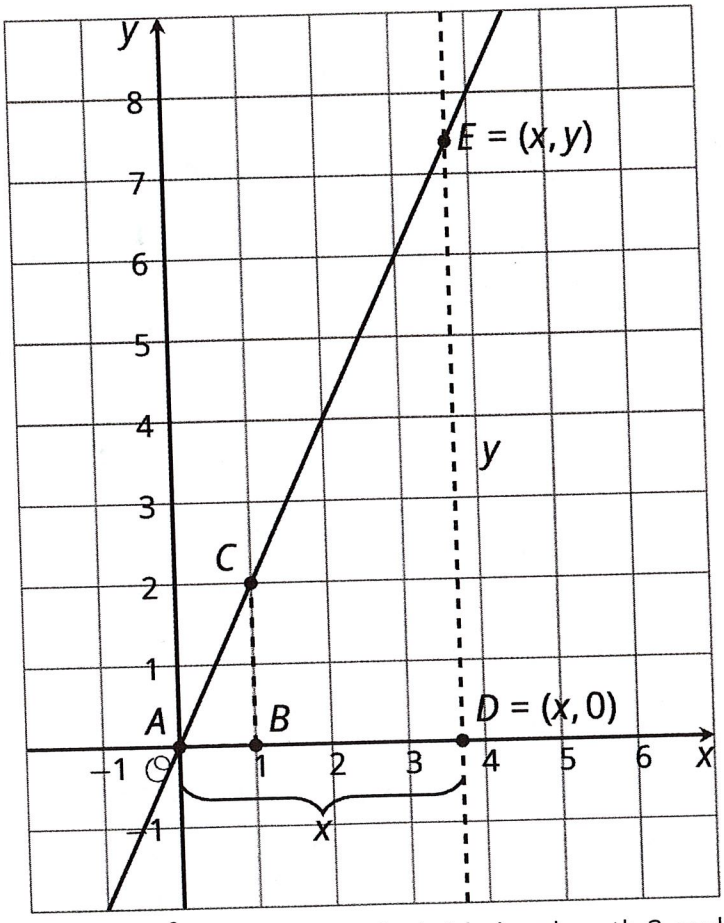
Unit 2

Lesson 11 Summary

Here are the points A, C, and E on the same line. Triangles ABC and ADE are slope triangles for the line so we know they are similar triangles. Let's use their similarity to better understand the relationship between x and y, which make up the coordinates of point E.



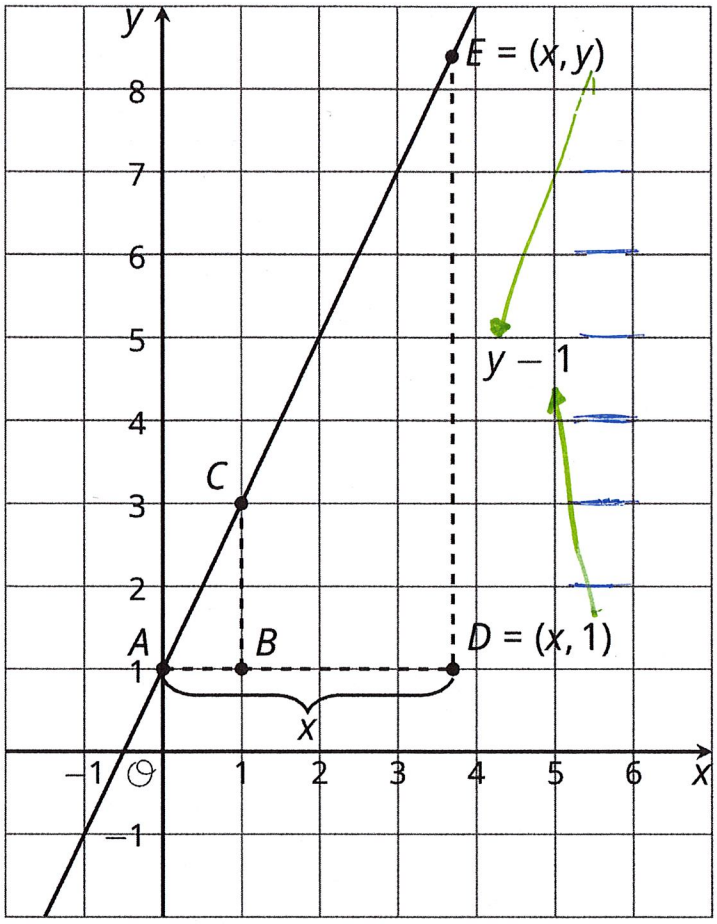
The slope for triangle ABC is $\frac{2}{1}$ since the vertical side has length 2 and the horizontal side has length 1. The slope we find for triangle ADE is $\frac{y}{x}$ because the vertical side has length y and the horizontal side has length x. These two slopes must be equal since they are from slope triangles for the same line, and so:

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

↓ same slope because they are on the same line

Since $\frac{2}{1} = 2$ this means that the value of y is twice the value of x, or that $y = 2x$. This equation is true for any point (x, y) on the line!

Here are two different slope triangles. We can use the same reasoning to describe the relationship between x and y for this point E.



The slope for triangle ABC is $\frac{2}{1}$ since the vertical side has length 2 and the horizontal side has length 1. For triangle ADE, the horizontal side has length x. The vertical side has length $y - 1$ because the distance from (x, y) to the x-axis is y but the vertical side of the triangle stops 1 unit short of the x-axis. So the slope we find for triangle ABC is $\frac{y}{x}$. The slopes for the two slope triangles are equal, meaning:

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

Since $y - 1$ is twice x, another way to write this equation is $y - 1 = 2x$. This equation is true for any point (x, y) on the line!

* The 2 lines have same slope but are located in different places on the number line.
* Each equation will have a slope & an x & an y. (denominator) (numerator)