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Inequalities with Decimals

In this video lesson, we talk about solving inequalities with decimals. You will learn in what order to take your steps to solve these types of problems.

Inequalities with Decimals

Before watching this video, you should already be familiar with solving regular inequalities that involve integers. Now, we'll take the next step and learn how to solve **inequalities with decimals**. These are inequalities that include decimal numbers. You will find these types of problems in use with statistics and other scientific fields.

For example, you might come across a problem such as $x + 1.5 > 7$ where you need to solve for the x. This could be a statistics problem about the number of chocolate bars that the average person eats per week. Looking at this problem, you might see that it looks a lot like our regular problems with integers. If our decimal number was an integer such as 1, we would have the problem $x + 1 > 7$, which you should be very familiar with solving.

How To Solve Them

And because they look so similar, the solving techniques are the same as well. What you want to do is to get the x, the variable, by itself. To do that you look at what operations are attached to the variable.

First you look at any subtraction or addition. If you see one or the other, then you perform the opposite operation. So, if you see addition, you subtract what is being added. If you see subtraction, you add what is being subtracted.

Next you look for any multiplication or division. The same applies here. You perform the opposite operation. If you see multiplication, you divide. If you see division, you multiply. What these opposite operations do is move the numbers to the other side of the inequality leaving you with just the variable.

Let's see how we go about solving our problem:

$x + 1.5 > 7$

We first look for any addition or subtraction going on. We see that there is a 1.5 being added to our x. We need to perform the opposite operation. So, we subtract the 1.5 from both sides of the inequality. We remember that when solving for a variable, whatever we do to one side of the inequality, we also must do to the other. We get:

$x + 1.5 - 1.5 > 7 - 1.5$

Which turns into:

$x > 5.5$

Our answer is 5.5. So, this means that the average person will eat more than 5.5 chocolate bars each week.

Let's look at a couple more examples.

Example 1

$1.1x - 3.1 < 4.6$

We are first looking for any addition or subtraction going on. We see that there is a 3.1 being subtracted. So, we add this 3.1 to both sides of our inequality.

$1.1x - 3.1 + 3.1 < 4.6 + 3.1$

This turns into:

$1.1x < 7.7$

Now we look for any multiplication or division going on. We see that our variable is being multiplied by a 1.1. This tells us to divide since division is the opposite of multiplication. So, we divide both sides by 1.1. We get:

$1.1x/1.1 < 7.7/1.1$

Which turns into:

$x < 7$

Our answer is $x < 7$.

Example 2

$x/-3.4 > 8.1$

What do we see in this problem? We don't see any addition or subtraction, but we do see division. This tells us to multiply. So we multiply both sides by the -3.4. We get:

$(x/-3.4)*-3.4 > 8.1*-3.4$

Since we are dividing by a negative number and we are working with inequalities, we need to make sure that we flip our inequality sign. This is what separates inequalities from other equations. If we began with a less than sign, we will end up with a greater than sign if we multiply or divide by a negative number. So what do we get for our answer here? We get:

$x < -27.54$

Lesson Summary

Let's review what we've learned. **Inequalities with decimals** are inequalities that include decimal numbers. Solving them uses the same steps as solving for inequalities that just have integers. We start by first looking to see if our variable is being subtracted from or added to a number. If so, then we perform the opposite operation to both sides of the inequality. If we see subtraction, we add what is being subtracted. If we see addition, we subtract what is being added. Next, we look for any multiplication or division. Again, we perform the opposite operation. If we see multiplication, we divide and if we see division, we multiply.

Learning Outcome

Once you are finished with this lesson, you should be able to identify and solve an inequality that includes decimals