

# 2 Rational Numbers and Equations

- 2.1 Rational Numbers
- 2.2 Adding and Subtracting Rational Numbers
- 2.3 Multiplying and Dividing Rational Numbers
- 2.4 Solving Equations Using Addition or Subtraction
- 2.5 Solving Equations Using Multiplication or Division
- 2.6 Solving Two-Step Equations



"I can't find my algebra tiles, so I am painting some of my dog biscuits."



"Now I will be able to solve the equation  $2x + (-2) = 2$ ."



"On the count of 5, I'm going to give you half of my dog biscuits."



"1, 2, 3, 4,  $4\frac{1}{2}$ ,  $4\frac{3}{4}$ ,  $4\frac{7}{8}$ ,..."

# What You Learned Before



## ● Writing Decimals and Fractions

**Example 1** Write 0.37 as a fraction.

$$0.37 = \frac{37}{100}$$

**Example 2** Write  $\frac{2}{5}$  as a decimal.

$$\frac{2}{5} = \frac{2 \cdot 2}{5 \cdot 2} = \frac{4}{10} = 0.4$$

### Try It Yourself

Write the decimal as a fraction or the fraction as a decimal.

1. 0.51

2. 0.731

3.  $\frac{3}{5}$

4.  $\frac{7}{8}$

## ● Adding and Subtracting Fractions

**Example 3** Find  $\frac{1}{3} + \frac{1}{5}$ .

$$\begin{aligned} \frac{1}{3} + \frac{1}{5} &= \frac{1 \cdot 5}{3 \cdot 5} + \frac{1 \cdot 3}{5 \cdot 3} \\ &= \frac{5}{15} + \frac{3}{15} \\ &= \frac{8}{15} \end{aligned}$$

**Example 4** Find  $\frac{1}{4} - \frac{2}{9}$ .

$$\begin{aligned} \frac{1}{4} - \frac{2}{9} &= \frac{1 \cdot 9}{4 \cdot 9} - \frac{2 \cdot 4}{9 \cdot 4} \\ &= \frac{9}{36} - \frac{8}{36} \\ &= \frac{1}{36} \end{aligned}$$

## ● Multiplying and Dividing Fractions

**Example 5** Find  $\frac{5}{6} \cdot \frac{3}{4}$ .

$$\begin{aligned} \frac{5}{6} \cdot \frac{3}{4} &= \frac{5 \cdot 3}{6 \cdot 4} \\ &= \frac{5}{8} \end{aligned}$$

**Example 6** Find  $\frac{2}{3} \div \frac{9}{10}$ .

$$\begin{aligned} \frac{2}{3} \div \frac{9}{10} &= \frac{2}{3} \cdot \frac{10}{9} \\ &= \frac{2 \cdot 10}{3 \cdot 9} \\ &= \frac{20}{27} \end{aligned}$$

Multiply by the reciprocal of the divisor.

### Try It Yourself

Evaluate the expression.

5.  $\frac{1}{4} + \frac{13}{20}$

6.  $\frac{14}{15} - \frac{1}{3}$

7.  $\frac{3}{7} \cdot \frac{9}{10}$

8.  $\frac{4}{5} \div \frac{16}{17}$