

## Lesson 13: From Ratio Tables to Equations Using the Value of a Ratio

### Classwork

#### Exercise 1

Jorge is mixing a special shade of orange paint. He mixed 1 gallon of red paint with 3 gallons of yellow paint.

Based on this ratio, which of the following statements are true?

- $\frac{3}{4}$  of a 4-gallon mix would be yellow paint.
- Every 1 gallon of yellow paint requires  $\frac{1}{3}$  gallon of red paint.
- Every 1 gallon of red paint requires 3 gallons of yellow paint.
- There is 1 gallon of red paint in a 4-gallon mix of orange paint.
- There are 2 gallons of yellow paint in an 8-gallon mix of orange paint.

Use the space below to determine if each statement is true or false.



**Exercise 2**

Based on the information on red and yellow paint given in Exercise 1, complete the table below.

Red Paint ( <i>R</i> )	Yellow Paint ( <i>Y</i> )	Relationship
	3	$3 = 1 \times 3$
2		
	9	$9 = 3 \times 3$
	12	
5		



**Exercise 3**

Blue ( <i>B</i> )	Red ( <i>R</i> )	Relationship

- a. Using the same relationship of red to blue from above, create a table that models the relationship of the three colors blue, red, and purple (total) paint. Let  $B$  represent the number of gallons of blue paint, let  $R$  represent the number of gallons of red paint, and let  $T$  represent the total number of gallons of (purple) paint. Then write an equation that models the relationship between the blue paint and the total paint and answer the questions.

Blue ( $B$ )	Red ( $R$ )	Total Paint ( $T$ )

Equation:

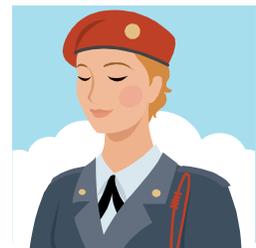
Value of the ratio of total paint to blue paint:

How is the value of the ratio related to the equation?

- b. During a particular U.S. Air Force training exercise, the ratio of the number of men to the number of women was 6:1. Use the ratio table provided below to create at least two equations that model the relationship between the number of men and the number of women participating in this training exercise.

Women ( $W$ )	Men ( $M$ )

Equations:



If 200 women participated in the training exercise, use one of your equations to calculate the number of men who participated.

- c. Malia is on a road trip. During the first five minutes of Malia’s trip, she sees 18 cars and 6 trucks. Assuming this ratio of cars to trucks remains constant over the duration of the trip, complete the ratio table using this comparison. Let  $T$  represent the number of trucks she sees, and let  $C$  represent the number of cars she sees.

Trucks ( $T$ )	Cars ( $C$ )
1	
3	
	18
12	
	60

What is the value of the ratio of the number of cars to the number of trucks?

What equation would model the relationship between cars and trucks?

At the end of the trip, Malia had counted 1,254 trucks. How many cars did she see?

- d. Kevin is training to run a half-marathon. His training program recommends that he run for 5 minutes and walk for 1 minute. Let  $R$  represent the number of minutes running, and let  $W$  represent the number of minutes walking.

Minutes Running ( $R$ )		10	20		50
Minutes Walking ( $W$ )	1	2		8	

What is the value of the ratio of the number of minutes walking to the number of minutes running?

What equation could you use to calculate the minutes spent walking if you know the minutes spent running?

**Lesson Summary**

The value of a ratio can be determined using a ratio table. This value can be used to write an equation that also represents the ratio.

Example:

1	4
2	8
3	12
4	16

The multiplication table can be a valuable resource to use in seeing ratios. Different rows can be used to find equivalent ratios.

**Problem Set**

A cookie recipe calls for 1 cup of white sugar and 3 cups of brown sugar.

Make a table showing the comparison of the amount of white sugar to the amount of brown sugar.

White Sugar ( <i>W</i> )	Brown Sugar ( <i>B</i> )

1. Write the value of the ratio of the amount of white sugar to the amount of brown sugar.
2. Write an equation that shows the relationship of the amount of white sugar to the amount of brown sugar.
3. Explain how the value of the ratio can be seen in the table.
4. Explain how the value of the ratio can be seen in the equation.

Using the same recipe, compare the amount of white sugar to the amount of total sugars used in the recipe.

Make a table showing the comparison of the amount of white sugar to the amount of total sugar.

White Sugar ( $W$ )	Total Sugar ( $T$ )

- Write the value of the ratio of the amount of total sugar to the amount of white sugar.
- Write an equation that shows the relationship of total sugar to white sugar.