Unit 3, Lesson 16

Reason about Quotients

Let's apply what we know about division to make sure our answers make sense.

Warm-up

Estimation Exploration: How Many One Fifths?

$$98 \div \frac{1}{5}$$

Record an estimate that is:

too low	about right	too high

Activity 1

Greater Than or Less Than 1

$25 \div \frac{1}{5}$ $\quad$ $\frac{1}{7} \div 25$ $\quad$ $\frac{1}{8} \div 25$

$25 \div \frac{1}{7}$ $\quad$ $25 \div \frac{1}{8}$ $\quad$ $\frac{1}{5} \div 25$

1. Without calculating the value of the expressions, write each expression under the correct category.

The value of the expression is less than 1.	The value of the expression is greater than 1.

2. Explain your strategy for determining whether a quotient is less than 1 or greater than 1.

Activity 2

Estimate and Divide

$25 \div \frac{1}{5}$ $\quad$ $\frac{1}{7} \div 25$ $\quad$ $\frac{1}{8} \div 25$

$25 \div \frac{1}{7}$ $\quad$ $25 \div \frac{1}{8}$ $\quad$ $\frac{1}{5} \div 25$

1. Without calculating the value of the expressions, put the expressions in order from least to greatest.

2. Choose 2 expressions and find the value of the expressions.

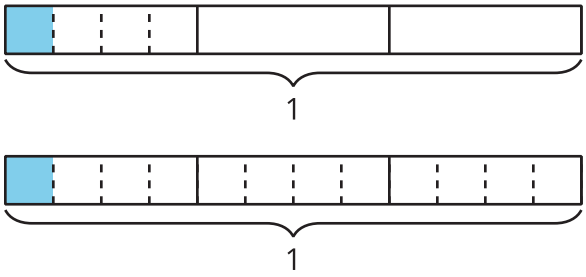
Section B Summary

We learned to divide with whole numbers and unit fractions. First, we used diagrams to solve problems involving division of a unit fraction by whole numbers.

Example:

Diagram A shows $\frac{1}{3} \div 4$ equals $\frac{1}{12}$. We find the size of one part if $\frac{1}{3}$ is split into 4 equal parts.

Diagram A



Then we noticed the relationship between division and multiplication.

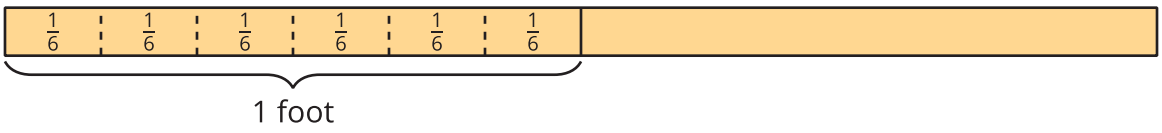
For Diagram A, we know that $\frac{1}{3} \div 4 = \frac{1}{12}$ because $\frac{1}{12} \times 4 = \frac{1}{3}$.

Next, we used diagrams to solve problems involving division of whole numbers by unit fractions. We also wrote equations to represent these problems.

Example:

Diagram B shows that if a strip of paper 2 feet long is cut into $\frac{1}{6}$ foot pieces, there will be 12 pieces. Therefore, $2 \div \frac{1}{6} = 12$ because we are finding how many $\frac{1}{6}$-size pieces are the same length as 2.

Diagram B



Finally, we noticed patterns when dividing whole numbers and unit fractions.

- We noticed whole numbers divided by unit fractions were greater than 1.

  Example:

  The value of $12 \div \frac{1}{4}$ is greater than 1. The number of $\frac{1}{4}$-size pieces with length 12 (or any whole number) is greater than 1.

- We also noticed unit fractions divided by whole numbers were less than 1.

  Example:

  The value of $\frac{1}{3} \div 18$ is less than 1. When a whole number less than 1 is divided into many pieces, each piece is less than 1.