

Lesson 13: Finding Equivalent Ratios Given the Total Quantity

Classwork

Example 1

A group of 6 hikers are preparing for a one-week trip. All of the group's supplies will be carried by the hikers in backpacks. The leader decides that each hiker will carry a backpack that is the same fraction of weight to all the other hikers' weights. This means that the heaviest hiker would carry the heaviest load. The table below shows the weight of each hiker and the weight of the backpack.

Complete the table. Find the missing amounts of weight by applying the same value of the ratio as the first two rows.

Hiker's Weight	Backpack Weight	Total Weight (lb.)
152 lb. 4 oz.	14 lb. 8 oz.	
107 lb. 10 oz.	10 lb. 4 oz.	
129 lb. 15 oz.		
68 lb. 4 oz.		
	8 lb. 12 oz.	
	10 lb.	

Example 2

When a business buys a fast food franchise, it is buying the recipes used at every restaurant with the same name. For example, all Pizzeria Specialty House Restaurants have different owners, but they must all use the same recipes for their pizza, sauce, bread, etc. You are now working at your local Pizzeria Specialty House Restaurant, and listed below are the amounts of meat used on one meat-lovers pizza.

$\frac{1}{4}$ cup of sausage

$\frac{1}{3}$ cup of pepperoni

$\frac{1}{6}$ cup of bacon

$\frac{1}{8}$ cup of ham

$\frac{1}{8}$ cup of beef

What is the total amount of toppings used on a meat-lovers pizza? _____ cup(s)

The meat must be mixed using this ratio to ensure that customers receive the same great tasting meat-lovers pizza from every Pizzeria Specialty House Restaurant nationwide. The table below shows 3 different orders for meat-lovers pizzas on the night of the professional football championship game. Using the amounts and total for one pizza given above, fill in every row and column of the table so the mixture tastes the same.

	Order 1	Order 2	Order 3
Sausage (cups)	1		
Pepperoni (cups)			3
Bacon (cups)		1	
Ham (cups)	$\frac{1}{2}$		
Beef (cups)			$1\frac{1}{8}$
TOTAL (cups)			

Exercise

The table below shows 6 different-sized pans that could be used to make macaroni and cheese. If the ratio of ingredients stays the same, how might the recipe be altered to account for the different-sized pans?

Noodles (cups)	Cheese (cups)	Pan Size (cups)
		5
3	$\frac{3}{4}$	
	$\frac{1}{4}$	
$\frac{2}{3}$		
$5\frac{1}{3}$		
		$5\frac{5}{8}$

Lesson Summary

To find missing quantities in a ratio table where a total is given, determine the unit rate from the ratio of two given quantities, and use it to find the missing quantities in each equivalent ratio.

Problem Set

1. Students in 6 classes, displayed below, ate the same ratio of cheese pizza slices to pepperoni pizza slices. Complete the following table, which represents the number of slices of pizza students in each class ate.

Slices of Cheese Pizza	Slices of Pepperoni Pizza	Total Slices of Pizza
		7
6	15	
8		
	$13\frac{3}{4}$	
$3\frac{1}{3}$		
		$2\frac{1}{10}$

2. To make green paint, students mixed yellow paint with blue paint. The table below shows how many yellow and blue drops from a dropper several students used to make the same shade of green paint.
- a. Complete the table.

Yellow (Y) (mL)	Blue (B) (mL)	Total (mL)
$3\frac{1}{2}$	$5\frac{1}{4}$	
		5
	$6\frac{3}{4}$	
$6\frac{1}{2}$		

- b. Write an equation to represent the relationship between the amount of yellow paint and blue paint.

3. The ratio of the number of miles run to the number of miles biked is equivalent for each row in the table.
- a. Complete the table.

Distance Run (miles)	Distance Biked (miles)	Total Amount of Exercise (miles)
		6
$3\frac{1}{2}$	7	
	$5\frac{1}{2}$	
$2\frac{1}{8}$		
	$3\frac{1}{3}$	

- b. What is the relationship between distances biked and distances run?
4. The following table shows the number of cups of milk and flour that are needed to make biscuits. Complete the table.

Milk (cups)	Flour (cups)	Total (cups)
7.5		
	10.5	
12.5	15	
		11