Unit 3
Lesson 10 Summary

We learned earlier that one way to find the slope of a line is by drawing a slope triangle. For example, using the slope triangle shown here the slope of the line is \( -\frac{2}{4} \), or \( -\frac{1}{2} \) (we know the slope is negative because the line is decreasing from left to right).

But slope triangles are only one way to calculate the slope of a line. Let's compute the slope of this line a different way using just the points \( A = (1, 5) \) and \( B = (5, 3) \). Since we know the slope is the vertical change divided by the horizontal change, we can calculate the change in the \( y \)-values and then the change in the \( x \)-values. Between points \( A \) and \( B \), the \( y \)-value change is \( 3 - 5 = -2 \) and the \( x \)-value change is \( 5 - 1 = 4 \). This means the slope is \( \frac{-2}{4} \), or \( -\frac{1}{2} \), which is the same as what we found using the slope triangle.

Notice that in each of the calculations, we subtracted the value from point \( A \) from the value from point \( B \). If we had done it the other way around, then the \( y \)-value change would have been \( 5 - 3 = 2 \) and the \( x \)-value change would have been \( 1 - 5 = -4 \), which still gives us a slope of \( -\frac{1}{2} \). But what if we were to mix up the orders? If that had happened, we would think the slope of the line is positive \( \frac{1}{2} \) since we would either have calculated \( \frac{2}{4} \) or \( \frac{2}{4} \). Since we already have a graph of the line and can see it has a negative slope, this is clearly incorrect. It we don't have a graph to check our calculation, we could think about how the point on the left, \( (1, 5) \), is higher than the point on the right, \( (5, 3) \), meaning the slope of the line must be negative.

\[
\begin{array}{c|c}
1 & 5 \\
\hline
-5 & 3 \\
\end{array}
\]

\[
\frac{2}{-4} = \frac{-1}{2}
\]

A negative sign can be in the numerator, denominator, or next to the fraction bar, they are all the same answer.

* Make sure to always start with the same point when subtracting your \( y \)-values & your \( x \)-values.