

Learning Goals

1. To understand how to deal with a negative sign if it is found in the denominator of a fraction.
2. To understand how to deal with the negative sign of a mixed number or improper fraction.

1.4 and 1.5 Rational Numbers and Operations

Rational Number - a number of the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

To make calculations simpler, rewrite negative fractions with the negative sign in the numerator.

$$\frac{3}{-4} = \frac{-3}{4}$$

Example One

Calculate.

$$-\frac{4}{5} + \frac{2}{-3}$$

1. Move all negative signs to the numerator.

$$\frac{-4 \times 3}{5} + \frac{-2 \times 5}{3}$$

2. Find a common denominator & rewrite.

$$\frac{-12}{15} + \frac{-10}{15}$$

3. Evaluate & put in lowest terms.

$$\frac{-22}{15}$$

Note: A negative mixed number implies that both the whole number and fraction are negative even though the negative sign is only in front of the whole number.

For example, $-7\frac{1}{4} = -7 + \left(\frac{-1}{4}\right)$

OR

$$-7\frac{1}{4} = -7 - \frac{1}{4}$$

Mixed to Improper

To convert a mixed number to an improper fraction, ignore the negative sign and include it in the numerator at the end of the calculation.

Example Two

Convert the following to an improper fraction.

$$-3\frac{7}{11}$$

$$-3\frac{7}{11} = \frac{-40}{11}$$

To make calculations easier, your first step should always be to convert any mixed numbers to improper fractions.

Example Three

Calculate.

$$-5\frac{1}{2} + 2\frac{2}{3}$$

1. Convert mixed numbers to improper:

$$\frac{-11 \times 3}{2 \times 3} + \frac{8 \times 2}{3 \times 2}$$

2. Find a common denominator:

$$\frac{-33}{6} + \frac{16}{6}$$

3. Evaluate:

$$\frac{-17}{6}$$

4. Change to a mixed number:

$$-2\frac{5}{6} = -\frac{17}{6}$$

Example Four

Calculate.

$$\frac{15}{16} \div \left(-1\frac{1}{24}\right)$$

1. Change mixed number to improper.

$$\frac{15}{16} \div \frac{-25}{24}$$

2. Multiply by the reciprocal.

$$\begin{aligned} \frac{15}{16} \times \frac{-24}{25} &= \frac{-25}{24} = \frac{25}{-24} = -\frac{25}{24} \\ &= \frac{-360}{400} \end{aligned}$$

3. Report in lowest terms.

$$\frac{-360}{400} = \frac{-9}{10}$$

Complete: p. 53 #2 (with a calculator),
8acef, 9acef, 14ad.