A job at a manufacturing plant pays $10.00. This table shows the relationship between the hours worked and dollars earned. Here we see that dollars earned is equal to the number of hours worked multiplied by 10.

Hours worked	0	1	2	3	4
Dollars earned	0	10	20	30	40

Vocabulary

Direct variation – a linear relationship written in the form $y = kx$, so, that we have a constant rate of change, either negative or positive.

Constant of variation – the variable k is a nonzero constant where, $k = \frac{\Delta y}{\Delta x}$

Varies directly – whenever you see these words remember $"k = "$

Examples: Graph the following equations and LABEL:
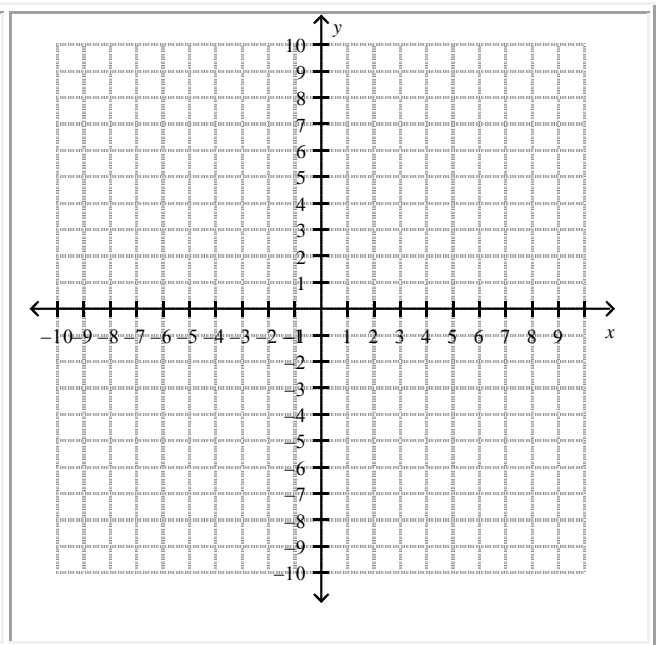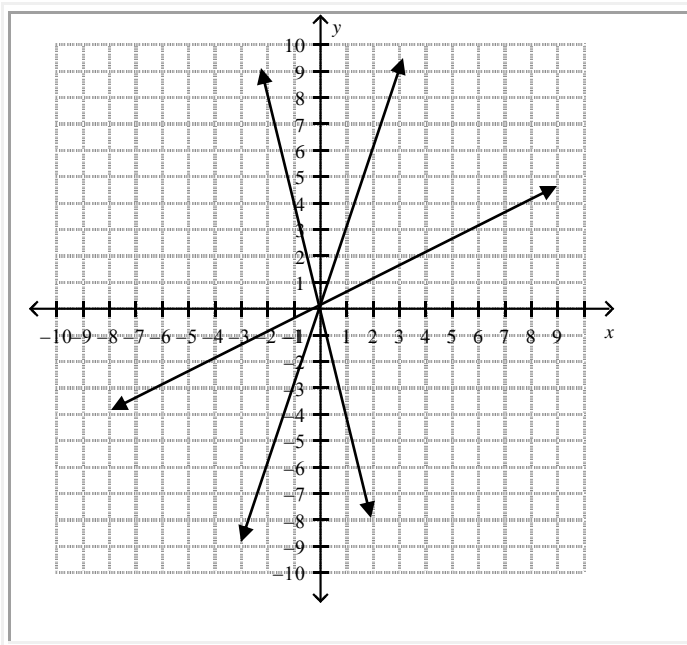
y=3x   y=1/2 x   y=- 4x   y=2x   y=-3x   y=-1/2 x

set up a table of values!!

x	
y	

What do you notice about the constant k? Is it equal to something previously studied??

If a linear equation is considered to be a **direct variation**, it has an initial condition of $(0,0)$. Graphically it will pass through the origin.

With this information we can determine if an equation is a direct variation or not. How? *Solve **any** equation for y. Is the equation in the $y = kx\ form$?   If yes, the coefficient is the **constant of variation.***

Tell whether each equation represents a direct variation. If so, identify the constant of variation. (*Solve* $y = kx$ *for* k ☺)

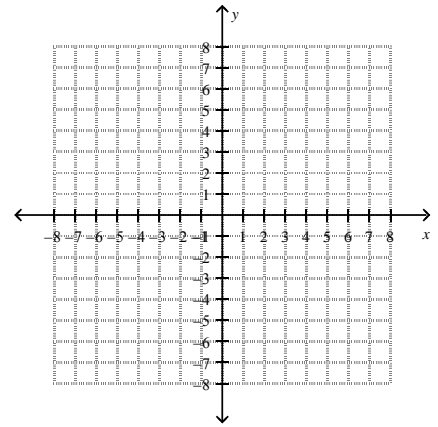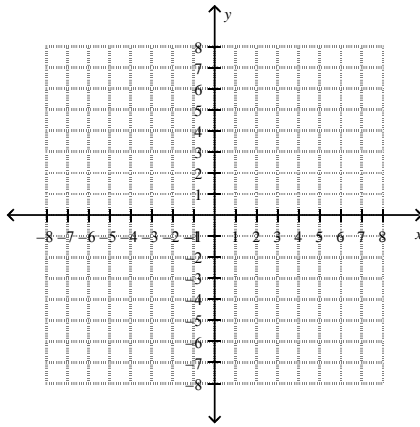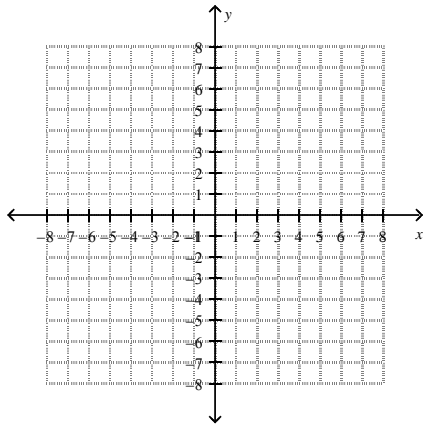$$3y = 4x + 1 \qquad\qquad 3x = -4y \qquad\qquad y + 3x = 0$$

So, **IF** we have a direct variation, the ratio $\frac{y}{x}$ is equal to the constant of variation.

Determine if the relationship is a direct variation, explain and graph. If it is direct variation, write the equation.
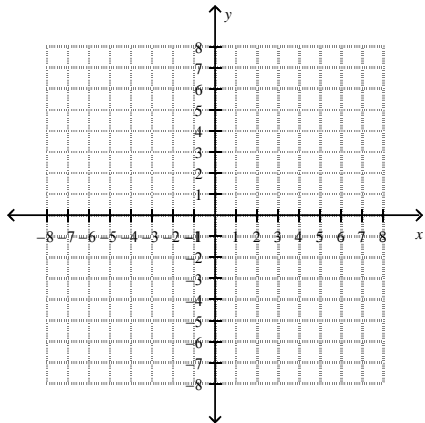
x	-3	1	3
y	0	3	6

x	2.5	5	7.5
y	-10	-20	-30

x	-2	1	4
y	5	3	1

The perimeter of **y** of a square varies directly with its side length **x.** Write a direct variation equation for this relationship and graph.

whoa!

The distance traversed by a car traveling at a constant speed is directly proportional to the time spent traveling. If the car travels 75 kilometers in 5 hours, how far will it go in 7 hours?