Direct Variation: When two quantities have a constant ratio

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

Hwk #31

1. Two equations for Direct Variation are: $y = kx$ and $\frac{y}{x} = k$

2. What does the letter k represent? The variation constant

3. The graph of Direct Variation is a line and passes through the origin

a) Direct Variation? No

X	Y	$\frac{Y}{X}$
7	14	2
8	15	$\neq 2$
9	16	
10	17	

If Yes, k = _____

If Yes, equation is:

b) Direct Variation? Yes

X	Y	$\frac{Y}{X}$
−3	−1.8	.6
5	3	.6
6	3.6	.6
8	4.8	.6

If Yes, k = .6

If Yes, equation is: $y = .6x$ or $\frac{y}{x} = .6$

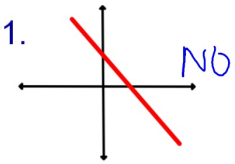
c)Direct Variation? NO

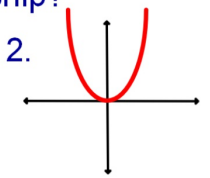
X	Y
−4	7
6	−10.5
10	17.5
16	−30

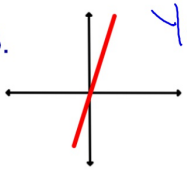
If Yes, k = _____

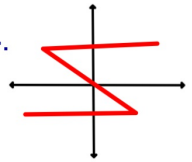
If Yes, equation is:

Does each graph represent a Direct Variation relationship?

1.  NO

2.  NO

3.  Yes

4.  NOT A FUNCTION

Direct Variation Equations:

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

Is each equation direct variation?
If yes, find the variation constant.

1. $4x + 2y = 10$ $\frac{-4x}{2}$ $\frac{}{2}$

NO $y = 5 - 2x$

2. $6 + 7y = 5 - 3x + 1$

$6 + 7y = 6 - 3x$

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

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

Given the table shows a direct variation relationship, find the value of ?.

1. Use a Direct Variation Equation

X	Y
4	9
10	22.5
24	54
35	?

$k = \frac{9}{4} = 2.25$

$y = kx$

$y = 2.25x$

$y = 2.25(35)$

$y = 78.75$

OR

2. Use a proportion

$\frac{9}{4} = \frac{?}{35}$

78.75

1. Use this table to write a Direct Variation equation.

X	Y
2	12.2
9	54.9
15	91.5
18	109.8
23	140.3

$y = 6.1x$ or $\frac{y}{x} = 6.1$ $\quad \frac{y}{x} = \frac{12.2}{2} = 6.1$

2. Find the value of x when y=50

$x = 8.2$ $\quad \frac{50}{6.1} = \frac{6.1x}{6.1}$

3. Find the value of y when x=20

$y = 6.1(20)$

$y = 122$

Remember the phrase: "Y varies directly with X"

The amount of water in the tub varies directly with the amount of time the water has running. After 5 minutes there are 12 gallons in the tub.

$k = \frac{y}{x} = \frac{12\text{ gal}}{5\text{ min}} = 2.4\ \text{gal/min}$

1. Model this situation with a Direct Variation equation.

$y = 2.4x$

2. Find the amount of time it takes to fill a 32 gallon tub.

$32 = 2.4x$

$13.3 = x$

The number of air conditioners built varies directly with the number of workers in the factory.

When there are 120 workers on the job 270 air conditioners are manufactured.

$y = \#A/C$

$x = \#W$

1. What is the variation constant?

$\frac{270\ A/C}{120\ W} = 2.25\ \frac{A/C}{W}$

2. Write a direct variation equation to model this situation.

$y = 2.25x$

3. Find the number of air conditioners that can be produced if there are 140 workers present

$y = 2.25(140)$

$315\ A/C$

The point (6,11) is on the graph of a direct variation relationship. (0,0)

Write an equation for this Direct Variation.

$m = \frac{y-y}{x-x}$

$m = \frac{-0}{-0}$

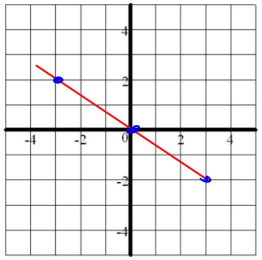
$m = \frac{11}{6}$

$y = \frac{11}{6}x$

$\frac{y}{x} = \frac{11}{6}$

Graphing Direct Variation.

1. Graph the direct variation that contains the point (-3,2)



Each of the ordered pairs given are for the same direct variation. Find the missing value.

1. (4,18) and (x, 45)

$k = \frac{18}{4} = 4.5$ $\quad y = 4.5x$ $\quad 45 = 4.5x$ $\quad x = 10$ or $\frac{18}{4} = \frac{45}{x}$

2. (18,6) and (24,y)

$k = \frac{6}{18} = \frac{1}{3}$ $\quad y = \frac{1}{3}x = \frac{1}{3}(24)$ $\quad y = 8$

The number of words I can type varies directly with the number of minutes that I've been typing for. I can 496 words in 8 minutes.

$k = \frac{496w}{8\ min} = 62\ words/min$

Model this situation with a Direct Variation equation and find the number of words that I can type in 20 minutes.

$y = 62x$

$= 62 \cdot 20$

$= 1240\ words$

or $\frac{496w}{8\ min} = \frac{?}{20\ min}$