Ratios and proportions are apparent in everyday life. One is forced to apply his or her knowledge about ratios and proportions to the situation he is in, or what activity he is participating in. Comparing a cup of sugar to a whole mixture, or comparing a score to another score is completely using ratios, as the term “ratio” means a comparison of two quantities. A ratio can compare a part of something to a whole of something, or a part of something compared to a part of something. A proportion is a statement that shows the equivalence of two ratios. These proportions appear in many situations- when you want to find the equivalent of a measurement, or when you want to find an increase of something every year when you know the increase of something in 5. If you know about proportions and ratios, you will soon find the relevance of them to almost any situation you come across! These very special math terms are extremely apparent in using baking recipes, in map-making and using, and in fashion design.

Maps are used to locate cities and different points of interest. They show many streets, and how long or short a travel to a place would be. Map scales represent ratios and proportions because the distance on a map related to the actual distance in a place is a ratio. Maps always have these scales (or ratios) to accurately represent distances between two places. You can also use scales to show the comparison between two distances or routes to the same destination. These all help the reader navigate his or her way through cities, museums and streets. If one is trying to determine the distance from his house to a museum, he would look at his map, and notice a scale: 1 cm = 15 feet. If the distance on his map shows 5 cm, then he would make a proportion: 1 centimeter to 15 feet is equal to 5 cm over ___ feet. Then he would know how many feet he needs to travel to get to the museum. You can also use maps, ratios and proportions to compare two ways you can travel to one destination, and see which ratio is bigger or smaller. You can also use proportions and maps to determine whether the distance to one museum is equal to the distance to the same museum on a separate map with a different scale.

When you are in a store shopping for a sweater, and you are looking at all of the possible sizes one design was created in, did you ever think that maybe the sweater’s designer used scale factors, ratios and proportions to create all of those sizes? A sweater is made up of different size fabrics, however big or small each piece is. If a fashion designer creates a sweater in a smaller size, and the sleeves’ lengths are

20 inches long, then the larger size might be 1.5 times longer (30 inches). Then, if the length of the center peice is 18 inches long, the length of the center piece for the larger size will also be 1.5 times the length of that (27 inches). This means every part of the smaller sweater will be proportional to the larger size by a scale factor of 1.5. The two sweaters will have the same scale factor and each component of each sweater would be similar. The math term “similar” in this case means that every component of the large-sized sweater is 1.5 times the corresponding components of the small sized sweater. The length of a design on the smaller sweater and the length of the design on the larger sweater in a ratio will be equivalent to the length of the smaller sweater’s sleeve and the length of the larger sweater’s sleeve in a ratio. Therefore, the smaller sweater as a whole will be proportional to the larger sweater as a whole. Even though there are two different sizes to the same sweater design, the angles of the sweaters should be the same, and the proportionality in the aspects of the sweater (the sleeve sections, the design at the bottom, and the center part) are the same to the proportionality in the aspects of a different size of that sweater.

In my interest driven math problem that I devised myself, I needed to solve a multi-step question involving a recipe for making a three layer cake. I found that to make a cake, one needs the following ingredients: 1 ½ cups of flour, 1 ½ teaspoons of baking powder, ¾ teaspoon of salt, ½ cup of butter, 1 cup of sugar, 2 eggs, ½ teaspoon of vanilla extract, and ½ cup of milk. I wanted to determine the percentage each ingredient is made up of the whole batter. I also asked myself, “If I were to make a three layer cake, and each layer was a different size, how much of each ingredient would I need for each layer? How much of each ingredient would I need in order to make the whole cake?”. To solve the first part of my problem, I converted the baking powder, salt, and vanilla extract from teaspoons to cups. Once all of my ingredients were measured in cups, I added them all together. The approximate number of cups in the whole batter was 4 cups. Then, to find the percentage of each ingredient in the batter, I wrote a proportion: the amount of cups of one ingredient as the numerator of a fraction, and the total amount of cups as the denominator. Then, I wrote another fraction: this time the denominator as 100. That way, once I found the numerator of that fraction, I could render that fraction as a percentage. This step of my problem involved ratios because I could find the ratio of every ingredient to the whole batter and then use a proportion to find the percentage of each ingredient to that whole batter. My cake was to have three layers: to make the base layer I would need to triple the recipe, to make the middle layer I would need to double the recipe, and to make the top layer I would need to halve the recipe. Ratios are used in this step because by tripling, doubling and halving the recipe, each ingredient is still the same fraction of the batter, no matter what I factor I multiply them by. This is because when I halved one ingredient, I also halved every other ingredient, making every ratio of each ingredient to the batter the same throughout the layers of the cake. Also, in the whole three-layer cake, the percentage of each ingredient in the batter is the same. The last step of my problem was to find how much each ingredient would cost. I added all of the amounts of each ingredient from each layer, and then I knew how much of each ingredient I would need to make the whole cake. Almost every ingredient was sold in weight, and all of my measurements were in cups. I then used proportions to find how much each ingredient would cost. Since I experimented and found that 2 cups of almost every solid ingredient weighed 12.15 ounces, I divided that amount by two to determine the weight of one cup. I then wrote my proportion: if one cup of that ingredient is 6.07 ounces, then how much would ____ of a cup weigh? Once I found my weight, I converted from ounces to pounds if needed and went searching for the price of that ingredient!

Ratios and proportions are helpful in any kind of job, and can help you make very important decisions. Once a comparison of two quantities is turned into a ratio, you are well on the road to comparing them to other ratios, finding its equivalent, and determining what that ratio means in terms of amount of ingredients, fabrics, or distances. Any information can be expressed in a ratio or proportion, and can be a great use to the world. Ratios and proportions are used invariably in baking, mapmaking and using, and even in fashion design. Think of how intricate and detailed baking, mapmaking and fashion design is today. This is essentially because of the way ratios and proportions have enhanced the world's learning. If you think you only use ratios and proportions in math class, you may want to look a little closer around you.