Tomorrow we will review Ch 6.

Today, we'll begin Chapter 9.

Direct Variation: When two quantities have a
constant ratio

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

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
7	14
8	15
9	16
10	17

$\dfrac{y}{x}$

2

1.875

Since the first two ratios are not the same
there is no reason to continue, this is NOT
Direct Variation.

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 $\dfrac{Y}{X} = .6$

c) Direct Variation? __NO__

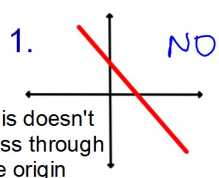| X	Y	$\frac{Y}{X}$
−4	7	−
6	−10.5	−
10	17.5	+
16	−30	

Using just the signs we find out the first two ratios are negative but the third one is positive which means there is no constant ratio.

If Yes, $k =$ _____

If Yes, equation is:

Does each graph represent a Direct Variation relationship?

1.   NO

This doesn't pass through the origin

2.   NO

This isn't a line

3.   Yes

4.   NO

This isn't even a function! It doesn't pass the Vertical Line Test.
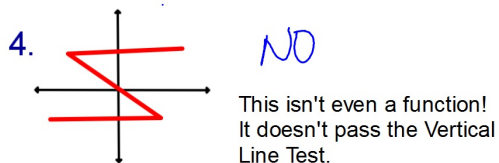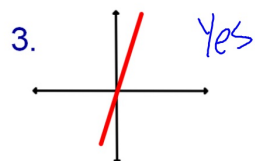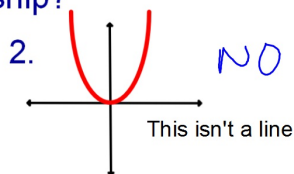
Given the table shows a direct variation relationship, find the value of ?.

1. Use a Direct Variation Equation

$K = \dfrac{9}{4} = 2.25$

X	Y
4	9
10	22.5
24	54
35	?

OR

2. Use a proportion

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

$X = 78.75$

$y = 2.25x$

$y = 2.25(35)$

$y = 78.75$

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.

$$k = \frac{Y}{X} = \frac{12}{5} = 2.4 \text{ gal/min}$$

1. Model this situation with a Direct Variation equation. $Y = 2.4X$ or $\frac{Y}{X} = 2.4$

2. Find the amount of time it takes to fill a 32 gallon tub. $\rightarrow Y$

13.33 min

$Y = 2.4X \Rightarrow \frac{32}{2.4} = \frac{2.4X}{2.4}$

Inverse Variation: When two quantities have a constant product

1. Three equations for Inverse Variation are:

$xy = k$, $y = \dfrac{k}{x}$, and $x = \dfrac{k}{y}$

2. What does the letter k represent?

The variation constant.

3. For Direct Variation, as one quantity increases the other quantity also increases.

For Inverse Variation, as one quantity

increases the other quantity ___Decreases___.

How do you tell if a table of values produces and inverse variation relationship?
See if xy is a constant product.

a) Inverse Variation?___Yes___

X	Y	xy
−12	−4	48
−6	−8	48
0.5	96	48
16	3	48

If Yes, k = ___48___

If Yes, equation is: $y = \dfrac{48}{x}$ or $xy = 48$

b) Inverse Variation?___NO___

X	Y	xy
−2	−8	16
3	12	36
5	20	
9	36	

These first two are not the same product so there is no reason to continue.

If Yes, k = _____

If Yes, equation is: