Caleb

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7th Math

Have you ever been baking and found out that you need to double the recipe? Or have you ever compared prices at the grocery store? You've been using ratios and proportions without even knowing it.

Ratios have been used by mathematicians ever since Ancient Greece, and it is really hard to do math without involving them. A ratio is when two numbers are compared in some way. They can take the form of fractions, decimals, percentages, and many other things. They are commonly expressed by two numbers with a semicolon between them. A proportion is an equation with two or more ratios that are equal. For example, $\frac{1}{2} = \frac{2}{4}$ is a proportion.

There are three different types of ratios. The first type is part to part. Part to part ratios are when two different part are compared. For example, 1 Doughnut:2 Doughnuts is a part to part ratio if it stands for the amount of doughnuts you can buy with two different deals at a store. The second type is part to whole ratios. Part to whole ratios are when a part of something is compared to the whole thing. For example, 1 Slice:6 slices is a part to whole ratio when the first is the amount of pizza slices I ate and the second is the amount of slices in the pie. The third type is called a rate. A rate is when two different things are compared. For example, 1 Apple:3 Cents is a rate that says that one apple costs three cents.

As can be derived from the introduction, ratios and proportions are very important in everyday life. Ratios and proportions are not only helpful, they run society.

Imagine that you are a student, and you have a 10 page paper due next week. You have timed your writing speed and you write one page every hour. That is a rate of 1P:1H, with P being page and H being hour. You would need to plan out your time so you have 10 hours to work on that paper. This seems like a very simple example, but it shows how society couldn't function without ratios because no one would ever be able to plan.

Now imagine that you are driving from New York City to San Francisco, 2572 miles, in an RV. Your RV drives 10 miles for every gallon of gas and its tank holds 9 gallons. That is a proportion, $\frac{1}{10} = \frac{9}{?}$. The answer, of course, is that you can drive 90 miles on a full tank of gas. Now, you have to consider how much gas costs. If the average price for gas in America is $2.80 per gallon, about how much money will you spend on the trip? This is one of the more challenging ways that ratios and proportions can be applied to everyday life. This example shows that you need ratios to be able to do almost anything.

In 2001, Billy Beane, the general manager of the Oakland Athletics, began revolutionizing the game of baseball. He figured out that new stats, like OBP and SLG, are way better at actually determining a players on-field performance than old school stats like batting average and RBI. OBP, on-base percentage, measures how many times a player will get on base in one at bat. Batting average measures how many times a player will get a hit during an at bat. OBP is better than batting average because it accounts for walks and hit-by-pitches, along with sacrifice flies and fielder's choices. Now that it has been determined that OBP and SLG are the stats to use, I decided to find the ideal ratio of OBP:SLG. I did this by taking five of the best teams in MLB history[1] and finding their ratios, and then averaging them out. From my research, I

[1] 1927 New York Yankees, 1929 Philadelphia Athletics, 1955 Brooklyn Dodgers, 1975 Cincinnati Reds, 1998 New York Yankees

determined that the ideal ratio of OBP:SLG is 1:1.25. This is a different type of rate called a unit rate, which compares something to one of something else. In this case, the SLG is found in comparison to one point of OBP. With this information, MLB general managers have a new stat to use: OSR (**O**BP to **S**LG **R**atio). Even without this new stat, baseball is still full of ratios. Batting average, ERA, OBP, and SLG are all rates that compare how well a player does while hitting or pitching. This is just one example of how ratios and proportions can be used to gain a sizeable advantage, as in the case of Billy Beane.

In conclusion, ratios are very important in the real world. As famous medical doctor Joel Fuhrman said: "The key to maintaining excellent health and longevity is to eat a high ratio of micronutrients to macronutrients. This shows that ratios are important in daily life and health. "The magnetic cleavage of the spectral lines is dependant on the size of the charge of the electron, or, more accurately, on the ratio between the mass and the charge of the electron."- Pieter Zeeman. This quote shows that ratios are important not only in science, but in the very particles that make up everything in the world, even humans. In conclusion, from Pieter Zeeman's quote, one can not only determine that ratios are important in everyday life, but that the very universe could not exist without ratios.