Direct Variation Equations

Direct variation equations are linear equations that describe the direct relationship between 2 variables, x and y.

The variables are linked by a constant of proportionality, k, which serves the role of "slope" (constant change in y over change in x) for these linear equations.

The formula for these equations is:

$$y = kx$$

There are typically 2 types of direct variation questions you will encounter: finding the constant of proportionality given y and x and determining what one variable (x or y) equals when given the other variable and the constant of proportionality.

Let's practice one problem of each type!

What is the constant of proportionality when x = 12 and y = 6?

First, plug in what we know to the equation (y = kx) to find k (the constant of proportionality).

$$6 = k(12)$$

Solve for k by dividing both sides by 12

$$\frac{6}{12} = \frac{12k}{12}$$

$$k = \frac{1}{2}$$

If x = 10 when y = 60, when x = 8, what is y equal to?

For these problems, you first need to use the x-y pair given (10 and 60) to find k. Then, you plug in x = 8 into the direct variation equation with k to find y.

$$\frac{60}{10} = \frac{k(10)}{10}$$

$$k = 6$$

$$y = kx$$

$$y = (6)(8)$$

$$y = 48$$

When x is equal to 8, y is equal to 48.

Tips for Solving Problems:

1. Remember the direct variation formula of y = kx! It is the go-to formula for solving direct variation problems!

2. If you are given an x-y pair and you have to find what y (or x) corresponds to another x (or y), make sure to find the constant of proportionality first before using the equation to find the missing variable.

3. The 2 types of direct variation problems you saw in this lesson are the only 2 you need to worry about in Algebra 1! Make sure to keep practicing and it will come easy to you!