Grade 6

Standard:

Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."

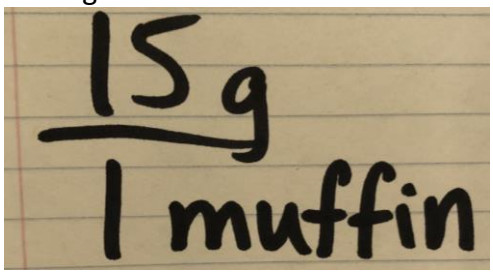
"Search the California Content Standards." *CA Content Standards (CA Dept of Education)*, California Department of Education, www2.cde.ca.gov/cacs/math?order=0&page=0&perpage=100&mingrade=6&maxgrade=6&dl=0.

Ratios and Proportions (with snacks)

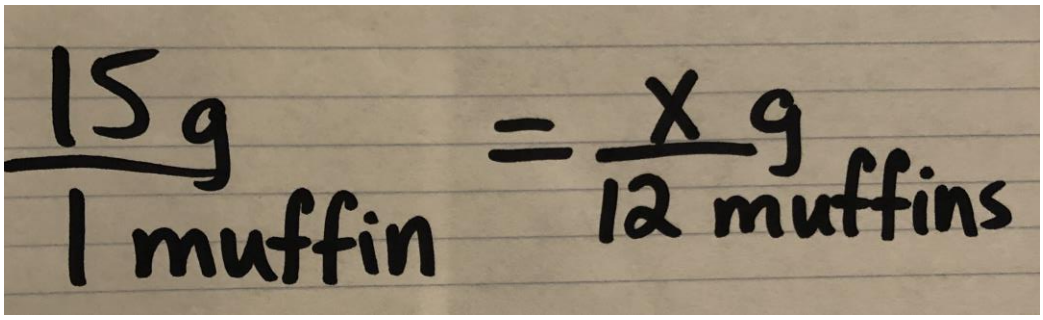
We need to use ratios and proportions to make calculations in our lives more often than you might think. For example, they are an important element of healthy meal planning. Let's enjoy a healthy snack while understanding how we can use ratios and proportions to calculate how much nutritional value a snack contributes to our diets and assist us with proper meal planning.

1) Think of your two favorite healthy snacks that you have at home currently.
2) Wash your hands and keep them clean!
3) Gather every one of those two types of snacks that you have. For example, if you have a bunch of 5 bananas, grab all 5; if you have a box of 12 pouches of fruit snacks, grab all 12.

4) Bring the nutrition facts labels of your snacks with you. Use them to determine how large a serving size is. If you chose produce (i.e. apples, bananas, oranges, carrots, etc.), consider one of those items to be one serving. This means one apple is one serving of apple. You can find nutrition facts of fruits here and vegetables here. Just scroll down the page until you've found your fruit or vegetable and click on its name. Once you are redirected, scroll down a bit and the nutrition facts chart will be on the right side of the page.
5) Set the snacks on a clean surface, like a table or kitchen counter. Count how many of each snack you have.
6) Determine the **ratios** of one of your snacks to the other. Ratios tell you how much there is of one thing compared to something else. For example:
    - Let's say I have 12 mini bran muffins and 4 oranges. That means I have a ratio of 4 oranges for every 12 muffins or 12 muffins for every 4 oranges. The ratio of oranges to muffins can be notated as "4 : 12," "4 to 12," or as the fraction "4/12." Ratios can and should be reduced, so I should say the ratio of oranges to muffins is 1 : 3, 1 to 3 or 1/3.
      Note: Ratios depend upon which quantities are being compared. For example, we see that the ratio of oranges to muffins is 1 : 3, but the ratio of oranges to ALL the food items (12 muffins + 4 oranges) is 4 : 16, which means oranges make up 4/16 or 1/4 of my whole set of snacks.
7) Next let's consider proportions. When items are **proportional**, the ratio between them will remain the same. So, if we know the ratio of oranges to muffins but then change the amount of oranges, we can find out how muffins should change by setting the two ratios equal. That sounds a bit confusing, so to clarify, complete these steps:
    a. Look at the nutrition facts labels. Find the heading labeled, "Total Carb." *If your snack has 0g of carbohydrates, look at the heading labeled, "Protein."
    b. Grab a piece of paper and something to write with.
    c. Write down your total carbohydrates or protein as a fraction per 1 serving of one of your snacks. For example, the ratio of carbs to one of my muffins is 15/1, meaning 15 grams of carbohydrates per 1 muffin.
    d. Now we want to calculate how many carbohydrates or proteins we have for all servings of this kind of snack. You can do this using **cross multiplication**.
        i. Write the ratio you found in step 7c. as a fraction of "grams per 1 serving." Here is mine:

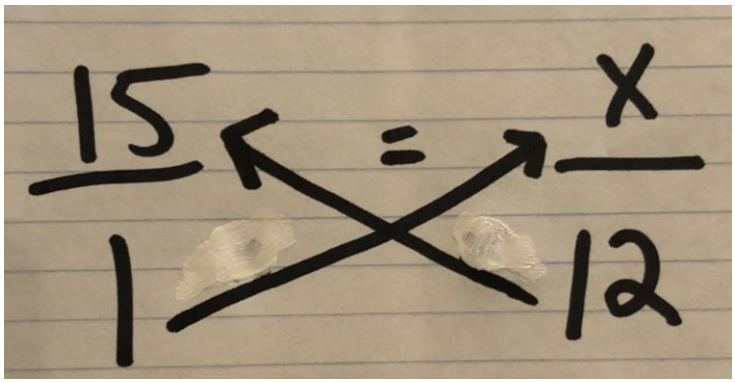


        ii. Next to that, write the ratio you are trying to solve for as "x grams per all servings," and set them equal to each other. I have 12 muffins, so all of my servings = 12. Here is mine:

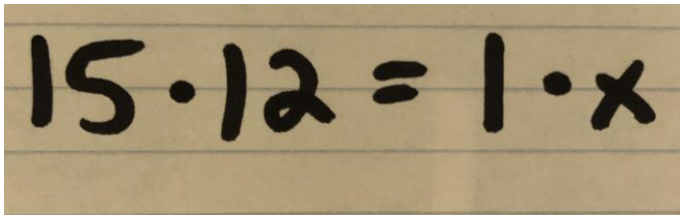


Note: make sure that both ratios have grams of carbohydrates or protein in the same place of each fraction. It must be either on the bottom (in the denominator) or on the top (in the numerator) of both ratios.

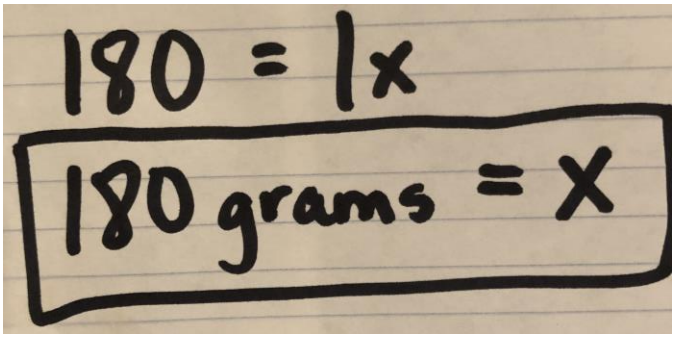
iii. Multiply the denominator of the first ratio to the numerator of the second and set it equal to the product of the second ratio's denominator and the first's numerator. Here is mine:



Which translates to:



iv. Solve for x.



v. Check your nutrition facts label again. If one package has more than one serving, you will have to multiply the grams you found in step iv by the number of servings in one package. If your package only contains one serving, do nothing.

Basically, what we have done is calculated the number of grams of carbohydrates or protein in all servings of our first snack. I know there are 15 g of carbs in one muffin, so I know that proportionally, there are 180 g of carbs in 12 muffins. If I were to eat all my muffins right now, I would be intaking 180 grams of carbohydrates. That's a huge portion of my daily recommended calorie intake!

e. Repeat steps a. through d. for your other snack.

8) OPTIONAL: Eat 1 serving of your snacks and enjoy!