Objective Determining Equivalent Ratios

Warm-Up

Choose the correct statement to complete each sentence and explain your reasoning.

1. When the manager at Sweets-a-Plenty Bakery decides how many bakers are needed to bake muffins for a given day, she needs to consider the total number of muffins needed for the day.

a. Making fewer muffins with more bakers will take:
- less time.
- an equal amount of time.
- more time.

b. Making more muffins in a shorter amount of time requires:
- fewer workers.
- an equal amount of workers.
- more workers.

Consider the given representations to answer each question.
Explain your reasoning.

1. Which dinner order has more pizza?

Order 1   Order 2

2. Which pattern has more stars?

Pattern 1   Pattern 2

☆☆△△☆☆   ☆○☆○☆○☆

3. Which pile of laundry has more shirts?

Pile 1   Pile 2

4. Which type of reasoning did you use for each question— additive or multiplicative?
Explain why.

Kerri and her friends are going hiking. Kerri invites her friends to meet at her house for a quick breakfast before heading out on their hike. Kerri wants to offer muffins to her friends.

1. She knows that one muffin combo has four muffins that can feed four people.
a. Draw a model showing the relationship between the muffin combo and the number of people it will feed.

b. If Kerri invites 6 friends, how many muffin combos will she need? Draw a model to show how many muffin combo(s) she will need, and explain your answer.

c. If Kerri has $2\frac{3}{4}$ muffin combos, how many friends can she feed? Draw a model to show how many friends she can feed, and explain your answer.

Let's consider a different variety pack.
In one muffin variety pack, two out of every five muffins are blueberry.
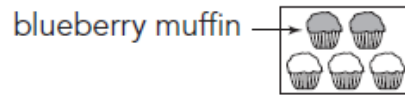
blueberry muffin →

2. Draw a model to answer each question. Explain your reasoning.
a. How many muffins are blueberry muffins if there are a total of 25 muffins?

b. How many muffins are blueberry muffins if there are a total of 35 muffins?

c. How many total muffins are there if 8 muffins are blueberry?

As you solved these problems, you determined equivalent ratios.
Equivalent ratios are ratios that represent the same part-to-part or part-to-whole relationship.

The local bakery sells muffins in variety packs of blueberry, pumpkin, and bran muffins. They always sell the muffins in the ratio of 3 blueberry muffins : 2 pumpkin muffins : 1 bran muffin.

1. Write the ratio that expresses each relationship. Identify each as a part-to-part or a part-to-whole ratio.

      a. blueberry muffins to total muffins

      b. pumpkin muffins to total muffins

      c. bran muffins to total muffins

      d. blueberry muffins to pumpkin muffins

      e. bran muffins to pumpkin muffins

      f. blueberry muffins to bran muffins

A ratio can be represented by drawing the objects themselves, but they also can be represented using a tape diagram. A tape diagram illustrates number relationships by using rectangles to represent ratio parts. A tape diagram representing the ratio of each type of muffin is shown.
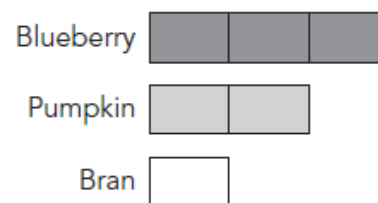
2. What does each small rectangle represent in the given tape diagram?

Tape diagrams provide a visual representation of ratios, but they also can be used to solve problems.


WORKED EXAMPLE

Suppose you purchase an 18-pack of muffins. How many blueberry, pumpkin, and bran muffins will you purchase?

There are 6 muffins represented in the tape diagram, and you want 18 total muffins that are in the same ratio.

Therefore, to determine how many muffins you need to maintain the same ratio, you can divide 18 by 6.
$18 \div 6 = 3$

Therefore, each rectangle will represent 3 muffins.

Blueberry	3	3	3
Pumpkin	3	3	
Bran	3		
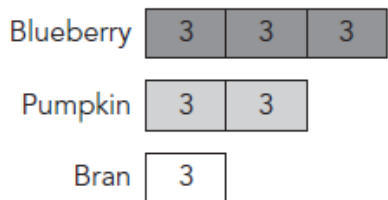
From the tape diagram, you can see that there are 9 blueberry muffins, 6 pumpkin muffins, and 3 bran muffins.

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3. Is the ratio 9 : 6 : 3 equivalent to 3 : 2 : 1? Explain how you know.

4. Suppose you purchase a 36-pack of muffins. Use the tape diagram to illustrate how many blueberry, pumpkin, and bran muffins you will receive.
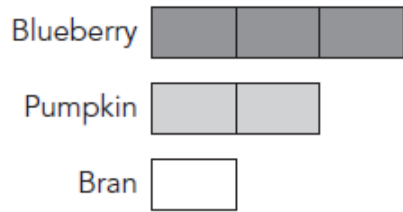
5. Suppose you wanted 20 pumpkin muffins in your variety pack. How many total muffins will be in your variety pack?
Complete the tape diagram to determine the answer.
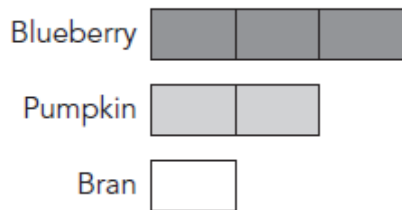
6. The table shows the number of muffins in specific sized variety packs. Complete just the missing cells in the columns for the 6-pack and 36-pack of muffins.

Total Number of Muffins	6	12	18	24	36
Number of Blueberry Muffins			9		
Number of Pumpkin Muffins			6		
Number of Bran Muffins			3		

7. Analyze the completed columns in the table.
a. What do you notice about the numbers?

b. How could you have determined the number of each type of muffin in the 18-pack without using the tape diagram?

c. How could you have determined the number of each type of muffin in the 36-pack without using the tape diagram?

d. Use what you noticed about the numbers in the table to complete the remaining columns for the number of each type of muffin in a 12-pack and in a 24-pack of muffins. Explain your strategy.

LESSON 4.3a
Oh, Yes, I am the Muffin Man

Objective **Determining Equivalent Ratios**

Suppose you wanted 46 pumpkin muffins in your variety pack.
How many total muffins will be in your variety pack?
Complete the tape diagram to determine the answer.

Blueberry

Pumpkin

Bran