What Fraction of a Group?

Lesson # 7

Addressing	**6.NS.A.1** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because 3/4 of 8/9 is 2/3. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?

Students, write your response!

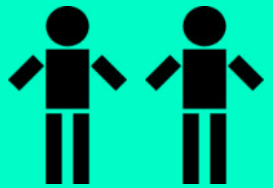
Let's think about dividing things into groups when we can't even make one whole group.

Today's Goals

- ❏ I can tell when a question is asking for the number of groups and that number is less than 1.
- ❏ I can use diagrams and multiplication and division equations to represent and answer "what fraction of a group?" questions.

Estimating a Fraction of a Number

Warm Up 7.1



Estimate the Following Quantities.

a. What is $\frac{1}{3}$ of 7?

b. What is $\frac{4}{5}$ of $9\frac{2}{3}$?

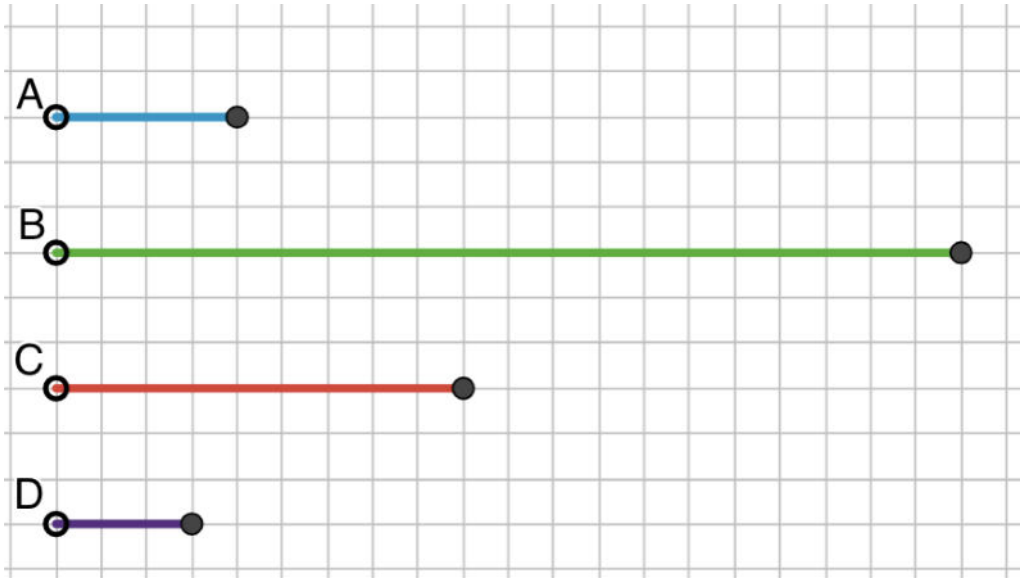
c. What is $2\frac{4}{7}$ of $10\frac{1}{9}$?

2. Write a multiplication expression for each question.

Fractions of Ropes

Activity 7.2

- **MLR8: Discussion Supports**
- **Think Pair Share**



Compare the lengths of rope B, C, and D to the length of rope A and complete each statement. Then, use the measurements shown on the grid to write a multiplication equation and a division equation for each statement.

a. Rope B is _____ times as long as rope A.
   Multiplication equation: _____
   Division equation: _____

b. Rope C is _____ times as long as rope A.
   Multiplication equation: _____
   Division equation: _____

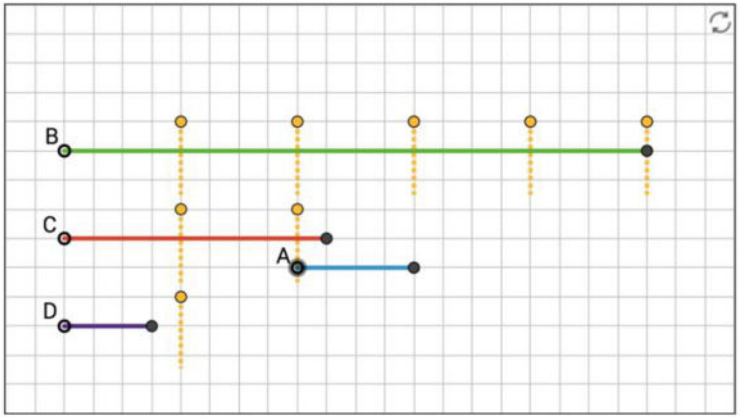
c. Rope D is _____ times as long as rope A.
   Multiplication equation: _____
   Division equation: _____

2. Each equation can be used to answer a question about rope C and D. What could each question be?

   a. $? \cdot 3 = 9$ and $9 \div 3 = ?$

   b. $? \cdot 9 = 3$ and $3 \div 9 = ?$

Let's Talk About It



1. a. Rope B is 5 times as long as rope A. $5 \cdot 4 = 20$ and $20 \div 4 = 5$

   b. Rope C is $2\frac{1}{4}$ (or equivalent) times as long as rope A. $2\frac{1}{4} \cdot 4 = 9$ and $9 \div 4 = 2\frac{1}{4}$

   c. Rope D is $\frac{3}{4}$ (or equivalent) times as long as rope A. $\frac{3}{4} \cdot 4 = 3$ and $3 \div 4 = \frac{3}{4}$

2. a. How many times as long as rope D is rope C? (Or how many times does the length of rope D go into that of rope C?)

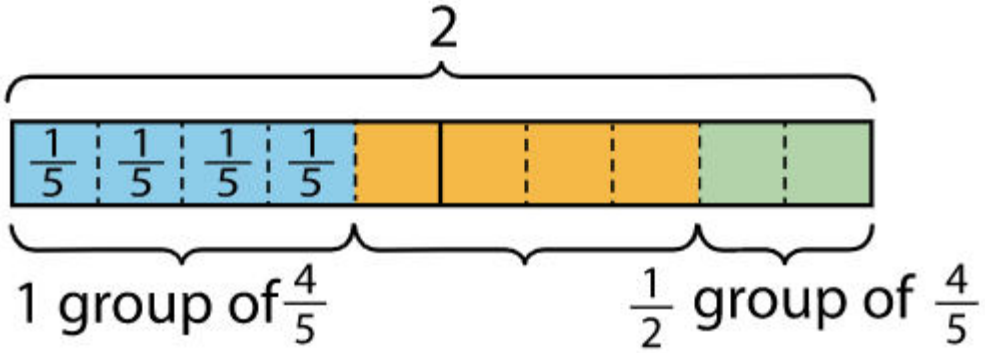
   b. How many times as long as rope C is rope D? (Or how many times does the length of rope C go into that of rope D?)

Fractional Batches of Ice Cream

Activity 7.3

- **Think Pair Share**
- **MLR6: Three Reads**

Let's Remember



Let's Do a Three Reads

One batch of an ice cream recipe uses 9 cups of milk. A chef makes different amounts of ice cream on different days. Here are the amounts of milk she used:

- Monday: 12 cups
- Tuesday: $22\frac{1}{2}$ cups
- Thursday: 6 cups
- Friday: $7\frac{1}{2}$ cups

1st Read: Shared Reading

What is this situation about?

2nd Read: Team Reading

What is countable or measureable in this story?

3rd Read: Team Reading

How might you begin to solve this task?

Start working on #1 and #2 your own. Then we'll discuss your thinking as a class!

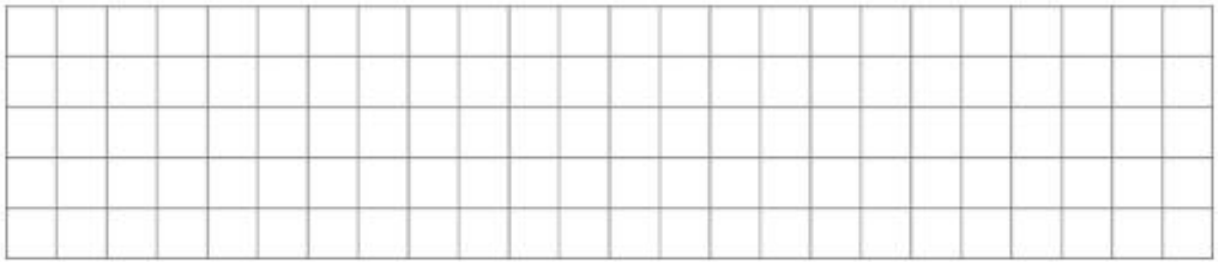
Fractional Batches of Ice Cream - Monday

One batch of an ice cream recipe uses 9 cups of milk. A chef makes different amounts of ice cream on different days. Here are the amounts of milk she used:

- Monday: 12 cups
- Tuesday: $22\frac{1}{2}$ cups
- Thursday: 6 cups
- Friday: $7\frac{1}{2}$ cups

How many batches of ice cream did she make on Monday? Write a division equation and multiplication equation, and draw a tape diagram for the amount of ice cream she makes. Then answer the question.

Division Equation:_____ Multiplication Equation: _____



Answer:_____

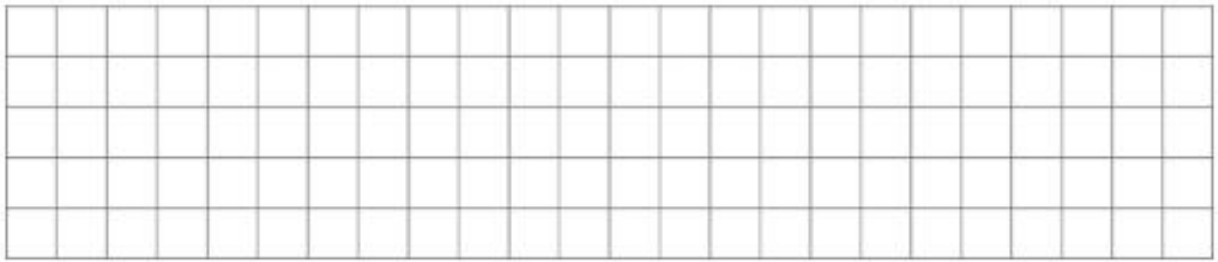
Fractional Batches of Ice Cream - Tuesday

One batch of an ice cream recipe uses 9 cups of milk. A chef makes different amounts of ice cream on different days. Here are the amounts of milk she used:

- Monday: 12 cups
- Tuesday: $22\frac{1}{2}$ cups
- Thursday: 6 cups
- Friday: $7\frac{1}{2}$ cups

How many batches of ice cream did she make on Tuesday? Write a division equation and multiplication equation, and draw a tape diagram for the amount of ice cream she makes. Then answer the question.

Division Equation:_____ Multiplication Equation: _____



Answer:_____

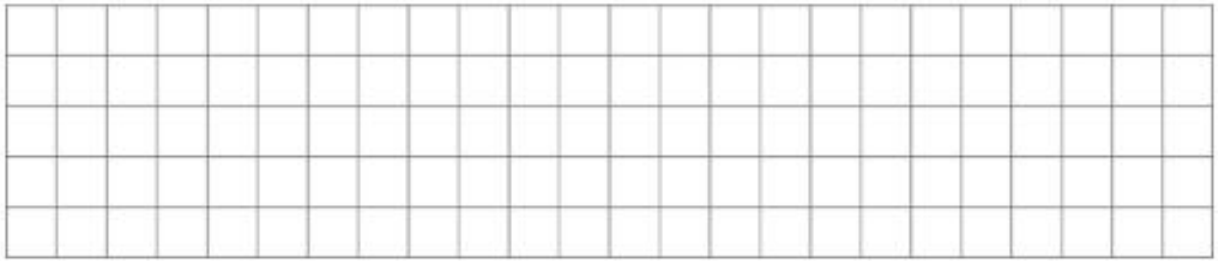
Fractional Batches of Ice Cream - Thursday

One batch of an ice cream recipe uses 9 cups of milk. A chef makes different amounts of ice cream on different days. Here are the amounts of milk she used:

- Monday: 12 cups
- Tuesday: $22\frac{1}{2}$ cups
- Thursday: 6 cups
- Friday: $7\frac{1}{2}$ cups

How many batches of ice cream did she make on Thursday? Write a division equation and multiplication equation, and draw a tape diagram for the amount of ice cream she makes. Then answer the question.

Division Equation:_____ Multiplication Equation: _____



Answer:_____

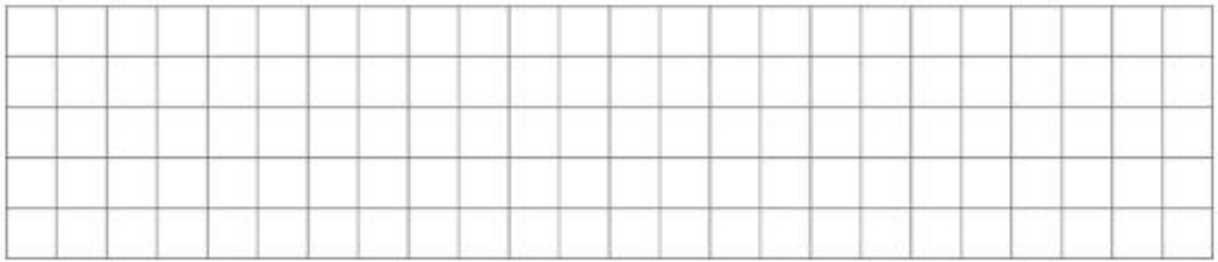
Fractional Batches of Ice Cream - Friday

One batch of an ice cream recipe uses 9 cups of milk. A chef makes different amounts of ice cream on different days. Here are the amounts of milk she used:

- Monday: 12 cups
- Tuesday: $22\frac{1}{2}$ cups
- Thursday: 6 cups
- Friday: $7\frac{1}{2}$ cups

How many batches of ice cream did she make on Friday? Write a division equation and multiplication equation, and draw a tape diagram for the amount of ice cream she makes. Then answer the question.

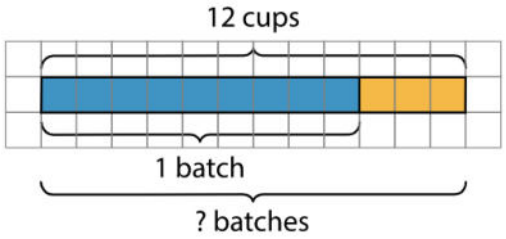
Division Equation:_____ Multiplication Equation: _____

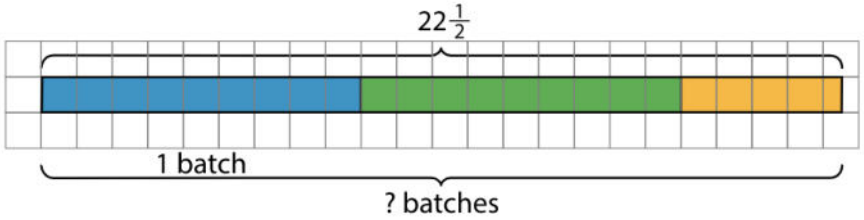


Answer:_____

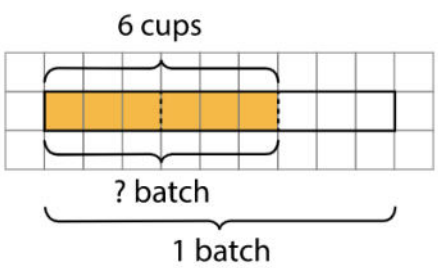
Let's Look at the Diagrams

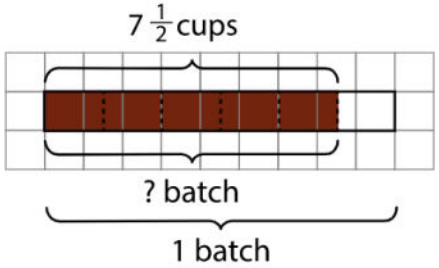
Monday & Tuesday





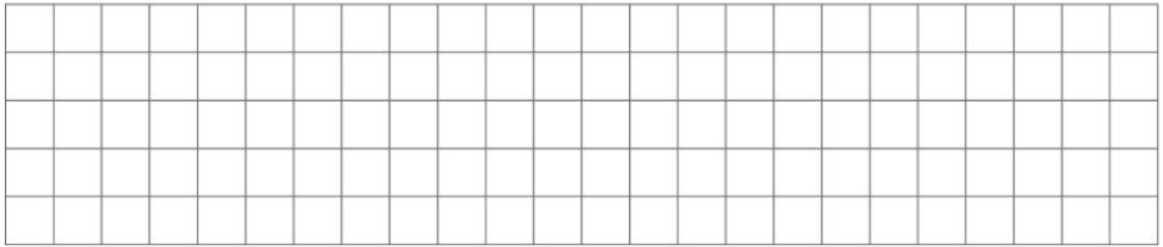
Wednesday & Thursday



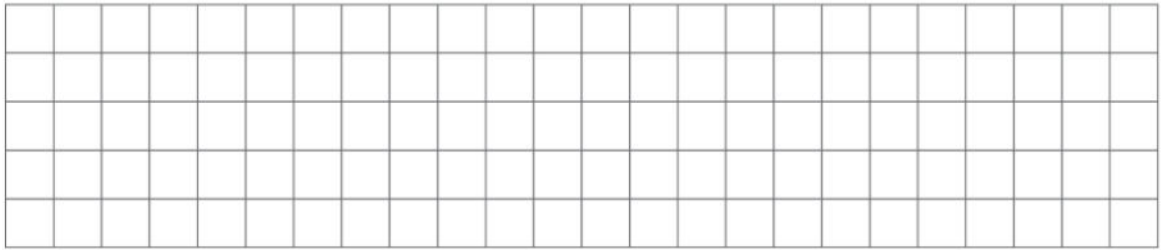


3. Write a division equation, and draw a tape diagram for each question. Then answer the question.

a. What fraction of 9 is 3?

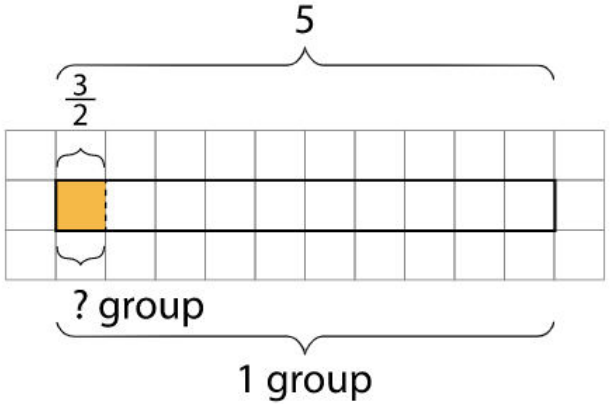


b. What fraction of 5 is $\frac{1}{2}$?



Let's Talk About It

- What fraction of 5 is ½?
- How can we tell if a fraction is more than 1 or less than 1 before calculating?
- What is the size of 1 group here? How do we know?
- How do we write a multiplication equation for this question? A division equation?



Lesson Synthesis

- How can we tell if a division situation involves less than one whole group?
- How do we find quotients that are less than 1?

Today's Goals

- ❏ I can tell when a question is asking for the number of groups and that number is less than 1.
- ❏ I can use diagrams and multiplication and division equations to represent and answer "what fraction of a group?" questions.

A Partially Filled Container

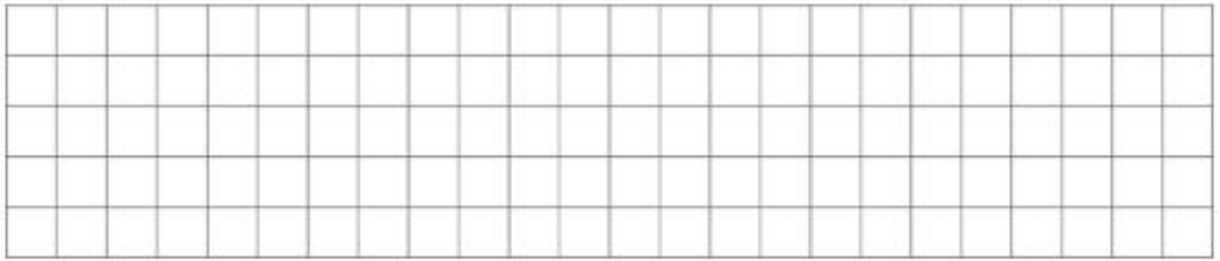
Cool Down 7.4

Exit Ticket

There is ⅓ gallon of water in a 3-gallon container. What fraction of the container is filled?

1. Write a multiplication equation and a division equation to represent the situation.

2. Draw a tape diagram to represent the situation. Then, answer the question.



Multiplication

Answer:_____