

Real Life Fraction Problems

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This assignment has the following two goals:

- 1) To extend your problem solving skills with fractions.
- 2) To help you identify contexts for multiplication and division of fractions (and to distinguish between them).

Solve each problem using at least two different methods. Record each of your methods in some detail. Then, for each step of each solution method, identify places where you were performing multiplication or division, even if you didn't frame your method as involving these operations.

1. A true cooking story: I was baking something. I thought I was measuring $\frac{1}{2}$ cup of flour, but after I had dumped the flour in the bowl, along with some wet ingredients (i.e. I wasn't starting over...) I realized that I had accidentally used the $\frac{1}{3}$ cup measure instead of the $\frac{1}{2}$ cup measure. I have a standard set of four measuring cups: 1 cup, $\frac{1}{2}$ cup, $\frac{1}{3}$ cup, and $\frac{1}{4}$ cup. Each cup has a line in the middle, so that you can measure half as much as the capacity of the cup. How would you have solved this dilemma?
2. Suppose that the above situation were reversed, i.e., that my recipe had called for $\frac{1}{3}$ cup of flour and I had accidentally used the $\frac{1}{2}$ cup measure. What could I have done to deal with this situation?
3. My laundry detergent comes in a 50 oz. bottle. The bottle says that it is good for 16 loads of laundry. How many ounces of liquid per load is this? Give your answer as a fraction (or mixed number).
4. Suppose I realized that $\frac{3}{4}$ oz. was enough detergent to do a load of laundry. How many loads could I do using my 50 oz. bottle of detergent?

5. When I cut my hair, I use the $\frac{3}{8}$ inch clip (i.e. the hairs remaining are $\frac{3}{8}$ inch long).

Once, I measured a hair I'd cut off – it was $2\frac{1}{4}$ inches long. What fraction of that original hair remained on my head? How many times as long was my hair before I cut it, as compared to after I cut it?

6. Here is a recipe for a natural window cleaner (taken from Natural Health magazine; I'm not sure of the date):

- $\frac{1}{2}$ cup witch hazel extract
- $\frac{1}{2}$ cup white vinegar
- 2 teaspoons liquid Castile soap
- 6 cups warm water
- 4 drops essential oil of choice, optional

Mix ingredients in a large plastic jug and shake well. To use, pour some into a plastic spray bottle. Shake well prior to each use and store in a cool, dark place (shelf life, 4 to 6 months).

I doubted that I would use this much window cleaner in 4 to 6 months, and I didn't even know whether I would like it, so I decided to make a much smaller amount, using only 1 cup of water. What are the other proportions? It might be helpful to know that 1 cup = 16 tablespoons and 1 tablespoon = 3 teaspoons. My measuring spoons include 1 tablespoon, $\frac{1}{2}$ tablespoon, 1 teaspoon, $\frac{1}{2}$ teaspoon, $\frac{1}{4}$ teaspoon, and $\frac{1}{8}$ teaspoon, and I described my measuring cups in an earlier problem. How could I reduce the recipe and use my measuring implements (explain any estimates I might need).

7. Here is my version of my grandmother's recipe for Mandel bread, which is a kind of cookie (that's really good!)

- 4 eggs beaten
- 1 cup oil
- $\frac{1}{3}$ cup sugar (my grandmother uses 1 cup sugar, but I think that's too much, especially when I use chocolate chips, which I usually do).
- $3\frac{1}{2}$ cups flour (approximately, depends on humidity, dough should be soft, but stiffer than most cookie doughs).
- 1 teaspoon baking powder
- 1 teaspoon vanilla
- Chocolate chips and sliced almonds
(optional, can also use other nuts, raisins, etc.)

Beat liquids together. Add dry ingredients. Mix. Form into about 4 rolls. Bake 30-45 minutes at 375° until light brown. Let cool a little. Slice into $\frac{1}{2}$ inch slices. Put on sides, put back in oven until dries (turn over once) and turns golden brown.

Now, suppose that I only had 3 eggs, I had lots of all the other ingredients, and I didn't want to go to the store. How could I make the most mandel bread possible, following the recipe?

8. Suppose, instead, that I had 10 eggs, and I wanted to use all of them to make mandel bread for a crowd. How much of each of the other ingredients would I need?

9. Suppose $\frac{2}{3}$ of our class (of 18) was absent one day and $\frac{5}{6}$ of the people who were absent went to a football rally. What fraction of the class went to the rally? Would this fraction change for a bigger class with the same fractions of students who were absent and who attended the rally?

10. My bedroom measures $4\frac{8}{9}$ yards by $4\frac{8}{9}$ yards. If I wanted to carpet the bedroom, and I was able to buy a carpet measuring 5 yards by 5 yards, how many square yards of carpet would I waste (if I measured really, really carefully, which is kind of unlikely...).