

## Lesson 5: A New Way to Interpret $a$ over $b$

Let's investigate what a fraction means when the numerator and denominator are not whole numbers.

### 5.1: Recalling Ways of Solving

Solve each equation. Be prepared to explain your reasoning.

$$0.07 = 10m$$

$$10.1 = t + 7.2$$

### 5.2: Interpreting $\frac{a}{b}$

Solve each equation.

1.  $35 = 7x$

2.  $35 = 11x$

3.  $7x = 7.7$

4.  $0.3x = 2.1$

5.  $\frac{2}{5} = \frac{1}{2}x$

### Are you ready for more?

Solve the equation. Try to find some shortcuts.

$$\frac{1}{6} \cdot \frac{3}{20} \cdot \frac{5}{42} \cdot \frac{7}{72} \cdot x = \frac{1}{384}$$

### 5.3: Storytime Again

Take turns with your partner telling a story that might be represented by each equation. Then, for each equation, choose one story, state what quantity  $x$  describes, and solve the equation. If you get stuck, consider drawing a diagram.

$$0.7 + x = 12$$

$$\frac{1}{4}x = \frac{3}{2}$$

## Lesson 5 Summary

In the past, you learned that a fraction such as  $\frac{4}{5}$  can be thought of in a few ways.

- $\frac{4}{5}$  is a number you can locate on the number line by dividing the section between 0 and 1 into 5 equal parts and then counting 4 of those parts to the right of 0.
- $\frac{4}{5}$  is the share that each person would have if 4 wholes were shared equally among 5 people. This means that  $\frac{4}{5}$  is the result of *dividing* 4 by 5.

We can extend this meaning of *a fraction as a quotient* to fractions whose numerators and denominators are not whole numbers. For example, we can represent 4.5 pounds of rice divided into portions that each weigh 1.5 pounds as:  $\frac{4.5}{1.5} = 4.5 \div 1.5 = 3$ . In other words,  $\frac{4.5}{1.5} = 3$  because the quotient of 4.5 and 1.5 is 3.

Fractions that involve non-whole numbers can also be used when we solve equations.

Suppose a road under construction is  $\frac{3}{8}$  finished and the length of the completed part is  $\frac{4}{3}$  miles. How long will the road be when completed?

We can write the equation  $\frac{3}{8}x = \frac{4}{3}$  to represent the situation and solve the equation.

The completed road will be  $3\frac{5}{9}$  or about 3.6 miles long.

$$\frac{3}{8}x = \frac{4}{3}$$

$$x = \frac{\frac{4}{3}}{\frac{3}{8}}$$

$$x = \frac{4}{3} \cdot \frac{8}{3}$$

$$x = \frac{32}{9} = 3\frac{5}{9}$$