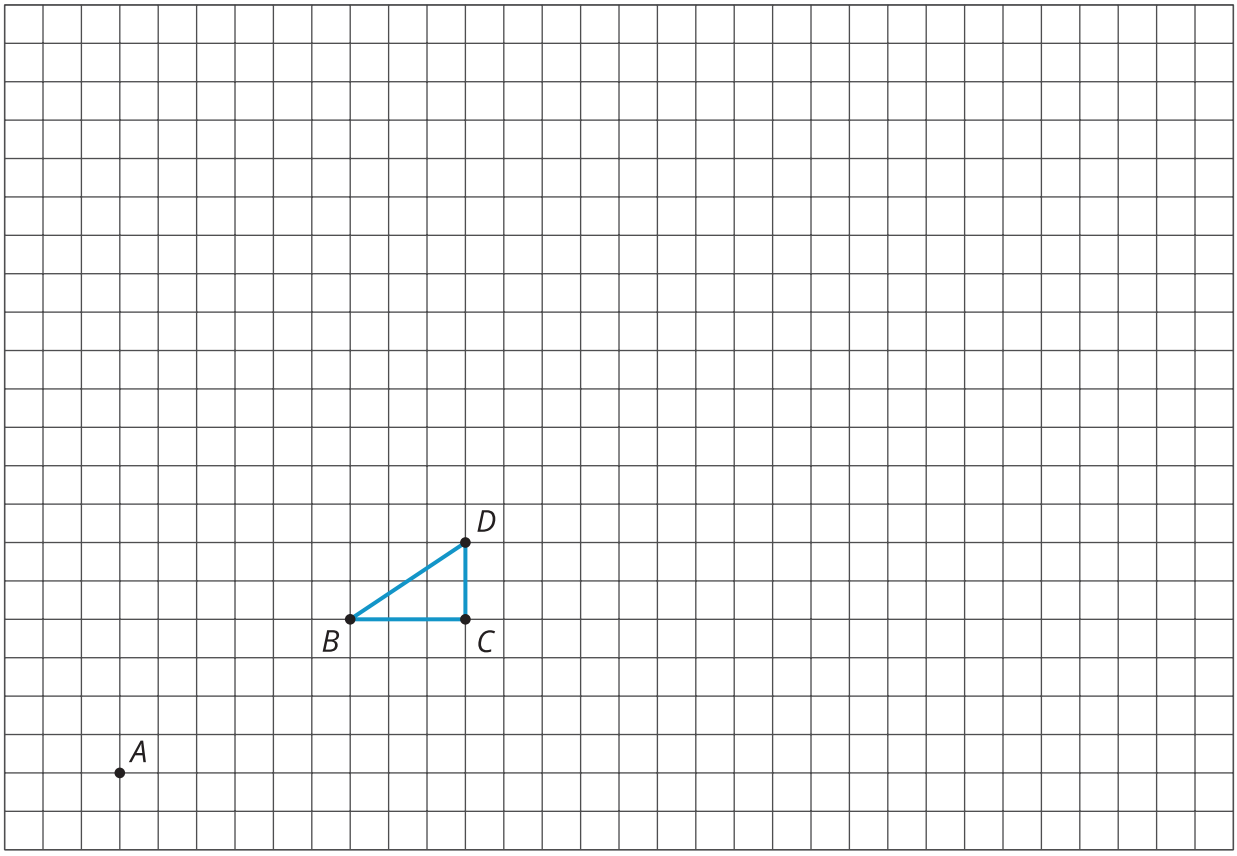
Unit 2, Lesson 15

Meet Slope

Let's learn about the slope of a line.

15.1 One Triangle, Many Scale Factors

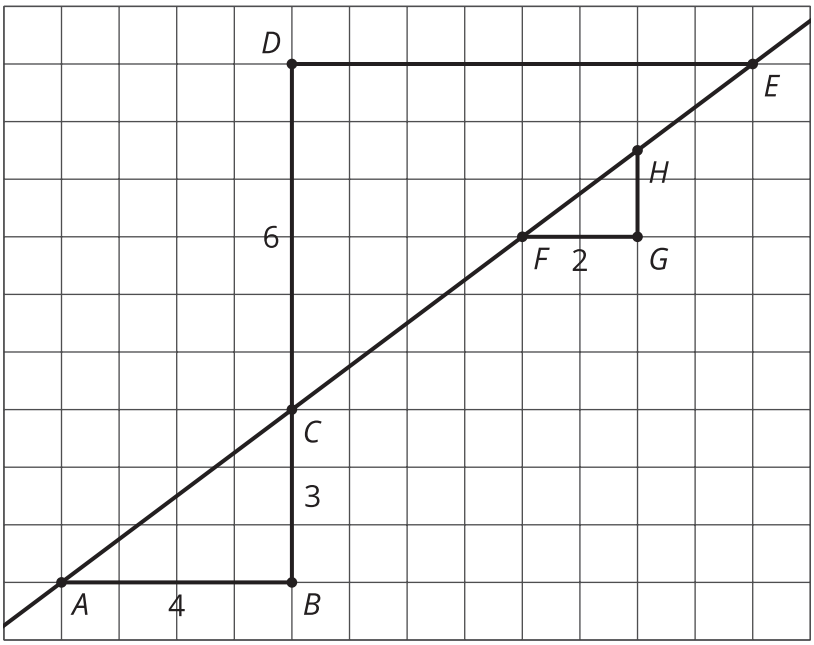
1. Choose a scale factor and draw a dilation of triangle BCD using point A as the center of dilation. What scale factor did you use?



2. Use a piece of tracing paper to trace point A and your dilated figure. Compare your dilation with your group. What do you notice?

15.2 Similar Triangles on the Same Line

1. The grid shows three right triangles, each with its longest side on the same line. Your teacher will assign you two of the triangles. Explain why the two triangles are similar.



2. Complete the table.

triangle	length of vertical side	length of horizontal side	(vertical side) ÷ (horizontal side)
ABC	3	4	$\frac{3}{4}$ or 0.75
CDE			
FGH			

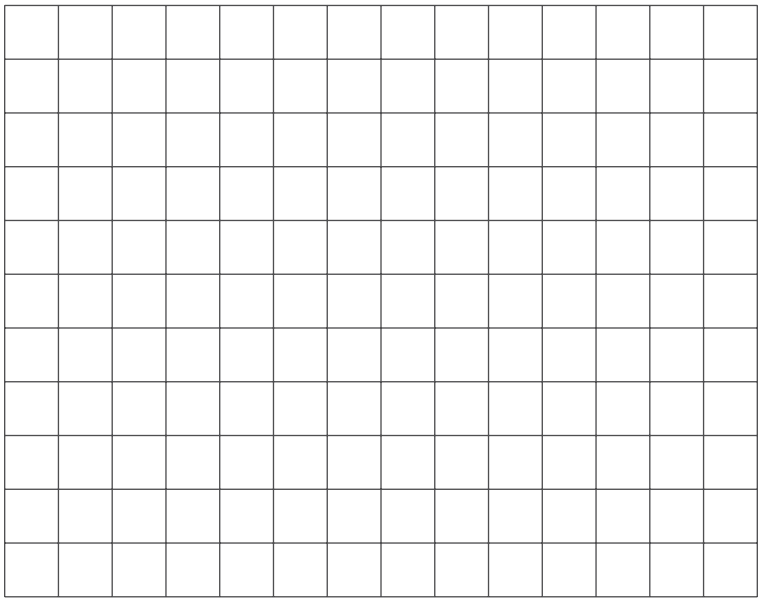
3. What do you notice about the last column in the table? Why do you think this is true?

CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.

15.3 Multiple Lines with the Same Slope

1. Draw two lines with a **slope** of 3. What do you notice about the two lines?

2. Draw two lines with a slope of $\frac{1}{2}$. What do you notice about the two lines?

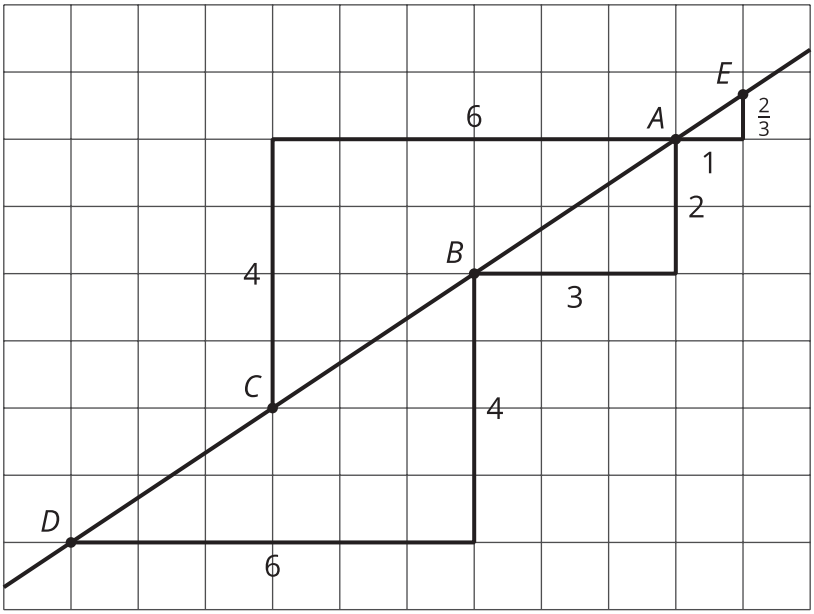


Are you ready for more?

As you learn more about lines, you will occasionally have to consider perfectly vertical lines as a special case and treat them differently. Think about applying what you have learned in the last couple of activities to the case of vertical lines. What is the same? What is different?

Lesson 15 Summary

Here is a line drawn on a grid. There are also four right triangles drawn.



These four triangles are all examples of *slope triangles.* The longest side of a slope triangle is on the line, one side is vertical, and another side is horizontal. The **slope** of the line is the quotient of the vertical length and the horizontal length of the slope triangle. This number is the same for all slope triangles for the same line because all slope triangles for the same line are similar.

In this example, the slope of the line is $\frac{2}{3}$. Here is how the slope is calculated using the slope triangles:

- Points A and B give $2 \div 3 = \frac{2}{3}$.
- Points D and B give $4 \div 6 = \frac{2}{3}$.
- Points A and C give $4 \div 6 = \frac{2}{3}$.
- Points A and E give $\frac{2}{3} \div 1 = \frac{2}{3}$.