

Algebra I: Module 4 Lesson 7 – Determine the Meaning of Slope and Intercepts

Ok, let me make sure I understand what you mean. You need help understanding the meaning of slope and intercepts? Cool, what's your number? Got it. Let me write something up for you and I will call you back.

The first thing I think I would say...what is the meaning of slope? In so many words, not using the fancy mathematical terms, I would probably say it is how something changes. It can change really fast or slow. It can increase or decrease. So I may say that something is increasing 10 beats per second or decreasing 10 beats per second or 20 beats per second. It's how something changes. The y intercept is where it begins. Meaning that it's your starting point. We can digest those two things. Let's do a problem.

Here's a problem. Jamie and John are friends and decided to start a savings account at the Algebra Bank. Jamie opens a savings account by depositing \$50. She decides to make a monthly deposit of \$10 a month. John opens a savings account by depositing \$10. He decides to make a monthly deposit of \$25 a month.

Remember, we were talking about multiple representations before? That would be my verbal. Let's get down to the equation.

Let's write an equation to represent the amount of money, y , Jamie and John will have in their accounts after x months. So y is the amount of money in their accounts. x is the amount of months. Let's start with Jamie.

Jamie starts out by opening an account with \$50. Remember, y intercept is where it all begins. So she starts out with \$50. What happens after that? She decides to make a monthly deposit of \$10 a month. That's something that's changing and if she's making a deposit, that's going to increase. So she's actually increasing by \$10 a month. I'm going to put $10x$. She starts out with 50 plus she increases by \$10 a month so my equation would be $y = 10x + 50$.

Let's talk about John. John opens a savings account by depositing \$10 so he started out with \$10. And over here, this is your y intercept. This is your slope. So John is starting out with \$10 so his y intercept is \$10. What happens once he does that? He wants to make a monthly deposit of \$25 a month. So \$25 every month is what John is going to do. So his equation would be $y = 25x + 10$ with 25 being the slope.

We can represent these equations in a table as well. To do that, let's use the graphing calculator. If you have your graphing calculator, the first thing you want to do is turn it on. You want to go to the $y=$, type in the first equation, $10x+50$. Ok, once you do that, we're going to hit second graph to display the table. This is what the table looks like. Notice that for your table, for Jamie, her starting point is at 50 so before she deposits anything, for no amount of months, she has \$50 in her account. So our first coordinate is $(0, 50)$. Our second coordinate $(1, 60)$ means after her first month, she has \$60 in her

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account. The third coordinate, after three months, she has \$70 in her account. And after four months, she has \$90 in her account.

So looking at John's table, John's table is a little different. You want to go back to the $y=$ screen and type in the equation for John, $25x + 10$, and then do second graph to get your table on the screen. Here's what John's table looks like. Initially, he starts out with \$10 so your coordinate pair is $(0, 10)$. After the first month, John has a total of \$35 in his account. After the second month, he has a total of \$65 in his account. After the third month...\$85 and after the fourth month...\$110.

This is what the table looks like for Jamie and John. Let's look at the graph for Jamie and John. If we are plotting the graph for Jamie and John, you want to choose at least two points to make a graph. Let's start with Jamie. I'm going to go back to her equation which is $10x+50$ and find two points. The points that I want to use, let's just do the first two, $(0,50)$, I'm plotting that point. Then let's plot the point $(1, 60)$ which is the amount after the first month. After we do that, connect your points so that you can see your graph or your line.

Let's do the same thing for John. Remember, John's equation is $25x + 10$. Looking at his table, his first ordered pair was $(0, 10)$. Let's plot that on the graph. I'm starting at 0 and going up to 10. Place my point. Next do the next ordered pair, which after one month, he has a total of \$35 in his account. So $(1, 35)$ and then let's connect those two points and make our line. Simple?

Here's what you have. Let's look at the graphs. Say you only have the graphs to look at and you have to determine the meaning of the slope and the y intercept from the graph. What would you do? Firstly, look at Jamie's graph. What is the y intercept for Jamie's graph? Can you circle that or put your pencil on it? That's right! Jamie's y intercept is 50. She starts at $(0, 50)$ which is \$50 in her account initially.

What about John's y intercept? Can you find John's y intercept? Good, \$10, that's it! So the ordered pair is $(0, 10)$. He starts out with \$10 in his account.

Now, if we're talking about the slope. Who's changing faster? Is it Jamie? Is it John? How can you tell? Let's take a look at the graph. The graph that is steeper or more slanted going up from left to right has the greater slope. Or you can take a look at the equation. You can see from the equation that John is increasing faster with his slope because he's depositing more money so John's graph looks like it's above Jamie's graph eventually. It doesn't start off that way because he doesn't have more money in his account but eventually the slope increases faster than Jamie.

So if you are ever asked a question – what does the slope mean in this particular equation? It's telling you how fast Jamie and John are depositing money in their account.

Sounds good? Let me know if you have any more questions.