

## Lesson 11: Part-Part-Whole Ratios

Let's look at situations where you can add the quantities in a ratio together.

### 11.1: True or False: Multiplying by a Unit Fraction

True or false?

$$\frac{1}{5} \cdot 45 = \frac{45}{5}$$

$$\frac{1}{5} \cdot 20 = \frac{1}{4} \cdot 24$$

$$42 \cdot \frac{1}{6} = \frac{1}{6} \cdot 42$$

$$486 \cdot \frac{1}{12} = \frac{480}{12} + \frac{6}{12}$$

### 11.2: Cubes of Paint

A recipe for maroon paint says, "Mix 5 ml of red paint with 3 ml of blue paint."

1. Use snap cubes to represent the amounts of red and blue paint in the recipe. Then, draw a sketch of your snap-cube representation of the maroon paint.
  - a. What amount does each cube represent?
  - b. How many milliliters of maroon paint will there be?
  
2.
  - a. Suppose each cube represents 2 ml. How much of each color paint is there?  
 Red: \_\_\_\_\_ ml                  Blue: \_\_\_\_\_ ml                  Maroon: \_\_\_\_\_ ml
  
  - b. Suppose each cube represents 5 ml. How much of each color paint is there?  
 Red: \_\_\_\_\_ ml                  Blue: \_\_\_\_\_ ml                  Maroon: \_\_\_\_\_ ml

3. a. Suppose you need 80 ml of maroon paint. How much red and blue paint would you mix? Be prepared to explain your reasoning.

Red: \_\_\_\_\_ ml

Blue: \_\_\_\_\_ ml

Maroon: 80 ml

- b. If the original recipe is for one batch of maroon paint, how many batches are in 80 ml of maroon paint?

### 11.3: Sneakers, Chicken, and Fruit Juice

Solve each of the following problems and show your thinking. If you get stuck, consider drawing a **tape diagram** to represent the situation.

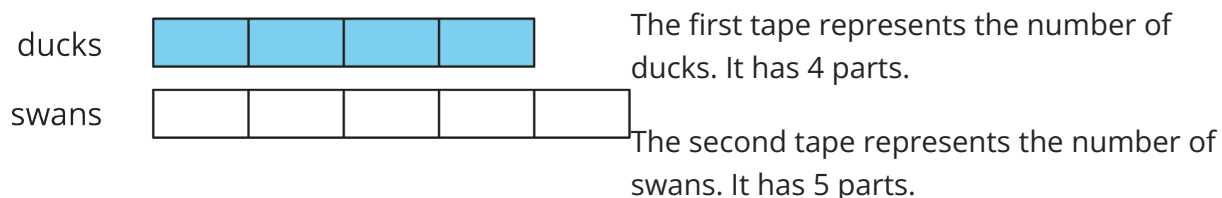
1. The ratio of students wearing sneakers to those wearing boots is 5 to 6. If there are 33 students in the class, and all of them are wearing either sneakers or boots, how many of them are wearing sneakers?
  
  
  
  
  
  
  
  
  
  
2. A recipe for chicken marinade says, "Mix 3 parts oil with 2 parts soy sauce and 1 part orange juice." If you need 42 cups of marinade in all, how much of each ingredient should you use?



## Lesson 11 Summary

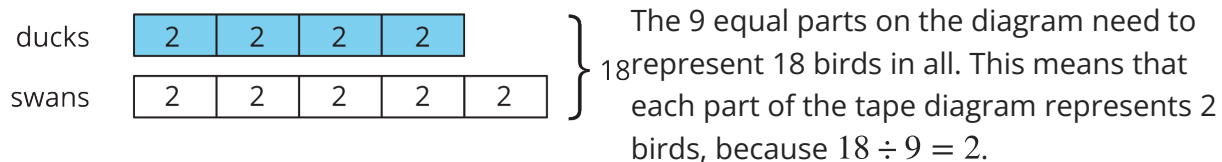
A **tape diagram** is another way to represent a ratio. All the parts of the diagram that are the same size have the same value.

For example, this tape diagram represents the ratio of ducks to swans in a pond, which is 4 : 5.



There are 9 parts in all, because  $4 + 5 = 9$ .

Suppose we know there are 18 of these birds in the pond, and we want to know how many are ducks.



There are 4 parts of the tape representing ducks, and  $4 \cdot 2 = 8$ , so there are 8 ducks in the pond.