

Section 4.5 Direct Variation

When two variables are said to vary directly it means that there is a constant that you can multiply x by to find the corresponding y value. It also means the graph of the equation goes through the origin $(0,0)$.

The model for direct variation is $y = kx$. This is easiest to demonstrate through an example.

Example: x and y vary directly. When $x=3$ then $y=7$. Find an equation that relates x to y and then find y when $x=9$.

Step 1: Write $y = kx$

Step 2: Substitute the given value of x and y into the equation.

$$7 = k(3)$$

Step 3: Solve for k

$$\frac{7}{3} = \frac{k(3)}{3}$$

$$k = \frac{7}{3}$$

Step 4: Write the equation by putting k in $y=kx$

$$y = \frac{7}{3}x$$

Step 5: Find the y value when x is 9 by substituting into the equation.

$$y = \frac{7}{3}(9)$$

$$y = 7(3) = 21$$

$$\mathbf{y = 21 \text{ when } x = 9}$$