## Lesson 6: Problems with Equal Groups of Fractions

* Let’s solve problems with fractions.

### Warm-up: True or False: Two and Three Factors

Decide whether each statement is true or false. Be prepared to explain your reasoning.

* $\frac{10}{12}=5×\frac{2}{12}$
* $1×\frac{10}{12}=5×\frac{2}{12}$
* $\frac{24}{4}=6×3×\frac{1}{4}$
* $12×2×\frac{1}{4}=8×3×\frac{1}{4}$

### 6.1: Banana Bread Recipe

A bakery is making banana bread. Here is the recipe for 1 batch.

|  |
| --- |
| Recipe:* 1 banana
* $\frac{2}{3}$ cup butter
* $\frac{3}{2}$ teaspoons baking soda
* $\frac{5}{8}$ cup sugar
* 2 large eggs
* $\frac{5}{2}$ cups of all-purpose flour
 |



1. The bakery makes 2 batches of banana bread on Monday. Complete the table to show how much of each ingredient is used.
* Monday’s banana bread

| * ingredient
 | * expression
 | * amount of ingredient
 |
| --- | --- | --- |
| * bananas
 |  | * \_\_\_\_\_\_\_
 |
| * butter
 |  | * \_\_\_\_\_\_\_ cup(s)
 |
| * baking soda
 |  | * \_\_\_\_\_\_\_ teaspoon(s)
 |
| * sugar
 |  | * \_\_\_\_\_\_\_ cup(s)
 |
| * eggs
 |  | * \_\_\_\_\_\_\_
 |
| * flour
 |  | * \_\_\_\_\_\_\_ cup(s)
 |

1. On Tuesday, the bakery needs $\frac{8}{3}$ cups of butter to make enough banana bread for the day. How many batches were made? Explain or show your reasoning.

|  |
| --- |
| * Recipe:
	+ 1 banana
	+ $\frac{2}{3}$ cup butter
	+ $\frac{3}{2}$ teaspoons baking soda
	+ $\frac{5}{8}$ cup sugar
	+ 2 large eggs
	+ $\frac{5}{2}$ cups of all-purpose flour
 |

1. Based on the number of the batches made on Tuesday, complete the table for each ingredient.
* Tuesday’s banana bread

| * ingredient
 | * expression
 | * amount of ingredient
 |
| --- | --- | --- |
| * bananas
 |  | * \_\_\_\_\_\_\_
 |
| * butter
 |  | * $\frac{8}{3}$ cups
 |
| * baking soda
 |  | * \_\_\_\_\_\_\_ teaspoon(s)
 |
| * sugar
 |  | * \_\_\_\_\_\_\_ cup(s)
 |
| * eggs
 |  | * \_\_\_\_\_\_\_
 |
| * flour
 |  | * \_\_\_\_\_\_\_ cup(s)
 |

### 6.2: How Much Milk Was Used?

The bakery that sells banana bread also sells fresh milkshakes. Each serving uses $\frac{1}{10}$ liter of milk.

Here are five descriptions of the milkshakes sold in a week and five expressions that represent the liters of milk used.



Match each description to an expression that represents it.

1. On Monday, the bakery sold 8 servings of milkshake. How much milk was used?
2. On Tuesday, two customers bought 4 servings of milkshake each. How much milk was used?
3. On Wednesday, four customers bought 2 servings of milkshake each. How much milk was used?
4. On Thursday, two customers each bought a serving of milkshake. They placed the same order three more times for their friends that day. How much milk was used?
5. On Saturday, four friends each purchased a serving of milkshake for breakfast. They came back for the same after dinner. How much milk was used?

$4×\left(2×\frac{1}{10}\right)$

$4×\frac{2}{10}$

$8×\frac{1}{10}$

$2×\left(4×\frac{1}{10}\right)$

$2×\frac{4}{10}$

### Section Summary

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In this section, we learned to multiply a whole number and a fraction by thinking about equal-size groups, just as we did when multiplying two whole numbers.

For instance, we can think of $6×4$ as 6 groups of 4. A diagram like this can help to show that the product is 24:



Likewise, we can think of $6×\frac{1}{4}$ as 6 groups of $\frac{1}{4}$. Diagrams can help us see that the product is $\frac{6}{4}$:





After studying patterns, we saw that when we multiply a whole number and a fraction, the whole number is multiplied only by the numerator of the fraction and the denominator stays the same. For example:

$6×\frac{1}{2}=\frac{6}{2}$

$2×\frac{4}{5}=\frac{8}{5}$

We also learned that:

* Every fraction can be written as a product of a whole number and a unit fraction. For example, $\frac{5}{4}$ can be written as $5×\frac{1}{4}$.
* We can write different multiplication expressions for the same fraction. For example, $\frac{8}{3}$ can be written as:
* $8×\frac{1}{3}$
* $4×2×\frac{1}{3}$
* $4×\frac{2}{3}$
* $2×\frac{4}{3}$



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