Lines and Systems I

SUMMARY KEYWORDS
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Hello, and welcome to ALEKS walkthrough video number four. My name is Robert J McKeown, and I'm very happy that you decided to check out my video today we're going to be covering lines and systems. Now I'm not going to go through every single concept and ALEKS topic for that would just take too long. And I want you to try and do it yourself, because that's how you're going to learn. Today's topic is relatively straightforward. One thing you'll hopefully appreciate from this activity is that linear equations are great, because with a linear equation, there's typically one solution, which is really, really handy, such as x is equal to four. That's really nice. Remember, last time in the last video, we had quadratics, where we could have two solutions. So linear equations are really great to work with. And we're also going to be working with graphs. And so this is our first sort of pass at graphing. A few things to remember one, understanding how to read graphs and how to create graphs is very, very important for you, as a young person learning to be an economist and learn to be a, what we call a white collar worker, and a knowledge worker. graphs are a way of representing sophisticated or complicated mathematical and statistical information to a wider audience. I make it makes it more accessible to people that maybe don't know that much about stats or math. But it's all and it's also very succinct, and can get that message across very quickly to people who do know quite a bit about statistics and math. And so it's going to be extremely important for your career, whether you're working in the private sector, wherever even if you're working in, you know, charities, the public sector, if you're working academics, being able to present information in a easy to understand and accessible way is a great way to get promoted, and to have a really great career. So I hope you've got your pencil, you've got your paper, and maybe you've got another tablet, if you want to write on that tablet, instead of using the pen and paper. Either way, I hope you're ready to go. So let's jump into the questions. Our first question says find an equation for the line that passes through the points two comma negative four, and negative four comma four. So if you're new to this, these are Cartesian coordinates. And the first value is the x coordinate. And the second value is the y coordinate. So if I draw a little diagram, I've got a coordinate at here's the x axis, here's the y axis, I have a point here at two x is equal to two. And when x is equal to two, y is equal to negative four. So I've got a point here, that's two and negative four. Now, we might want to say this is our first point, and this will be our second point. So I'll put a subscript of two to denote that it's the second observation or the second point, and here x is equal to negative four. And when x is equal to negative four, y is equal to four. And now we've identified the point to negative four. Now it's a line. This is an equation for the line the past the points described. So I could draw a line like that and it goes off forever in both directions. Now the question is asking me to find an equation for this

line. That equation for a line always has the form y is equal to the intercept A plus the slope times the x variable. So A is the intercept, or I should be careful, that's the y intercept. m is the slope. And x is the x axis value. And so the question is asking me to find, essentially this point right here, I want to find that point, the equation to find that point is one you're probably familiar with, which says that the slope of a straight line, or the slope of any line for that matter, is equal to rise over run. And in our case, rise over run is equal to the change, or maybe the distance from y two, two y one divided by the distance between x two and x one. And if we do that, we're going to find the slope. So let's go ahead and find the slope of this line. I've got m is equal to four minus minus four, that's y two minus y one divided by negative four, minus two. And that's going to give me eight over negative six, which I could simplify to negative four over three. And so the equation, the equation, this line is going to have a slope that's equal to negative four over three. So I have y is equal to the y axis intercept, minus four over three times x. Now, how am I going to find the y axis intercept? Well, I'm going to go back to our rise over run equation. And I'm going to use these coordinates as my x one and y one coordinates. So I'm going to have a negative negative four in the numerator, oops, and a to negative two and the denominator. And if I want to find the y intercept, the y intercept occurs when when x is equal to zero when x is equal to zero, so I'm going to let x two equal to zero. And I'm going to let this whole thing be equal to negative four over three, and I'm going to solve for y two, I'm going to solve for y two. I've got negative four over three is equal to y two plus four over negative two. If I multiply both sides by negative two, I get eight over three is equal to y two plus four, I get y two is equal to eight over three minus 458 over three, that's like minus 12 over three. It's equal to y two and I get y two is equal to negative four over three. Now that looks a little silly. Because I have the same value for the slope that I have for the y axis intercept, this implies that the equation of this line is equal to negative four over three minus four over three times x. Right? And that's the same form that we started out with. Here I am on ALEKS. I'm going to put our answer and and see if we have the right answer. So I've got a y, y is equal to negative four over three times negative for over three, multiplied by x. And although it looked kind of funny, it was the right answer. So we got the right answer. And that's the methodology you want to be able to use. So we're actually able to use the same equation or equation for the slope of the line twice. Looking at our next question, we want to graph the solution to a system of inequalities. This is pretty straightforward, but I found it very easy to make a mistake when I was working, especially working through ALEKS. So let's take a look at the first equation, I want to graph the first equation we have y is greater than two x minus three. So there's a couple ways to approach this, I would recommend finding two points in this inequality. And starting there, so I'm going to say well let x equals zero. If x equals zero, y becomes two times zero, minus three and y is equal to minus three. Now I'm going to go over to ALEKS. And I'm going to make a little mark. So we've got x is equal to zero, y is equal to minus three. And I made, it's kind of hard to see, but I made a little a little tiny blue x at the coordinates. Remember our de Cartesian coordinates at zero, minus three. Now, what if I say, well let x equal one. Now I've got and maybe, you know, I should probably be aware, I like to put little equalities there. But of course, this is an inequality. So maybe I'll keep the inequality live. So if we let x equal one, y is going to be larger than two times one, minus three, so y is going to be larger than negative one. Now we'll go back to ALEKS. I'll click on the little pencil diagram. And I'll make a point. Maybe I should have done it over here. First, I'm looking for the coordinate one, negative one, one, x is equal to one and y is equal to negative one. Now that I've got those little coordinates marked, I'm going to just press on that line icon, and essentially tap or click on those two little axes. And now I've got a line going up and has a slope that's equal to two, you should be able to say that the slope here is equal to two. Now y has to be larger, y has to be larger, or

above and to the left of this line, and I'm going to click on this icon right here that I've got highlighted, and he should be able to see with a little hand pointer. Now if I click on that, and I click on this space up here, y can take on any of the values of that shaded area. Now before I rush off, when I start working on the second inequality, notice that y is strictly greater than to x minus three. So I'm going to click on this little icon here, you can see that it's highlighted and that light blue color, and it's got an arrow pointing in both directions. I'm going to click on that. And I'm going to click on the line. And now notice that the line has become the line has become dotted. And that means y cannot take on a value equal to two x minus three. So that's just a little a little technical, a little bit of detail and definitely detail you want to get correct when you're working with ALEKS. So that you get rewarded for everything that you do now. Now we're ready to tackle the second inequality and we've got y is greater than or equal to negative two x minus seven. And I'm going to do the same thing, well, let's let x equal to zero. That's easy calculation. I like using that as one of the points, then we get y is greater than or equal to negative seven. And I've got the point zero, negative seven. What if we let x be equal to one. Now we've got y is greater than or equal to negative two, excuse me, times one, negative seven, now y is greater than or equal to negative nine. And so we've got the coordinate one, negative nine. Now I'm going to go and I'm going to use the little pencil icon like I did last time. And I'm going to look for zero negative seven, which is down there. And I'm going to look for one and nine, which is right down there. Now, I'm going to put cross the line icon, and I'm going to click on those two little axes that I drew on the diagram. It's already been shaded in for us. Why can take on it can be equal to negative two x minus seven with our second equation, and so why don't we see if I've done this correctly, I'll click click the check button. We'll see if we've got the solution. And we do so as long as y is in this blue, light blue shaded area here