2.1 Comparing and Ordering Rational Numbers

Explore Rational Numbers

The following notes provide guidelines to help you adapt the Explore Rational Numbers section from *MathLinks 9*.

- Review the meaning of *rational numbers*, *opposite numbers*, and *equivalent numbers*.
- On a number line, show that negative numbers are always less than positive numbers. Have students create a rule about this in their own words. For example, "the bigger the negative, the smaller the number."
- Review how to place decimals, fractions, and negative integers on a number line. **BLM 2–2 Number Line Comparing Decimals, Fractions, and Integers** shows a number line from -1 to $+1$ with decimals and fractions plotted on it. Some students struggle to understand that $-\frac{1}{2}$ is less than $+0.1$. Use the number line to show examples of how to place rational numbers.

Examples

- Review how to find a common denominator.
- Review estimation methods, such as finding a common denominator and comparing numerators, or converting to decimal numbers using a calculator.

Working Example 1:

- Show $\frac{4}{5}$ of a chocolate bar and $\frac{7}{8}$ of a chocolate bar on the board so students can see that $\frac{4}{5}$ is less than $\frac{7}{8}$.
- For the Show You Know, reinforce the meaning of *ascending* and *descending*.
- Remind students that negative numbers are always less than positive ones, and the further a negative number is from zero on the number line, the smaller the negative number. Encourage students to use **BLM 2–2 Number Line Comparing Decimals, Fractions, and Integers** to assist them. You may want to enlarge this blackline master and post it as a visual.

Working Example 2:

- When comparing fractions, remind students to find the decimal equivalents and to round so they know which number is greater.

Working Example 3:

- Ensure students know that *between* means greater than one number and less than the other.
- For the Show You Know, encourage students to reduce their answers to lowest terms.

Communicate the Ideas, Practise, and Apply

- For #1 and #2, ask students to verbalize how they know which number is larger. Expressing ideas verbally builds understanding and helps to catch any mathematically incorrect ideas.
- For #3, remind students that in a negative mixed number, the entire number is negative, not just the whole number. Many students think $-2\frac{1}{5}$ means $-2 + \frac{1}{5}$.
- Provide students who need additional practice with **BLM 2–3 Section 2.1 Extra Practice**.

Common Errors

- Students using estimation to compare rational numbers often mistake the impact of the values of the numerators and denominators. For example, they may believe that $\frac{5}{6}$ is less than $\frac{2}{3}$ because they overvalue the denominators.

$\mathbf{R}_x$ Encourage students to convert fractions to decimal numbers or equivalent fractions before comparing.