Big Ideas Math: Red

Parent Newsletter

Chapter 2: Rational Numbers

Standards

Common Core:

7.NS.1: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS.2: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.3: Solve real-world and mathematical problems involving the four operations with rational numbers.

Students will...

Understand that a rational number is an integer divided by an integer.

Convert rational numbers to decimals.
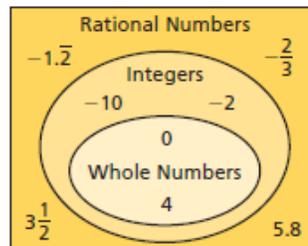
Add rational numbers.

Subtract rational numbers.

Multiply and divide rational numbers.

Solve real-life problems.

Key Ideas

Rational Numbers
A rational number is a number that can be written as $\frac{a}{b}$ where a and b are integers and $b \neq 0$.

Rational Numbers
$-1.\overline{2}$ $-\frac{2}{3}$

Integers
-10 -2

0

Whole Numbers
4

$3\frac{1}{2}$ 5.8

Adding Rational Numbers
- To add rational numbers, use the same rules for signs as you used for integers.
- For example:
$$-\frac{1}{3} + \frac{1}{6} = \frac{-2}{6} + \frac{1}{6} = \frac{-2+1}{6} = \frac{-1}{6} = -\frac{1}{6}$$

Subtracting Rational Numbers
- To subtract rational numbers, use the same rules for signs as you used for integers.
- For example:
$$\frac{2}{5} - \left(-\frac{1}{5}\right) = \frac{2}{5} + \frac{1}{5} = \frac{2+1}{5} = \frac{3}{5}$$

Multiplying and Dividing Rational Numbers
- To multiply or divide rational numbers, use the same rules for signs as you used for integers.
- For example:
$$-\frac{2}{7} \cdot \frac{1}{3} = \frac{-2 \cdot 1}{7 \cdot 3} = \frac{-2}{21} = -\frac{2}{21}$$

$$-\frac{1}{2} \div \frac{4}{9} = \frac{-1}{2} \cdot \frac{9}{4} = \frac{-1 \cdot 9}{2 \cdot 4} = \frac{-9}{8} = -\frac{9}{8}$$

Key Terms

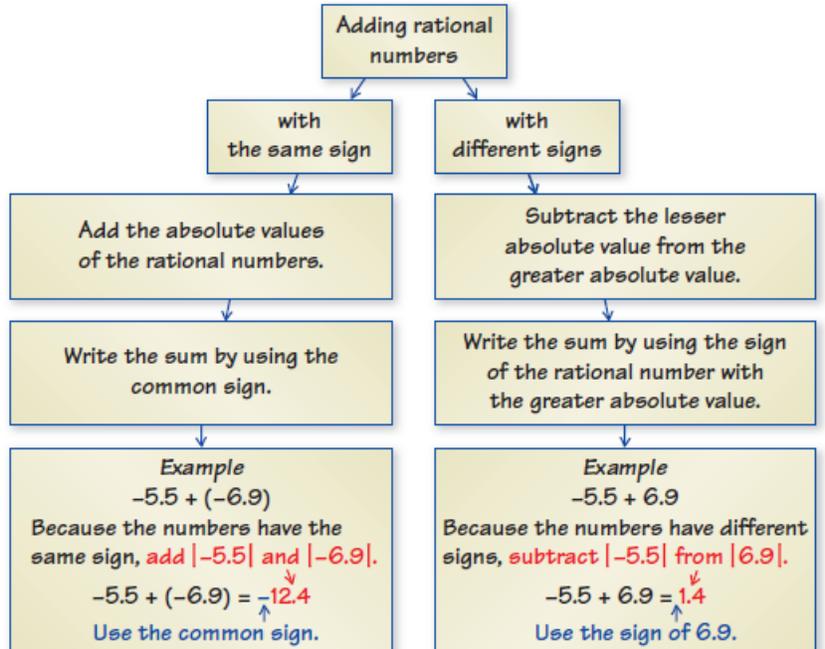A **rational number** is a number that can be written as the ratio of two integers.

A **terminating decimal** is a decimal that ends.

A **repeating decimal** is a decimal that has a pattern that repeats.

Good to know.

Reference Tools

A **Process Diagram** can be used to show the steps involved in a procedure. Process diagrams are particularly useful for illustrating procedures with two or more steps, and they can have one or more branches. As shown, process diagrams can consist of a single flowchart-type diagram, with example(s) included in the last box to illustrate the steps that precede it. Or, the diagram can have two parallel flowcharts, in which the procedure is stepped out in one chart and an example illustrating each step is shown in the other chart.

Adding rational numbers

with the same sign

Add the absolute values of the rational numbers.

Write the sum by using the common sign.

Example
−5.5 + (−6.9)
Because the numbers have the same sign, add |−5.5| and |−6.9|.
−5.5 + (−6.9) = −12.4
Use the common sign.

with different signs

Subtract the lesser absolute value from the greater absolute value.

Write the sum by using the sign of the rational number with the greater absolute value.

Example
−5.5 + 6.9
Because the numbers have different signs, subtract |−5.5| from |6.9|.
−5.5 + 6.9 = 1.4
Use the sign of 6.9.

Essential Questions

How can you use a number line to order rational numbers?

How can you use what you know about adding integers to add rational numbers?

How can you use what you know about subtracting integers to subtract rational numbers?

Why is the product of two negative rational numbers positive?

Quick Review

- Because you can divide any integer by any nonzero integer, you can use long division to write fractions and mixed numbers as decimals. These decimals are also rational numbers and will either *terminate* or *repeat.*

- Every quotient of integers (with a non-zero divisor) is a rational number.

- The distance between any two numbers on a number line is the absolute value of the difference of the numbers.

- When multiplying or dividing fractions, mixed numbers must be written as improper fractions.

What's the Point?

The ability to work with rational numbers is very useful in real life for events like balancing a checkbook. Have your student help you balance your checkbook or check your online bank statement. What is the beginning balance and the end balance? How much was spent in total? Stress to them the importance of checking bank statements because errors can be made.

Hmmm.

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 2: Carpenter or Joiner STEM Video is available online at www.bigideasmath.com.