Here you’ll learn to identify and write equivalent ratios.

Have you ever been sent on an errand? Casey is off to the grocery store. Take a look.

On the way home from soccer practice, Casey’s mom sends her into the grocery store to get a half gallon of milk. Casey is hungry after practice, so she isn’t paying attention to what kind her Mom has asked her to get. In Casey’s house they drink both whole milk and skim milk. Casey runs to the dairy section of the grocery store and stops short. She isn’t sure what to get. There are five different kinds of milk. There is whole milk, reduced fat milk, lowfat milk, skim milk and organic milk. There are also different brands to choose from: Hood, Eagle Brand, and Garelic for non-organic milk, and Organic Valley and Nature’s Valley for organic brands. Casey notices that there are three non-organic brands to the two organic brands. Then she notices that the supermarket has its own brand of non-organic milk as well. That makes four non-organic brands to two organic brands. Casey is sure that this means something. She has been reading about organic food in school and is interested in organic milk and food. Casey wishes that there were more organic brands than non organic brands. She decides to make a note of this to show her teacher at school.

If Casey wants to document this information as a ratio, how could she do it?

This Concept will teach you all you need to know about equivalent ratios.

**Guidance**

This Concept focuses on ratios. Ratios are everywhere in everyday life. In fact, we work with ratios so much that we probably don’t even realize that we are working with them. In this Concept, you will learn how to write ratios, simplify ratios and compare ratios, but there is a question that we must answer first.

What is a ratio?

A ratio is a comparison of two quantities. The quantities can be nearly anything: people, cars, dollars... even two groups of things!

Let’s look at a picture.
We can write ratios that compare the boys in this picture, but how?

**How do we write a ratio?**

A ratio is written in three different ways. It can be written as a fraction, with the word “to” or with a colon.

Let’s take a look at this in action by writing ratios that compare the boys in the picture.

What is the ratio of boys with striped shirts to boys with solid shirts? There are two boys with striped shirts and two boys with solid shirts. *Let’s write the ratio in three ways.*

\[
\frac{2}{2} \quad 2:2 \quad 2 \text{ to } 2
\]

*Each of these ratios is correct. Notice that we are comparing an individual quality here.*

**What about comparing a category to the group?**

What is the ratio of boys that are holding binders to all of the boys?

There are two boys holding binders and four boys in the group. *Let’s write the ratio three different ways.* Notice that the first thing being compared comes first when writing the ratio. Or the first thing becomes the numerator in the fraction form of the ratio.

\[
\frac{2}{4} \quad 2:4 \quad 2 \text{ to } 4
\]

*Each of these ratios is equivalent, meaning that they are all equal. Each ratio, though written in a different form, is an equivalent ratio.*
We can write many different ratios by comparing these figures. Let’s list some and use the word “to” to write our ratio form.

Stars to circles = 3 to 2
Red stars to total stars = 2 to 3
Red stars to blue stars = 2 to 1
Blue stars to red stars = 1 to 2
Blue stars to total stars = 1 to 3

We could continue making this list.

We can also write the same ratios using a colon or a fraction.

Practice on your own. Use the picture to write each ratio three different ways.

Example A

What is the ratio of orange marbles to green marbles?
Solution: 2 to 4

Example B

What is the ratio of yellow marbles to total marbles?
Solution: 2 to 22
Example C

What is the ratio of orange marbles to total marbles?

Solution: 2 to 22

Now we can help with the milk comparisons. These comparisons can be written as ratios.

If Casey wants to document this information as a ratio, how could she do it?

A ratio is a comparison. We can write a ratio to compare two quantities in three different ways. In this problem, Casey wants to compare organic and non-organic brands of milk.

She notices that there are four non-organic brands and two organic brands.

Casey can write this comparison three different ways.

\[ \text{4 to 2} \quad \text{4} \quad \frac{4}{2} \quad 4 : 2 \]

This is our answer.

Vocabulary

Ratio

a comparison between two quantities; can be written three different ways.

Equivalent

equal

Guided Practice

Here is one for you to try on your own.

What is the ratio of total marbles to dark blue marbles?

Answer

First, count the total number of marbles. There are 22 marbles.
There are three dark blue marbles.

**Our answer is 22 to 3.**

**Video Review**

**KhanAcademy, Introduction to Ratios**

**James Sousa, Introduction to Ratios**

**Practice**

**Directions:** Use the picture to answer the following questions. Write each ratio three ways.

1. What is the ratio of hens to chicks?
2. What is the ratio of green chicks to yellow chicks?
3. What is the ratio of white chicks to total chicks?
4. What is the ratio of green chicks to total chicks?
5. What is the ratio of yellow chicks to total chicks?
6. What is the ratio of green chicks to white chicks?
7. What is the ratio of light blue marbles to dark blue ones?
8. What is the ratio of orange marbles to red marbles?
9. What is the ratio of pink marbles to red marbles?
10. What is the ratio of green marbles to total marbles?
11. What is the ratio of yellow marbles to red marbles?
12. What is the ratio of total marbles to dark purple marbles?
13. What is the ratio of total marbles to all blue marbles?
14. What is the ratio of pink marbles to total marbles?
15. What is the ratio of red marbles to total marbles?