Converting from Point-Slope to Slope-Intercept Form

Both point-slope and slope-intercept forms tell us a lot of information about the graph of that equation. Any equation written in point-slope form can also be written in slope-intercept-form, and vice versa. They are just two different ways of expressing a linear equation.

When you have an equation written in point-slope form, and you want to rewrite it in slope-intercept form, the steps to do that are, first, simplify any double negatives. Then distribute on the right-hand side of the equation. Next, collect the like terms. Now your linear equation is in slope intercept form. From here you can read the location of the y-intercept from the equation, as well as solve for the location of the x-intercept by substituting 0 in for y in the equation. Let's look at an example of this process.

Here, we're asked to rewrite the equation y minus 0 equals 3 quarters times x minus negative 1 in slope intercept form, and to give the coordinates of its y-intercept. So let's look at this point-slope equation: equation y minus 0 equals 3 quarters times x minus negative 1. In this form, we can tell that graph of this equation passes through the point negative 1, 0, and that it has a slope of 3 over 4.

Let's write this equation in slope-intercept, and see what information is revealed in that form. On the left-hand side of the equation, y minus 0 is just y. And on the right-hand side, let's get rid of that double negative, and make x minus negative 1 just x plus 1. Next, we need to distribute that 3 fourths coefficient over both terms inside the parentheses. Doing that gives us the equation y equals 3 fourths x plus 3 fourths, which is in slope-intercept form, y equals mx plus b.

In this form, we can see that the y-intercept is located at the point 0, 3 fourths. Additionally, we can tell that the slope of this line is 3 fourths. We can also easily find the x-intercept by substituting 0 in for y in our equation, like this. If we solve for x here, we find that x equals negative 1, so the x-intercept is located at the point negative 1, 0.

Let's head over to the whiteboard to look at a couple more examples.

This first question reads, "Rewrite the equation y minus 6 equals negative 3 times x minus 4 in slope intercept form. Give the coordinates of its y-intercept." Alright, well let's write that equation down: y minus 6 equals negative 3 times x minus 4. There are no double negatives that we need to deal with, so the first thing we're going to do is distribute this negative 3 across both of these terms inside the parentheses. Doing that gives us y minus 6 equals negative 3x plus 12. And now the only like terms to combine are the constant terms, and we'll do that by adding 6 to both sides of the equation. And that gives us y equals negative 3x plus 18. And this is in slope intercept form, y equals mx plus b. So there's our slope intercept equation. Next, we're asked to give the coordinates the y-intercept. Well, the y-intercept is going to be at 0, because y-intercepts always have an x-coordinate of 0, and then this value for b, which is 18. So our y-intercept is at 0, 18. Alright, let's look at one more example.

This one reads, "Rewrite the equation y minus negative 2 equals one half times x minus 6 in slope intercept form. Give the coordinates of its y-intercept." Again, let's write that equation down. That's y minus negative 2 equals one half times x minus 6. We do have a double negative here, so let's deal with that first. That becomes y plus 2 equals one half times x minus 6. Now we want to distribute this one half coefficient across both of these terms. That gives us y plus 2 equals one half x minus 3. Now all that's left to do is combine like terms, and the only like terms are the constant terms, so we're going to

do that by subtracting 2 from both sides of the equation, and that gives us y equals one half x minus 5. And this is in slope-intercept form, y equals mx plus b. Next, we want to find the coordinates of the y-intercept. Again, the x-coordinate of a y-intercept will always be 0, and the y-coordinate is going to be this b value, which for us is negative 5. So the y-intercept of this equation is located at 0, negative 5.