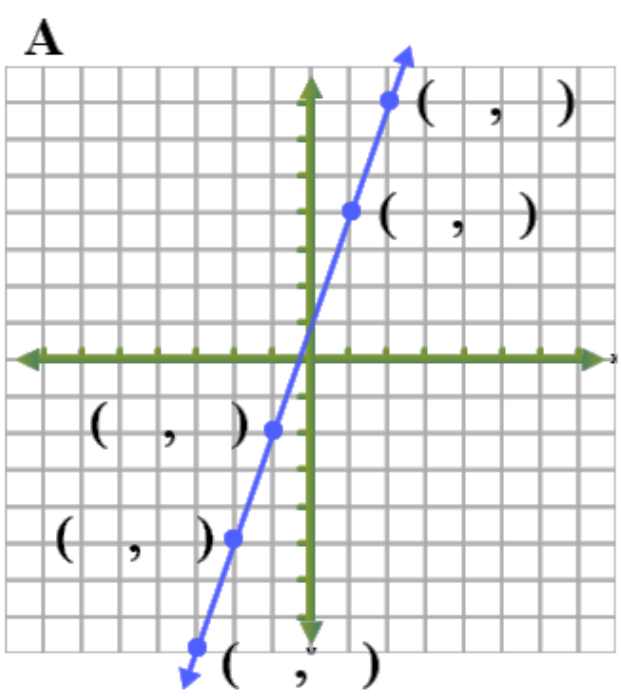
4.6: Model Direct Variation

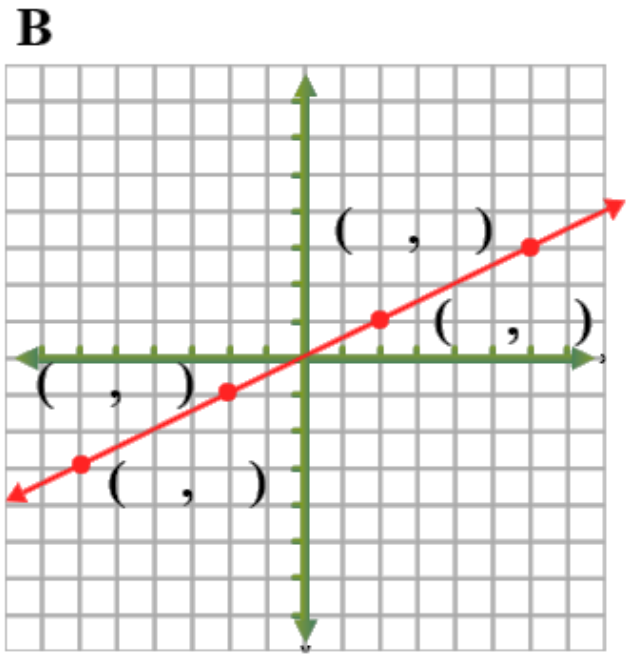
Goals: *Identify a direct variation equation given an *x*/*y* relationship
*Graph a direct variation equation
*Write a direct variation equation given data

INVESTIGATION! What is direct variation??

Follow the steps below:

1. Find the slope between the points on graph A (Use *rise* over *run*). What do you notice?
2. Find the slope between the points on graph B (Use *rise* over *run*). What do you notice?
3. Fill in each ordered pair on graphs A and B.
4. For each ordered pair, divide *y* by *x*. $\left(\frac{y}{x}\right)$ Write your answer next to each ordered pair.
5. Does anything stand out about the ratios in either graph?
6. Do you notice anything about the ratios in either graph compared to the slope in the same graph?





Direct Variation:

***a* =**

Similar to:

but:

Since:

Graph will always:

1. Decide whether the equation represents direct variation. If so, identify the constant of variation.

Ex: $2x - 3y = 0$ Can the equation be rewritten so it is in the form $y = ax$?

Ex: $-x + y = 4$

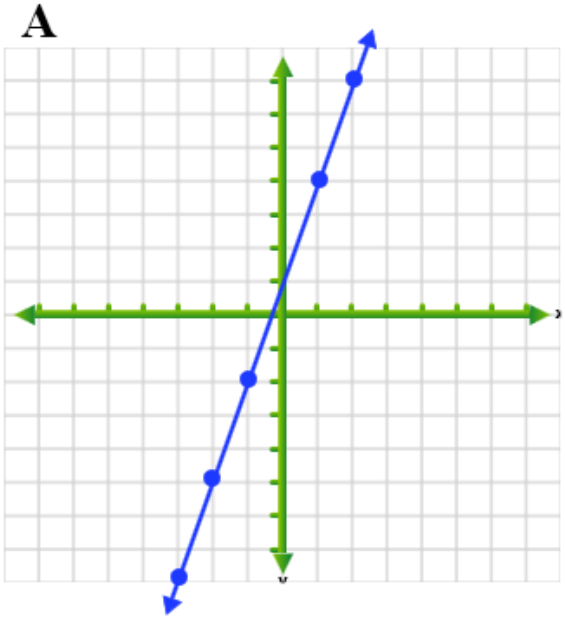
Ex: $-x + y = 1$

Ex: $2x + y = 0$

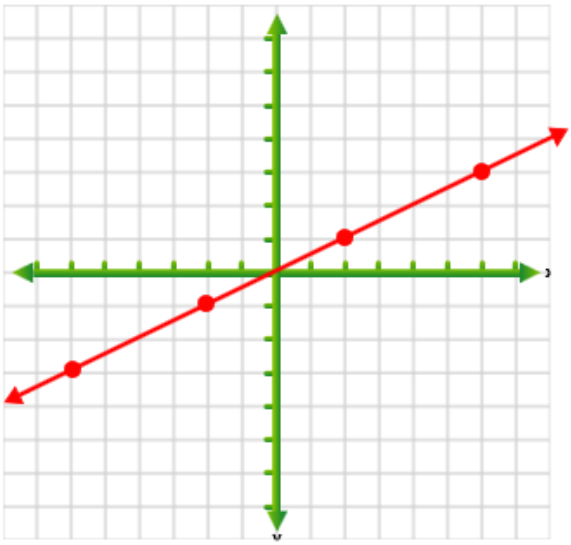
Ex: $4x - 5y = 0$

For the graphs draw below, which equation represents direct variation? How do you know?

A

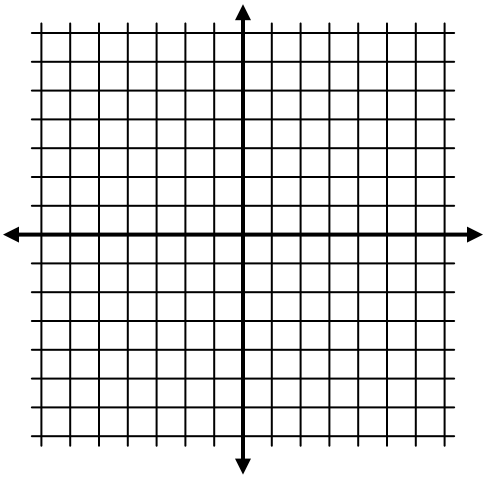


B

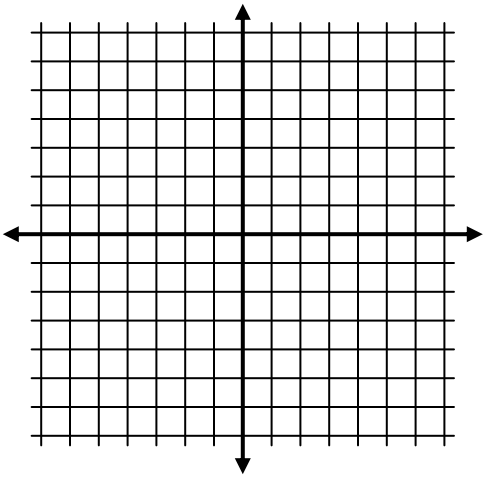


2. Graph a direct variation equation. (Graph the same way as:)

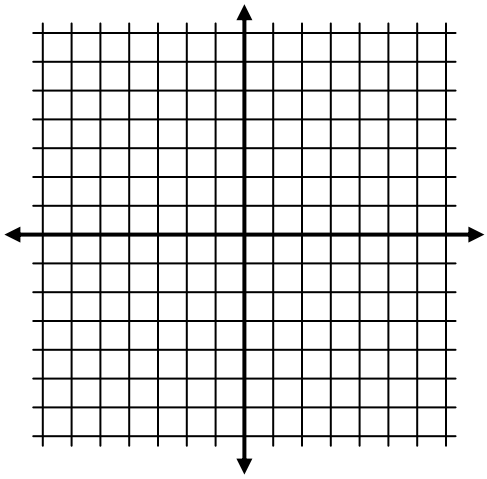
Ex: $y = \frac{2}{3}x$



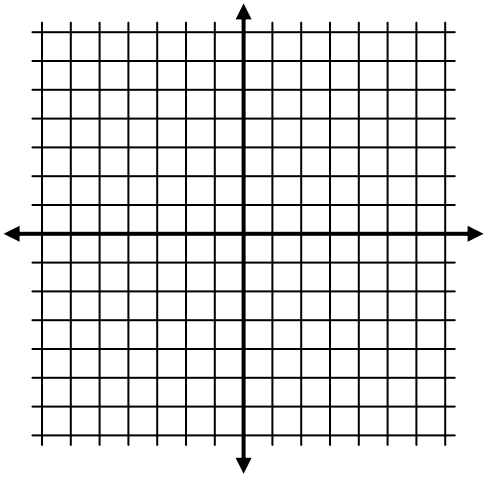
Ex: $y = -3x$



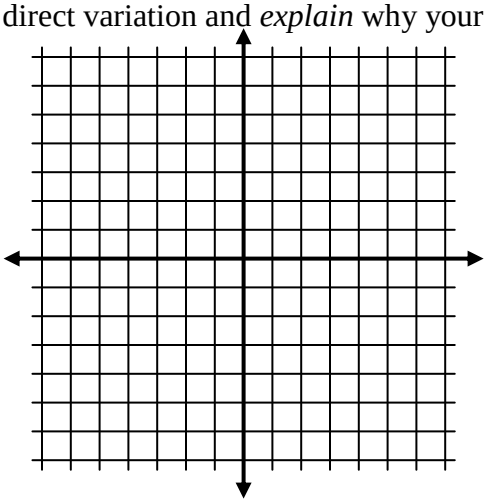
Ex: $y = 2x$



Ex: $y = -\frac{1}{2}x$

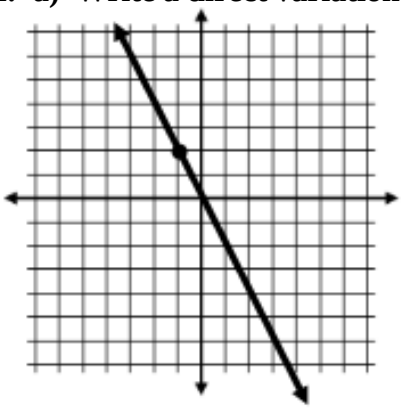


Ex: Draw a line that represents direct variation and *explain* why your line represents a direct variation relationship.



3. Write a direct variation equation.

Ex: a) Write a direct variation equation:



1.

2.

3.

4.

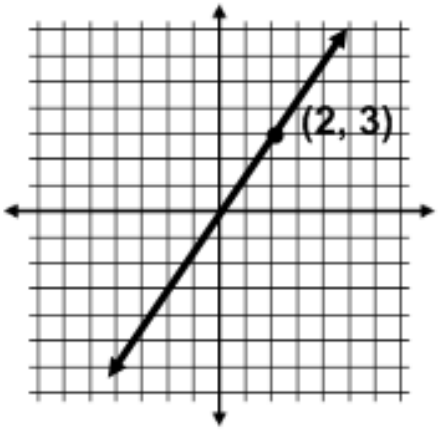
b) THEN Find y when $x = 60$.

Ex: The graph of a direct variation equation passes through the point (4, 8).

a) Write a direct variation equation relating x and y.

b) Find y when $x = 24$.

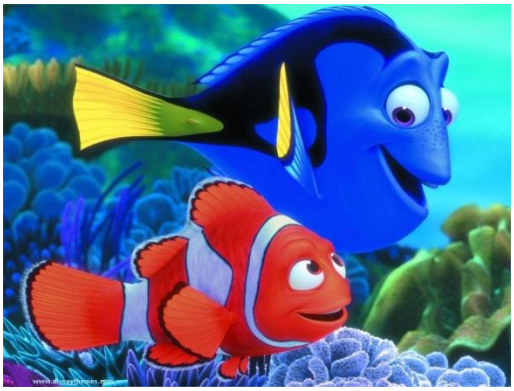
Ex: Write a direct variation equation and find y when $x = 14$.



Ex: The number *s*, of tablespoons of sea salt needed in a saltwater fish tank varies directly with the number *w*, of gallons of water in the tank. A pet shop owner recommends adding 100 tablespoons of sea salt to a 20 gallon tank.

a) Write a direct variation equation relating *w* and *s*.

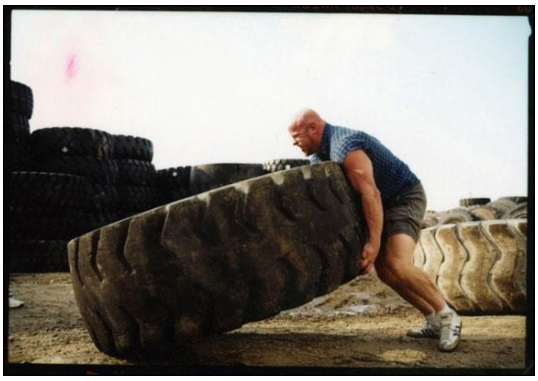
b) Find the number of tablespoons needed in a 30 gallon tank.



Ex: An object that weighs 100 pounds on Earth would weigh just 6 pounds on Pluto. Assume that weight *p*, on Pluto varies directly with weight *e*, on Earth.

a) Write a direct variation equation relating *e* and *p*.

b) What would a 750 pound rock weigh on Pluto?



Ex: The table shows the total cost *c*, of downloading *s* songs at an internet music site.
a) Explain why *c* varies directly with *s*.
b) Then write the direct variation equation.

s	***c* ($)**
3	2.97
5	4.95
7	6.93

Ex: The table shows the total cost *c*, of buying *d* used DVD's at a music store.

a) Explain why *c* varies directly with *d*.

b) Write the direct variation equation.

d	***c* ($)**
3	25.77
6	51.54
9	77.31