

## Linear Relations ( graphing lines )

Please define - Linear  
- Relation

In math we learn in steps and not having mastery makes next step a lot more difficult.

we learn what math is - numbers then operations then fractions and integers  
then math really starts

next we solve more single solution bedmas questions working forwards

$$14 - 2 ( 3 x - 4 ) =$$

next we solve single unknown questions with algebra by working backward

$$14 - 2 ( m x - 4 ) = 38$$

now we will solve equations with double unknowns, this is a new concept and  
you really need to understand the steps and not just try to solve mentally.

I think this idea is best explained with an example

We will start with an easy one - at my job I get paid \$15 dollars per hour

So if I ask a single question there is a single answer

For 3 hours of work how much do I make obviously \$ 45 but we need an equation

$$\text{Pay} = \$ 15 / \text{hour} \times \text{number of hours}$$

$$P = 15 \times h \text{ this is the 2 unknown equation I need to solve and graph}$$

Since I can work many different amounts of hours there are many different amounts of pay.

For this question we choose the value of one of the variables, the other we calculate.

I would know my hours worked and have to figure out my pay.

So hours worked is considered the independent variable, we can just pick those.

Then pay is calculated after we know the hours so it is the dependent variable

So I now need to organize this info

If I work 0 hours 0 pay, 1 hour \$15 pay, 2 = 30, 3 = 45, 10 = 150, ect .....

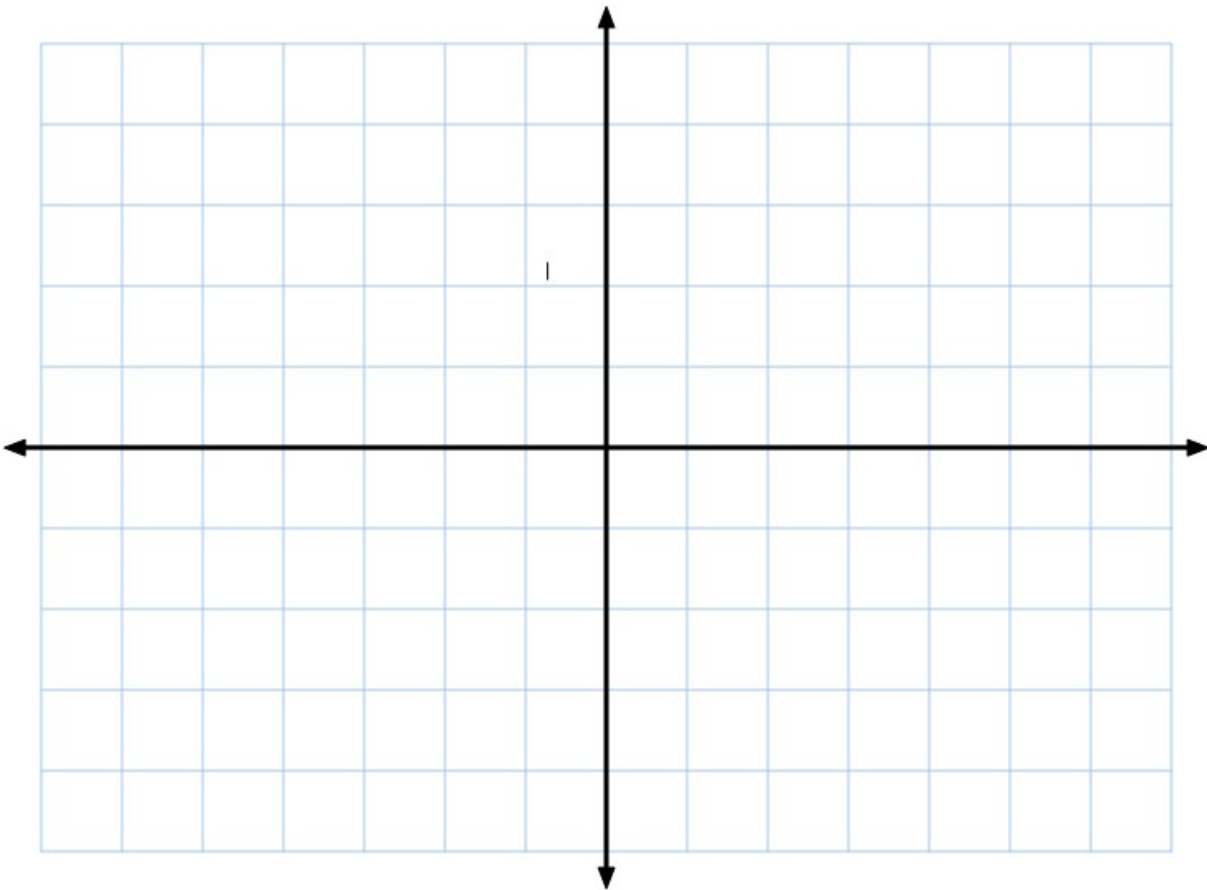
This is messy and not well organized, we need a better way this is a **T-chart** or **T-table**

time (hours)	0	1	2	3	5	10	40	ect ....	independent (you pick)
pay (dollars)	0	15	30	45	75	150	600		dependent (calculated)

Since you could have picked any numbers for time, there are endless numbers for the pay

So we don't have one solution we have a linear relation, from which we can get endless answers.

Now we will graph the relation, for that we use a **coordinate plane**



If you do not have graph paper at home that's ok you should have half graph paper (it's just lined paper)

You need to spread the horizontal lines out to be the same as the vertical lines.

We will only be using the positive part of this graph, because I generally don't work negative hours

For any linear relation you create there are some things you always need to include

- Always include a title - My Pay
- Label each axis - Time ( hours ) and Pay ( 4 )
- You need to put numbers on each axis but **it must be evenly spaced.**
- This can get tricky and you really need to think about the best way here
- Our example is an easy one (you can go up by 10s but evenly or 15s might have been better)

Here is my graph of our example



You now need to plot the points off our t chart

Once you have plotted the dots connect them with a line and it should continue on

We did not stop at 5 but our graph only goes to 7 hours.

I like graphing – They say “ A picture is worth a thousand words”

I agree when you describe a picture you can use many words.

“ A graph is worth a thousand numbers “ because I could explain using many words.

Your work for today after you copy the notes and complete the easy example we did,

I need you to look up the minimum wage for a 14 year old in prince George

and make - Equation with words

Formula

T-chart

Graph showing your pay for 0 to 8 hours worked.

Finally, a full work week is 40 hours, show me how to calculate how much I am getting paid this week.

( assume no taxes are going to be taken off )