<u>Direct Variation:</u>
When two quantities have a constant ratio.

Variation Constant: $k = \dfrac{y}{x}$

Direct Variation Equations:

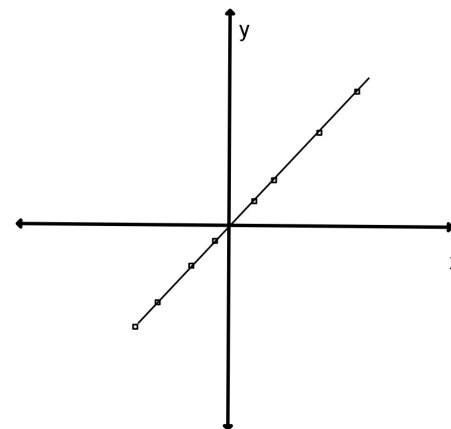$k = \dfrac{y}{x}$ or $y = kx$

| The graph of Direct Variation. | A line passing through the origin. |

The table below shows a Direct Variation relationship.
Make a scatter plot of this data.

L_1 L_2

x	y
−8	−12
−6	−9
−3	−4.5
−1	−1.5
2	3
4	6
7	10.5
10	15

The amount of water that drains from the container varies
directly with the amount of time that the valve has been open.

After 8 minutes a total of 100 gallons has drained.

1. Write a direct variation equation to model this situation

$12.5 = \dfrac{y}{x}$

$K = \dfrac{y}{x} = \dfrac{100\,gal}{8\,min} = 12.5\ gal/min$ $y = 12.5x$

2. Find the numer of gallons that has drained after 15 minutes.

Use a Proportion $\dfrac{8\,min}{100\,gal} = \dfrac{15\,min}{x}$ Or   Use a Direct Variation Eq. $y = 12.5(15)$

$= 187.5\ gal$

Without using a calculator explain why these tables
do not show direct variation.

A.

X	y
−8	−34
−6	−26
4	18
1.5	−9

this will be negative
the rest will be pos.

B.

X	y
2.5	3
16	18
28	24
40	46

$\dfrac{y}{x}$

> 1

> 1

< 1

This will be
less than 1
and the rest
will be greater
than 1.

Direct Variation in real life:

As the number of students in the district increases....

   The more the state of Michigan pays the school district.

Inverse Variation:
When two quantities have a constant product.

Variation Constant: $k = xy$

Inverse Variation Equations:

$$k = xy \quad \text{or} \quad y = \frac{k}{x}$$

Does each table show Direct Variation, Inverse Variation, or Neither?

If there is a Direct or Inverse Variation relationship state the variation constant and write a variation equation.

A.

x	y	XY
0.5	72	36
2	18	36
3	12	36
9	4	36

Inverse

B.

x	y
1	3
4	14
6	18
12	45

neither