Math 1314 College Algebra
Section 2.2 Linear Equations in One Variable - Part 1

So this is a new book. What I decided to do was to kinda combine part of 2.1 with the end of 2.2. So 2.2. talks about linear equations and then it talks about lines and slopes. 2.1. talked about the rectangular cordinate system and plotting lines and things like that. So I decided to lump those together. We are gonna start with lines, linear equations. Then we are gonna pick up lines and slopes and the rest of it all together.

So what is an expression? Any combination of operations, variables and numbers. What is an equation? a mathematical statement that sets two expressions equal to one another. It is very importatnt you understand the difference between an expression and an equation. Alot of students confuse them. If I tell you to simplify an expression you just clean it up as far as you can. Alot of students like to introduce an equal sign and try to solve. So an expression there is no equal sign you just clean it up as best as you can. Most of the stuff on the quiz I just gave you are expressions so there is no solving.

What is a solution or a root? Any number that satisfies an equation. What is a solution set? The set of all solutions of an equation. When I say solve what do I mean? The process used to find the solution set of an equation.

Restrictions are gonna what we would through out. what would cause a problem. When we get started on functions your also gonna domain associated with this. So far now we are just gonna say restrictions.

Give me some things in math that your never allowed to do. What killed the dinosaurs? Dividing by zero. So if I have a variable thats in the denominator I have to be careful to make sure it can never be zero. What else is not allowed? Something with a negative number. Where can a negative number not be? It can be in the denominator. I can never have a negative under an even route. Heres how I right this, my summary, If I had a fraction and any variable stuff on the bottom Ima going to make sure that my variable stuff can not be zero. That means if i have a 3 on the bottom then its okay. but any time i have anything with a variable I ahve to make sure that the whole denominator is not equal to zero. Then the other one is the even root. So if I have something with variables in it (variable stuff)an expression with variables under a root, I have to make sure that that stuff is never negative. We classify numbers three ways according to sign. Positive, Negative, And Zero. So if I am throwing out negatives which two are allowed. Positive and Zero. So I have to make sure that my variable stuff is not negative so it is greater than or equal to zero. Greater than or equal to zero is sometimes read as non-negative.

So lets do some examples. We are gonna find some restrictions. Notice these are equations. How do you know they are equations? They have equal signs. What do the directions tell me to do? Find the restrictions. Do not solve. I am throughing out any variable that would cause an issue. Look at the first one. Do I have any fractions with a variable in the denominator. Yes Tell me what to do, So I am gonna take the denominator that has the variable in it (y-17) and set that not equal to zero, I am making sure that denominator will never be zero. And then I am going to solve for that. So Y can not be equal to 17. I am not solving the equation. I am solving for that restriction. So I know Y can never be 17. It can be anything else but 17 because if I plug in 17 for Y I get 17 on the bottom. Do I have any roots, even roots. Does everybody see I took this right here. And there is also a square root right there. So now I have to address that. The square root of X. which mean I need to take what is under that root and set that to greater than or equal to zero. The radicand is what is under the square root sign. I have to take my radicand and make sure it is not negative.

Which means I have to make it so that X is non-negative. X can be zero or postive. So my restrictions are that y can not equal 17 and x cannot be negative. Every other variable is allowed. This does not mean the variables will solve the problem. But I am allowed to plug in any value of x that is positive or zero and any value of y that is not 17. It may not be a true statement but it will not cause any issues. There is a difference between solving and getting a true answer and doing something illegal mathematically.

Lets try another one. Find the restrictions. 4x-14=x+5 Are there any fractions with x in the denominator. No. Are there any even roots? No. When you are find restrictions you always start out with all real numbers. and then when you find a denominator where x is a the bottom or a even root with x under the root then you start throughing away certain values for x. Do I through away anything here. No. So there are no restrictions. Every single value for x is allowed to be plugged into the equation. It does not mean it will solve the equation. It just means I am allowed to plug in any x value I want.

What about Part C (8x/9)+2=12 No restrictions? what about the denominator? x is in the numerator. So the answer is No restrictions.

Look at part D. Take the denominator and it cannot be zero. I want to point out that I want to see x minus one does not equal zero. Not x does not equal zero. That is not the same thing. The denominator can not be zero. The variable may or may not be. Solve that. X can not be one. Do I have to address anything else in this equation. Yes. What else? The other denominator. x plus 3 can not be equal to zero. So x can not be -3. So I have through out both 1 and -3 as values for x. That means if I was looking at a number line and graphing all the possibilities I could not include -3 and 1 but everything else is possible. I can plug in infinitley many x values except for those specific ones.

Properties of Equality: Uf a,b,c, are real numbers and a equals b, So what have I done on the first one. If I had a equal to b then I added c to both sides. If I have an equation I am allowed to add something to both sides. What about a-c=b-c. I had an equation a=b and i subtracted c on both sides. What about a/c=a/b. Assume c does not equal zero. I divided both sides by c. What about