

Direct Variation: constant: $k = \frac{y}{x}$

Inverse Variation: constant: $k = xy$
 Name _____
 Date _____ Period 3rd

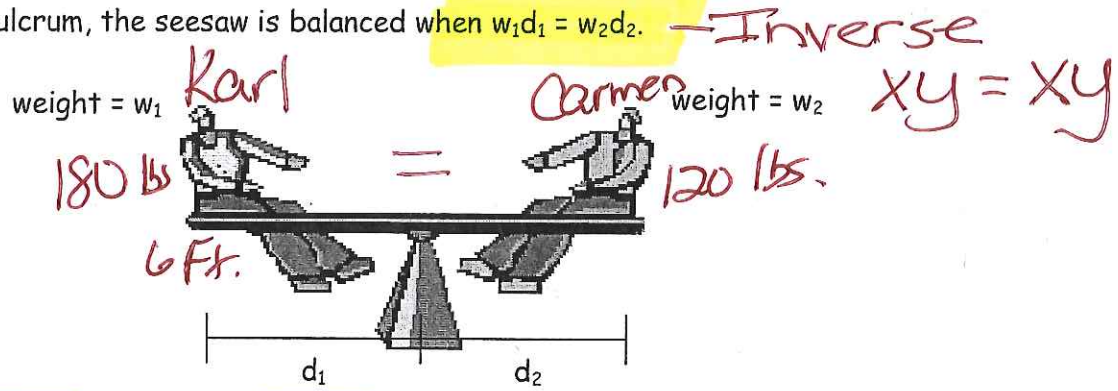
Inverse Variation Applications

Activity/Notes

Inverse variation is described by an equation $xy = k$ ($k \neq 0$) or $y = \frac{k}{x}$ and we say that "y varies inversely as x".

EQUATION

1. When two people are sitting on a seesaw, the heavier person must sit closer to the fulcrum to balance the seesaw. If people weighing w_1 and w_2 are seated on a seesaw at distances d_1 and d_2 from the fulcrum, the seesaw is balanced when $w_1d_1 = w_2d_2$.



Karl weighs 180 pounds and is sitting 6 feet from the fulcrum on a seesaw that is 20 feet long. Carmen weighs 120 pounds. How far does Carmen need to sit away from the fulcrum to balance the seesaw?

$xy = xy$
 $180 \cdot 6 = 120 \cdot y$
 $\frac{1080}{120} = \frac{120y}{120}$
 $y = 9 \text{ feet away}$

2. Consider the following situations. Decide if each is an example of direct or inverse variation.

- a. the miles you drive and the amount of gas left in your tank **Inverse**
- b. the hours you work and the amount of your paycheck **Direct**
- c. the distance you drive and the number of hours you drive **Direct**
- d. the number of CD's you buy and the amount of money you have left **Inverse**
- e. the hours it takes to paint a room and the number of people painting **Inverse**
- f. write your own example of inverse variation.

g. **Inverse**

$\uparrow x$	$y \downarrow$
1	12 = 12
2	6 = 12
3	4 = 12
4	3 = 12

$k = 12$

h. **Direct**

$\uparrow x$	$y \uparrow$
1	2 = 2
2	4 = 2
3	6 = 2
4	8 = 2

$k = 2$

i. **Inverse**

$\downarrow x$	$y \uparrow$
10	4.8 = 48
8	6 = 48
6	8 = 48
4	12 = 48

$k = 48$

j. **Direct**

$\downarrow x$	$y \downarrow$
4	12 = 3
3	9 = 3
2	6 = 3
1	3 = 3

$k = 3$

Name: _____ Period: _____

Inverse Variation—Graphs and Tables

Example 1:

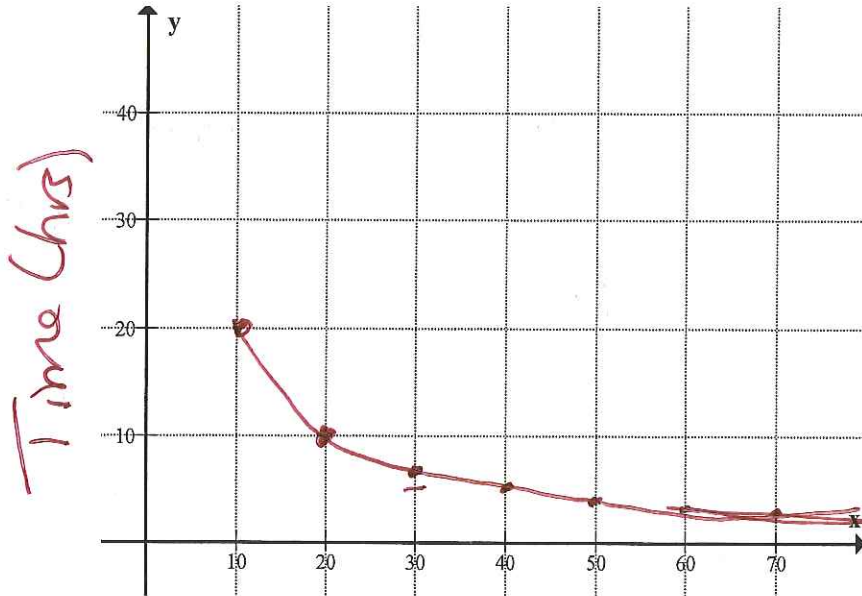
$$y = \frac{k}{x}$$

Suppose you drive **200 miles** without stopping. The time it takes to travel a distance varies inversely as the rate at which you travel. Let x = speed in miles per hour and y = time in hours. Complete the table and graph the variation.

rate time

x	y
10	20
20	10
30	6 $\frac{2}{3}$
40	5
50	4
60	3 $\frac{1}{3}$
70	2.9

$\frac{200}{20} = 10$
 $\frac{200}{30} = 6\frac{2}{3}$
 $\frac{200}{50} = 4$



Rate (mph)

Example 2:

Graph an inverse variation in which y varies inversely as x and $y = 3$ and $x = 12$.

$$k = 3(12) = 36$$

x	y
-6	-6
-3	-12
-2	-18
2	18
3	12
6	6

III
I

