Practical Applications of Ratios and Proportions

There are many circumstances in which ratios and proportions can be useful. A ratio is a comparison of two numerical values; it is a portion of a number. A ratio may also be expressed as a fraction or a division problem. For example, the ratio $\frac{2}{3}$ expresses two parts compared to three parts of a number. There are two types of ratios, a part to part ratio and a part to whole ratio. A part to part ratio is the ratio of a part of a number to a part of a number. For example, a pizza has 8 slices; Jim ate 3 slices and Joe ate 5 slices, the part to part ratio is 3:5. A part to whole ratio is the ratio of a part of a number to the whole number itself. For example, a pizza has 8 slices; Joe ate 3 slices, the part to whole ratio is 3:8. A proportion is a comparison of two ratios and or fractions. A proportion states that two ratios and or fractions are equivalent. Solving a proportion can tell someone if two ratios and or fractions are proportional or disproportional. There are multiple strategies one can use to solve a proportion; I prefer to use cross multiplication.

There are more useful examples of ratios and proportions than one might think. Ratios can be used to compare any two numbers. One example is comparing how many men and women there are at an office. You can use ratios when you have the scale from a small figure to a large figure. For example, a model car can have a 1:18 scale to the real car; this means that the real car is eighteen times bigger than the model. Scaling may be applied to any similar figures. Proportions can be used to compare any two ratios and or fractions. One can compare the fraction of children who like board game A over children who like board game B to the fraction of adults that like board game A over adults that like board game B. It is surprising how useful ratios and proportions can be when completing a simple task. In some ways, these methods of mathematics can make life easier.

Another real world application of ratios and proportional reasoning is architecture. There are many cases where an architect builds a scale model, and would like to know the size of the parts of the real building. If the architect is aware of the scale, he/she can determine the size of the real building. The strategy of scaling can be applied to any similar figures.

Towards the beginning of the seventh grade, I completed a proportion problem involving measurement, another example of ratios and proportions being used in the real world. The problem was called, “The Shadow Knows”. The goal of of the assignment was to find the height of a tall object in Central Park without measuring it. To solve this problem, I needed a seventh grader, a pole and the pole’s shadow. First, I measured the height of the student and wrote it down. Then I measured the length of the student’s shadow when standing in the same spot. Finally, I measured the length the pole’s shadow. After I had all of that information, I set up a proportion. I compared the ratio of the students height to the length of the students shadow to the ratio of the pole’s height, X, to the length of the pole’s shadow. To calculate the height of the shadow, one can also use scale factor. He/she can divide the length of the pole’s shadow by the length of the seventh grader’s shadow. He/she can then apply that number and or the scale factor to the student’s length and that number would be the height of the pole. “The Shadow Knows” problem is similar to the application of proportionality in architecture and scaling in general.

In my interest driven problem, ratios and proportions are applied to baking. A baker wishes to bake a brownie, although he does not have enough flour to bake the brownie. The question also states that the recipe serves 16 people. The baker must use proportional reasoning to reduce all of the other ingredients to even out with the flour. I compared the fractions of the original amount of flour over the original amount of the other ingredients to the fraction of the reduced amount of flour over X, the reduced amount of each ingredient. To confirm my solution, I realized that since all of the ingredients were proportional to one another, then they all must have have been reduced by a factor of 4. I then divided all of the ingredient amounts by 4 and calculated all of the reduced amounts.

The next part of my interest driven problem asks how many people the new recipe serves. I simply divided the original number of people the brownie serves by 4 and calculated that the new recipe serves 4 people.

I also came up with a bonus question that asked how much of each ingredient would be necessary to serve 100 people. To solve this portion of my problem, I found the scale factor from the old number of people the recipe served, to how many people the new recipe would serve. To do so I divided 100 by 16 which equaled 6.25. The scale factor of 6.25 represented the amount of times more each ingredient the baker should have used. Using proportions, I then applied the scale factor to all the amounts of the original ingredients. I compared the fraction of 6.25 times the original recipe over 1 times the original recipe to the fraction of X, 6.25 the amount of each ingredient over 1 times each ingredient. From solving that problem I learned a lot about how ratios and proportions could be applied to baking.

Thus, ratios and proportions are two of the most important skills in mathematics. There are countless activities one can partake in on a daily basis involving those two mathematical tools. If you think about it, ratios and proportions can be used in any almost every facet of life, not just in baking, architecture and finding the height of a figure without measuring it; most jobs and hobbies can involve using proportional reasoning and ratios. Using ratios and proportions is not just a skill in math, it is a skill in life.