# Ratio Relationships - Lesson 1 Supplement

What is a ***ratio***?

It's often defined as a "comparison between two numbers or values," and that's not *wrong*, it's just not *complete*.

It's not good enough.

Let's add the word **relationship** when talking about ratios, because **relationship** is a very important word in maths and sciences. Here's a better definition:

A ratio describes the **relationship** that is happening between two values (or quantities), and while the relationship stays the same, the values may change.

*For example:*

The ratio of people to cats in my house is 2 to 1. That's 2 humans for every cat.
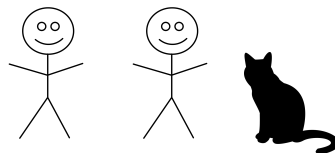


And I like it that way.  I don't want to change that **relationship**. I can write that relationship with numbers, in *fractional notation*:

$$\frac{2}{1} = \frac{humans}{cats}$$

The ratio relationship between humans and cats, written as ratio, is 2 over 1. Notice I didn't write it as 1 over 2, because order matter with ratios. If I say humans before I say cats, then humans go on top, or they're written first.

I can also write this ratio as **2:1**, which is called *odds notation*. You will see me use *fractional notation* with ratios most often, since it's so easy to work with.

Now, let's look a little more closely at that human-to-cat relationship.

There's actually a bit more information in that ratio:

$$\frac{2}{1}$$

We've already decided that it means there are 2 humans for every 1 cat in my house. We say that this is a **part-to-part ratio**. Why do you think that is?

If you were to add up the humans *and* cats, you see that there are 3 *total* living things in this relationship. That's important, because it means you can write a different kind of ratio -- the **part-to-whole ratio**:

$$\frac{2}{3} = \frac{humans}{everyone}$$

*or...*

$$\frac{1}{3} = \frac{cats}{everyone}$$

In those examples above, I'm showing the relationship of either humans or cats to the entire population, instead of to each other.

In the next lesson, we'll use this information to write out ratios and solve some real-life problems with these relationships!