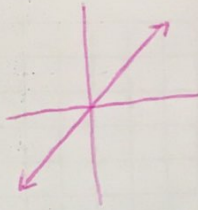# Unit 4: INVERSE VARIATION

Name _____

Direct Variation: As x __increases__, y __increases__

or as x __decreases__, y __decreases__.

A line with a y-intercept of __zero__ is a direct variation.

A direct variation is represented by the equation __$y = kx$__ where k is the

__constant of variation__.

Inverse Variation: As x __increases__, y __decreases__

or as x __decreases__, y __increases__

An inverse variation is represented by the equation __$y = \frac{k}{x}$__

Check to see if the tables below are Inverse Variation:

x	1	2	5	7
y	6	12	30	42

NO

$k = 6$

x	1	2	3	4
y	2	1	$\frac{2}{3}$	$\frac{1}{2}$

yes

$2 = \frac{k}{1}$ $1 = \frac{k}{2}$ $\frac{2}{3} = \frac{k}{3}$ $\frac{1}{2} = \frac{k}{4}$

$k = 2$

Extra Practice Word Problems

1. y varies inversely as x. Given y = 4 when x = 2. Determine the inverse variation equation. Then determine y when x = 16.

$$y = \frac{k}{x} \rightarrow 4 = \frac{k}{2} \rightarrow k = 8 \rightarrow y = \frac{8}{16} \rightarrow \boxed{\frac{1}{2}}$$

2. y varies inversely as x. y = 6 and x = 16. Determine the inverse variation equation. Then determine y when x = 4.

$$y = \frac{k}{x} \rightarrow 6 = \frac{k}{16} \rightarrow k = 96 \rightarrow y = \frac{96}{4} \rightarrow \boxed{24}$$

3. The time, t, required to empty a tank varies inversely as the rate of r, of pumping. If a pump can empty a tank in 2.5 hours at a rate of 400 gallons per minute, how long will it take to empty a tank at 500 gallons per minute?

$$t = \frac{k}{r} \rightarrow 2.5 = \frac{k}{400} \rightarrow k = 1000 \rightarrow t = \frac{1000}{500} \rightarrow \boxed{2 \text{ hrs}}$$

4. The force, F, needed to break a board varies inversely with the length, L, of the board. If it takes 24 pounds of pressure to break a board 2 feet long. How many pounds of pressure would it take to break a board that is 5 feet long?

$$F = \frac{k}{L} \rightarrow 24 = \frac{k}{2} \rightarrow k = 48 \rightarrow F = \frac{48}{5} \rightarrow \boxed{9.6 \text{ pounds of pressure}}$$