

Dear Family,

In this module, *Operations with Rational Numbers*, students will use their prior knowledge of rational numbers (fractions, decimals and integers) to understand repeating and terminating decimals and to build fluency in calculating with fractions, mixed numbers and decimals, especially as they occur in combination.

What Did Students Learn Previously?

In earlier lessons, students performed arithmetic operations with fractions, multi-digit integers and multi-digit decimals.

What Will Students Learn in This Module?

Fractions Written as Decimals

- Students will convert fractions to decimals using long division.
- Students will understand when to use fractions, instead of decimals, in mathematical operations. For example, in the multiplication $\frac{1}{3} \times -2.75$, converting the fraction $\frac{1}{3}$ to a decimal would result in multiplying -2.75 by the repeating decimal, $0.\overline{3}$, which cannot be performed without rounding. To find the exact answer, -2.75 would need to be converted to a fraction [see box below].

Add and Subtract Rational Numbers in Different Forms

Find $\frac{1}{3}(-2.75)$. Write in simplest form.

When the factors are written in different forms, you first need to rewrite them in the same form.

Because $\frac{1}{3}$ repeats non-zero digits, write the second factor as a mixed number.

$$\frac{1}{3}(-2.75)$$

Write the expression.

$$= \frac{1}{3}(-2\frac{3}{4})$$

Write -2.75 as a mixed number.

$$= \frac{1}{3}(-\frac{11}{4})$$

Write $-2\frac{3}{4}$ as an improper fraction.

$$= \frac{1(-11)}{3 \cdot 4}$$

Multiply the numerators and denominators.

- Students will combine mixed numbers by rewriting them as improper fractions with common denominators.
- Students will combine fractions and decimals, either by converting fractions to decimals, or by converting decimals to fractions.

$$= -\frac{11}{12} \quad \text{Simplify}$$

Multiply and Divide Rational Numbers in Different Forms

- Students will multiply fractions and divide out common factors.
- Students will rewrite division by a fraction as multiplication by the reciprocal.
- Students will multiply and divide mixed numbers by converting them to improper fractions.
- Students will multiply and divide decimals by fractions either by converting fractions to decimals or converting decimals to fractions.

What Vocabulary Terms Will Students Use?

Term	Definition
additive inverse	Two numbers that are opposites. The sum of a number and its additive inverse is zero.
integer	Any number from the set {..., -3, -2, -1, 0, 1, 2, 3 ...}, where ... means “continues without end”.
multiplicative inverse	Two numbers with a product of 1. The reciprocal.
rational number	A number that can be written in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$.
repeating decimal	A decimal in which one or more of the digits repeat.
terminating decimal	A decimal in which the only repeating digit is zero.

How You Can Provide Support

1. Support your child’s understanding of operations with rational numbers by showing them how these operations apply to everyday life.
 - *Budgets:* Discuss with your child how budgets can be used to manage spending by deciding in advance what portion of the monthly income should be allocated to various expenses. Then have your child create a budget. The budget they create can be for themselves, a club or sports team, or your household. When they are satisfied with their budget, have them calculate the spending limits for each category based on an estimated amount of monthly income and evaluate their reasonableness.

- *Scrap Material:* Projects often result in left-over pieces of material that do not have whole number measures. Have your child measure the lengths of scraps from a recent project and calculate the total amount of scrap material.
2. Encourage your child to have a positive, growth-oriented attitude towards mathematics and their learning.
 - Encourage them to ask questions – both at home and in class. Sometimes, an answer to a question will generate more questions. That’s how you know they are learning!
 - Encourage your child to embrace challenges and remind them that every challenge is an opportunity to learn something new.
 - Celebrate successes – both small and large.
 3. Contact me to arrange a time to discuss the specifics of your child’s performance and how we can work together to help them succeed in this module.

Sincerely,

(Teacher’s Name)

(Email/Phone)