

Problem of the Day: Find the slope of the line passing through (2, -7) and (2, 2).

Plan for the Day: Get new weekly homework
 Finish yesterday's notes
 Finish puzzle from Wednesday
 Objective: We will be able to solve problems with direct variation.
 Today is National Chocolate Cupcake Day and National Legging Day!!

A direct variation is a relationship that can be written in the form $y = kx$.

k is the constant of proportionality (or variation).

The constant of proportionality acts the same as the slope. It represents the scale factor of a proportion.

$$\frac{2}{3} \quad \frac{6}{9} \quad \frac{16}{24}$$

If a direct variation exists, it is worded as "y varies directly with x", which means as one value increases, so does the other value.

To find your k , divide the y value by the x value.

$$k = \frac{y}{x}$$

Once you have your k , you can write an equation in direct variation by plugging it into $y = kx$.

We can use an equation of a direct variation to help us predict or find given values.

$$\begin{array}{r} 40 \\ 5 \overline{) 200} \\ \underline{20} \\ 0 \\ \underline{0} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

To find a given value, write the equation and then plug the given values in for the appropriate variables.

You can also use a proportion to find the given values.

Example: For the following examples, y varies directly as x . Write a direct variation equation that relates x and y . Then solve.

a. If $y = 6$ when $x = 10$, find x when $y = 18$.

$$y = kx$$

$$k = \frac{y}{x} = \frac{6}{10} = \frac{3}{5}$$

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

$$18 = \frac{3}{5}x$$

$$90 = 3x$$

$$30 = x$$

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b. If $y = 22$ when $x = 8$, find y when $x = -16$.

Example: The mass of a substance varies directly with the volume of the substance. The volume of 50 kilograms is 40 liters. What is the volume, in liters, of 6.5 kilograms?

Example: The value of y varies directly with x . Write a function that represents the relationship between x and y if $y = 20/3$ when $x = 30$.