

## Lesson 6 Graphing a Line

*Word Problem 1* Let's pretend you are baking bread for a school or church bake sale. Your mom wants to take pictures of this marathon bake-o-rama for the family album. Then right before you start, you bake two loaves to make sure that you have all the necessary ingredients and to test the oven to see that it is working properly. You figure that with everything taken into consideration, you'll be able to bake three loaves per hour.

Bright and early the next morning, Mom arrives with the camera and takes the first picture of the two loaves sitting on the counter. She will return and take a snapshot, once every hour. When she returns after the first hour, you have 5 loaves of bread: the 2 you began with and 3 that just came out of the oven. In two hours you have 8 loaves; the 2 you began with, plus 3 plus 3 for the two hours you've been baking. In three hours there are 11 tasty brown loaves ( $2 + 3 + 3 + 3$ ). How many would you have in ten hours? 32 (3 each hour or  $3 \times 10$ , plus the two you started with).

When we record this data in two columns, it looks like this:

Hour	Bread
0	$(3 \times 0) + 2 = 2$
1	$(3 \times 1) + 2 = 5$
2	$(3 \times 2) + 2 = 8$
3	$(3 \times 3) + 2 = 11$
10	$(3 \times 10) + 2 = 32$

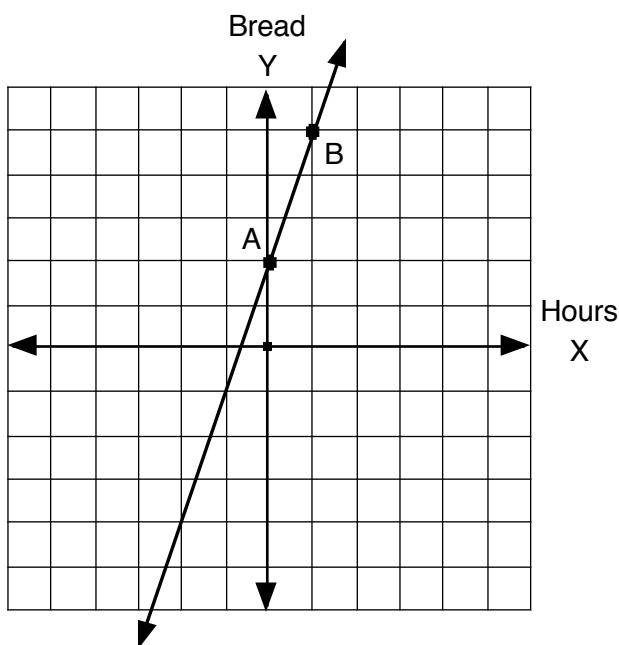
*Graphing the Problem* We can interpret the data in our table with an equation.

Bread equals three per hour, plus two.

$$B = 3H + 2$$

Each hour we have a new set of data. The data, or points to be graphed, are:

H	B
0	2
1	5
2	8
3	11



Due to the size of the graph, we can only plot the first 2 points. They are points A and B. Connecting the points with a straight line gives us our first line graphed with Cartesian coordinates.

*Word Problem 2* Sometimes problems begin with someone owing or in debt or in the hole. This will be represented by negative numbers. If I owe you 5 dollars, this appears on the graph as -5. In the next example, Bobbie owed 3 (negative 3) dollars to Barbara. He earns 1 dollar for every block set he assembles (positive 1). How much money will he have after assembling 6 block sets and then paying back his debt to Barbara? When he begins, without having put together any blocks sets, he has no money, in fact he is in the hole 3 dollars. This is shown in the data as -3. And since he didn't have a chance to begin working yet, the money from the block sets is 1 times 0 or 0.

When we record this data in two columns, it looks like this:

	Block Sets	Dollars
When he starts.	0	$(1 \times 0) - 3 = -3$
	1	$(1 \times 1) - 3 = -2$
	2	$(1 \times 2) - 3 = -1$
	3	$(1 \times 3) - 3 = 0$
	4	$(1 \times 4) - 3 = +1$
	5	$(1 \times 5) - 3 = +2$
	6	$(1 \times 6) - 3 = +3$

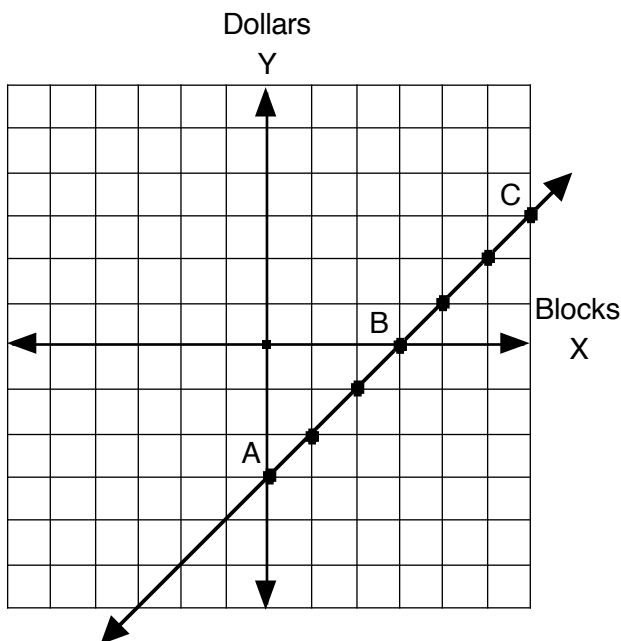
*Graphing the Problem* We can interpret the data in our table with an equation.

Dollars equals one per block set, minus three.

$$D = 1B - 3$$

Each time we complete a block set, we have a new set of data.

The data, or points to be graphed, are:



	B	D
Point A	(0, -3)	
	(1, -2)	
	(2, -1)	
Point B	(3, 0)	
	(4, 1)	
	(5, 2)	
Point C	(6, 3)	

Points A, B, and C are shown as three points on the graph. Connecting the points with a straight line shows us the data drawn as a line and graphed with Cartesian coordinates.