

Comparing Negative Fractions, Mixed Numbers and Decimal

Summary

Compare and order negative rational numbers in different forms with and without a number line.

Main Core Tie

Mathematics Grade 6

[Strand: THE NUMBER SYSTEM \(6.NS\) Standard 6.NS.6](#)

Additional Core Ties

Mathematics Grade 6

[Strand: THE NUMBER SYSTEM \(6.NS\) Standard 6.NS.7](#)

Materials

Worksheets: [Comparing Negative Rational Numbers](#), [Locating Rational Numbers on a number line](#).

Manipulative: Fraction Towers (or centimeter paper for sketching and shading)

Ti-73's and View Screen, Presenter or Smart View

Paper for each student to make a foldable

A [transparency](#) for each team with three pre-printed rational numbers and number lines on each (attached) and a Vis a Vis marker

A Nerf or foam ball and garbage can or box for basketball game.

Background for Teachers

Enduring Understanding (Big Ideas):

Comparing rational numbers

Essential Questions:

How does ordering negative fractions, mixed numbers, and decimals compare to ordering positive fractions, mixed numbers, and decimals?

Skill Focus:

Compare and order rational numbers

Vocabulary Focus:

rational number, rational number forms, equivalent, convert, number line, negative fraction, negative decimal.

Ways to Gain/Maintain Attention (Primacy):

Manipulatives, technology, Foldable notes (journaling), visualizing, Game

Instructional Procedures

Note: Throughout the lesson, have students read and say all rational numbers in this lesson identifying the place value, for example saying, "three tenths", rather than merely saying "point 3".

Starter: Review

Write each number as a decimal: $\frac{3}{8}$, $4\frac{1}{2}$

Write each number as a fraction or mixed number: 0.5, 3.75, 2.9

Sketch a number line, order and plot the numbers from 1 and 2 above.

Lesson Segment 1: How does ordering negative fractions, mixed numbers, and decimals compare to ordering positive fractions, mixed numbers, and decimals?

Ask students to predict what number would lie halfway between 0 and -1, between -1 and -2. Explain that just as there are positive fractions and decimals, there are also negative fractions and decimals.

Sometimes it is necessary to know which of two or more negative rational numbers is the greatest or the least. We can use the same strategies for comparing and plotting negative fractions and decimals as we do for comparing and plotting locations for positive fractions and decimals.

Following are two strategies we learned previously for comparing.

A number line can be used to compare rational numbers. Use the Numline Application on the TI-73 to compare rational numbers and complete the "[Comparing Negative Rational Numbers](#)" worksheet. Remind students that the further to the left a number is the less the value of that number.

Using the Numline App To Compare Rational Numbers

You must have the Numline App downloaded on your calculator, if it is not preloaded. Select . Choose Numline. In Numline, select Fraction line. Push and set the window minimum as -5 and maximum as 0. You may select a different minimum and maximum if you want. The "Start" can be adjusted to begin at any point on the number line. The "Step" can be adjusted to be increments common to both numbers using the LCD of two numbers.

On the number line view, use the up or down arrow keys to select the upper indicator (top) or the lower indicator (bottom). Using the right and left arrow keys, you can then move the indicators along the line to find values in increments of tenths or any step you have chosen.

To show a specific rational number or compare several rational numbers using the number line, push . Select DrawLabel. Type a number and push . Then type another number and push . You can compare fractions or decimals by looking at their comparative distances to the left of 0.

A second way to compare negative rational numbers is to first write each number in its decimal form. As discussed in the previous lesson, numbers can be converted from one form to another form. So, fractions can be written in their decimal form for a negative rational number. Once both numbers are converted to a decimal form, the two decimals can be compared. This procedure could be done by:

- Convert both numbers to decimal form

- Use zeros as place holders to write each number to the same decimal place.

- Compare the value of both numbers to determine which is greatest.

On the back of the "Comparing Negative Rational Numbers" worksheets, write each pair of numbers listed on the front in its decimal form if it is not already in decimal form and use $<$ or $>$ to write an inequality statement.

Once you have determined which number is greatest and which is least you can plot the approximate location of the numbers on a number line.

Lesson Segment 2: Where is a rational number located on a number line?

When we have misplaced something and need to find it, we generally begin by asking ourselves questions such as: Where should it be? When did I see it last? What was near it? To find where a number belongs on the number line, we ask questions too. Here are some questions that can help us determine where a number is located?

Questions:

- What two integers does it belong between?

- Is it more or less than half the distance to the left of the greater?

 - If it's a fraction is the numerator less than half or more than half the denominator?

 - If it's a decimal, is the decimal part greater than 0.5 or less than 0.5 the distance from the greater number?

In its decimal form, approximately how many tenths is it to the left of the greater number?

An example: Locate -3.25.

What two integers does it belong between? -3.25 is between -3 and -4. A common error is for students to want to place -3.5 between -3 and -2. Remind students they begin with the integer part of the number and move to the left.

Starting at the greater of the two integers, is it more or less than half the distance from to the left of the greater integer.?

If it's a mixed number or fraction is the numerator less than half or more than half the denominator?

If it's a decimal, is the decimal part more than 0.5 or less than 0.5 the distance to the left of greater integer?? Its less than 0.5, so the location would be closer to the -3 than the -4

In its decimal form, approximately how many tenths is it to the left of the greater integer? about 0.3

Help students with example of locating negative rational numbers on a number line by completing the "Locating Negative Fractions and Decimals" on a Number Line worksheet together.

Have students take notes on a three flap foldable for the three questions below as shown. They should write an example of their own under each flap. Students should answer the question about the number under the flap, then sketch a number line to show the answer to that question below.

Lesson Segment 3: Practice-Team Challenge Basketball

Materials: A transparency for each team with examples and number lines (attached), a Nerf or foam ball, garbage can or box

Procedure: Give each team a transparency with three numbers and a number line (see attached). Each team will work together to order their numbers from least to greatest, and then plot the approximate locations on the first number line on their transparency.

Once the teams have done this, they will take turns in challenging the class to order and plot their numbers in this manner:

A challenging team shows all three numbers on the transparency covering up the work and plotting they have done

The other teams are given time to work together to order, and sketch the plots on their individual assignment papers.

The challenging team selects one person in the class to come to the overhead, explain what their team was thinking, ordering the numbers and showing the plot on the second number line on the transparency.

The two number lines are then shown to allow the class to compare. If the person correctly orders and plots the numbers, that person or a person they designate from their team shoots three shots at the basket (2 pts each) . If not, the teacher selects a person from the challenging team to explain their order and plot to have a chance to shoot three baskets.

Teams should be given negative rational numbers that fall between two consecutive integers. For example, team 1 could be given numbers between 0 and -1. Team 2 could be assigned numbers between -1 and -2. Team three could be given numbers between -2 and -3. Team four's numbers would fall between -3 and -4 etc.

Assign any text practice as needed.

Assessment Plan

Performance task, observation.

Bibliography

This lesson plan was created by Linda Bolin.

Authors

[Utah LessonPlans](#)