

NOTES

$\frac{y}{x}$  (divide!)  
its proportional  
 $(\frac{y}{x} = \frac{y}{x})$

**Main Idea/Questions** **Direct Variation**

**What is it?** A function in the form of:  $y = Kx$

- Where "K" is the constant of variation.
- "y varies directly with x"

**How to find the Constant of Variation "K"**

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

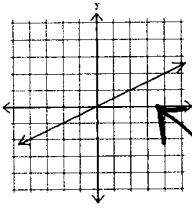
Example: Suppose that y varies directly with x. When x = 3, y = 9, find k, the constant of variation.

$K = \frac{y}{x} = \frac{9}{3} = 3$  (since K=3, the equation is y=3x)

**Recognizing Direct Variation and Inverse Variation from.....**

**Graphs**

- A straight line
- Passes through the origin
- y-intercept = 0
- As x increases, y increases
- As x decreases, y increases



**Tables**

x	y
2	4
5	10
7	14

$k = \frac{y}{x}$   
 $k = \frac{4}{2} = 2$   
 $k = \frac{10}{5} = 2$   
 $k = \frac{14}{7} = 2$

\*\*\*If you divide y by x and the k's are the same, then it is a direct variation. (Check all ordered pairs!)

⚡ All same, so table IS direct variation

**Equations**

Non-example:  $y = 3x + 4$

$y = mx + b$ , where  $b = 0$  (so NO Addition or subtraction)

$y = 3x$        $y = \frac{5}{8}x$        $3y = x$

**Writing Equations and Finding x and y (direct....divide)**

1. If y varies directly with x, and y = 9 when x = 3, write an equation.

To write equation, just find K!  $K = \frac{y}{x} = \frac{9}{3} = 3$  Equation  $y = 3x$

2. Given that y varies directly with x, and y = 28 when x = 7, find x when y = 52.

proportion  $\frac{y}{x} = \frac{y}{x}$  (cross mult & divide)  $(7)(52) \div 28$   $x = 13$

3. The number of miles you drive varies directly with the number of gallons. If a car uses 8 gallons of gasoline to travel 290 miles, how much gasoline will the car use to travel 400 miles?

proportion!

$\frac{y}{x} = \frac{y}{x} \rightarrow \frac{290}{8} = \frac{400}{x}$        $(8)(400) \div 290$   
 $x = 11.03$  gallons

## 3.6 Assignment - Direct Variation

1. The table shows the costs  $C$  (in dollars) of downloading  $s$  songs from a music website.

Number of songs, $s$	Cost (dollars), $C$
3	2.97
5	4.95
7	6.93

a. Explain why  $C$  varies directly with  $s$ .

b. Write a direct variation equation that relates  $s$  and  $C$ .

2. If  $y$  varies directly with  $x$ , and  $y = 9$  when  $x = 3$ , write an equation.

3. The ordered pair  $(5, 6)$  is a solution of a direct variation equation. Write the equation and identify the constant of variation.

4. The number  $s$  of tablespoons of sea salt needed in a saltwater fish tank varies directly with the number  $w$  of gallons of water in the tank. A pet shop owner recommends that you add 100 tablespoons of salt to a 20-gallon tank. How many tablespoons of salt should you add to a 30-gallon tank?