Comparing & Ordering Rational Numbers

After watching this video lesson, you will be able to look at any rational number and compare it with any other rational number. Learn what you need to do so that you know which number is greater or lesser than another.

Rational Numbers

Sam runs over to you looking scared. He has a piece of paper in his hand. He tells you he desperately needs your help. He knows that you are learning math using really helpful video lessons, and he feels that you are the one that can help him with his problem. He shows you his paper. On it, you see this problem: Order these numbers from least to greatest: 1, 4, 0, 3, 3/2, 4/5, and 10.

Sam says, 'Can you help me?' You tell him of course you can. You look at these numbers and you realize that they are **rational numbers**, numbers that can be written as the division of two integers. All of the numbers can be written as a fraction of two integers. For example, the 1 can be rewritten as 1/1. The 4 can be rewritten as 4/1. The 3/2 and the 4/5 are already written as the fraction of two integers.

You ask Sam, 'Do you want to go over this problem right now?' Sam says, 'Yes!' You say, 'Okay! Let's get started then. Have a seat!'

Comparing Rational Numbers

You begin by telling him how to compare two rational numbers to each other. You point to the 3 and the 3/2. How can Sam tell which number is greater or lesser? You tell Sam that for the rational number 3/2, Sam first needs to divide it to get a decimal number. Dividing 3 by 2, we get 1.5. Sam can now look at the numbers 3 and 1.5 to see which is greater or lesser. 1.5 is greater than 1 and less than 2. Is this less than 3? Yes, so 1.5 is less than 3, and 3 is greater than 1.5.

To compare the numbers 4 and 4/5, the same process is followed. First, we divide the 4 by the 5. What do we get? We get 0.8. Is 0.8 greater or lesser than 4? Well, 0.8 is less than 1 and greater than 0. This is definitely less than 4. So, 4 is greater than 0.8.

Ordering Rational Numbers

You ask Sam, 'How do you feel about comparing rational numbers now?' Sam says, 'I understand that part now. What's next?'

You tell Sam that next comes the ordering the rational numbers part. Since you've already divided the rational numbers to find the equivalent decimal numbers, the numbers that you are ordering now are 1, 4, 0, 3, 1.5, 0.8, and 10. Looking at these numbers, which one is the least? We don't have any negative numbers, so 0 is the smallest. So, you tell Sam to write down 0 first.

You also tell Sam to cross off the 0 from the list since he already wrote it down as part of his answer. What number comes next? You see a 1 and you also see the 0.8. You know all the other numbers are bigger. Which one of these comes first? Well, the 0.8 is between 0 and 1, so the 0.8 comes next.

Then comes the 1. Sam crosses these two numbers out too from this original list. What comes after 1? We have 4, 3, 1.5, and 10 left. Which one is the least of these? The 1.5 is. So, 1.5 comes next. Sam writes the 1.5 after the 1 in his answer list and crosses off the 1.5 from the original problem list. Now we have 4, 3, and 10 left. What's next? The 3 is next, followed by the 4, and then the 10. And we are done! Sam's answer is 0, 0.8, 1, 1.5, 3, 4, and 10. Sam rewrites this using the original rational numbers for his final answer: 0, 4/5, 1, 3/2, 3, 4, and 10.

Example

To make sure Sam really understood what you told him, you give Sam another problem to try. Order these numbers from least to greatest: 1/8, 0, 1, 4, -5, 4/5.

Sam looks at this problem, sees the fractional rational numbers, and converts them to decimal numbers right away so he can compare them to the other numbers. The 1/8 becomes 0.125, and the 4/5 becomes 0.8 after making the division. Now, the numbers that Sam needs to compare are 0.125, 0, 1, 4, -5, and 0.8. Which number is the smallest of the list? The -5 is the smallest because it is a negative number. Sam writes down the -5 as part of his answer, and he crosses off the -5 from the problem list.

What's next? Sam sees the 0.125, 0.8, 0, and 1 as possible next answers. But which one is the least? The 0.125 compared with the 0 is greater, so is the 0.8. Zero is smaller than both of these numbers. So, 0 comes next. 1 is the biggest. Since 1 is the largest, Sam needs to compare the 0.125 and the 0.8. Which one is smaller? The 0.125 is smaller than the 0.8, so the 0.125 comes next.

Then comes the 0.8 and then the 1. What is left from the problem list now? The 4 is left. So, Sam writes down the 4 at the very end of his ordered list. He now has -5, 0, 0.125, 0.8, 1, and 4. He rewrites this so that his final answer uses the numbers as originally written: -5, 0, 1/8, 4/5, 1, and 4.

You check Sam's work, and you give him a big smile, and you write a big A+ on his paper for a correct answer.

Lesson Summary

Let's review what we've learned. **Rational numbers** are numbers that can be written as the division of two integers. To compare rational numbers, we must first divide them to get a decimal number. After getting the equivalent decimal numbers, we can them compare them to other numbers to see which one is greater or lesser.

Learning Outcomes

After this lesson, you should be able to:

- Define rational numbers

- Explain how to compare and order rational numbers