**Main Problem #2**

Topic: *Subtract Fractions with Unlike Denominators*

Problem: You and Rosa are making some authentic Peruvian “Salchipapas”, which is a famous street-food consisting of french fries, hotdogs/sausages, and a variety of flavourful sauces. The ingredients for the *original* recipe are:

* $3\frac{1}{2}$cups of oil
* $2\frac{1}{3}$pounds of peeled Russet potatoes
* $\frac{2}{3}$of a pound of beef hotdogs/sausages
* $\frac{2}{6}$of a pound of pork hotdogs/sausages
* $1\frac{2}{5}$tablespoons of ketchup
* $1\frac{7}{10}$tablespoons of mustard
* $1\frac{3}{8}$tablespoons of mayonnaise
* $1\frac{4}{9}$tablespoons of *salsa verde* (green sauce)

You and Rosa decided to modify the quantities of each ingredient to your likings.

Q1. Because Rosa is on a “low-carb diet”, she decides to use$1\frac{3}{5}$pounds of potatoes instead of the intended amount. By how many pounds did she reduce the amount of potatoes.

Q2. Both of you guys are in the mood for beef sausages instead of pork sausages, so you both decide to reduce the amount of pork by a third of a pound. How many pounds of beef sausages do you guys have now?

Q3. Since too much oil is harmful to one’s health, you decide to decrease the amount of oil by $2\frac{1}{12}$cups. How much oil will you be using to cook now?

Q4. You and Rosa agree that measuring and creating different amounts of sauce is a hassle, so you both decide to create 2 tablespoons of ketchup, mustard, mayonnaise, and salsa verde. For each sauce, how many more tablespoons will you guys be adding?

A1. This problem models the equation $2\frac{1}{3}-x=1\frac{3}{5}$, where *x* is the number of pounds that Rosa has reduced. The first step would be to convert the mixed numbers into improper fractions and express them as fractions with like denominators. Therefore, $2\frac{1}{3}-x=1\frac{3}{5} => \frac{7}{3}-x=\frac{8}{5} => \frac{35}{15}-x=\frac{24}{15}$. Students can use the Missing-Addend Method to transform the subtraction problem into an addition problem;$\frac{35}{15}=\frac{24}{15}+x$. Solving for *x* we get $\frac{11}{15}$, meaning Rosa has reduced the amount of potatoes by $\frac{11}{15}$pounds.

A2. The fractional representation of a third is $\frac{1}{3}$. Notice that $\frac{2}{6}$is the same as $\frac{1}{3}$ since both are equivalent fractions. Therefore, $\frac{2}{6}-\frac{1}{3}=\frac{2}{6}-\frac{2}{6}=\frac{0}{6}=0$. There are 0 pounds of beef sausages.

A3. This problem models the equation $3\frac{1}{2}-2\frac{1}{12}=x,$where *x* represents the number of cups of oil after the reduction. Like the first question, we start off by expressing all the mixed numbers as improper fractions with like denominators. Therefore $3\frac{1}{2}-2\frac{1}{12}=x => \frac{7}{2}-\frac{25}{12}=x => \frac{42}{12}-\frac{25}{12}=x$. Solving for *x,* we get $\frac{17}{12}$(or $1\frac{5}{12}$)cups of oil.

A4. The both of you want to have 2 tablespoons of each sauce. Because every sauce has more than 1 tablespoon, we simply need to look at the fraction of each mixed number and determine how much more tablespoons we need until we reach 1 (or $\frac{x}{x}$ where *x* is the denominator). Therefore,

* Ketchup: $1-\frac{2}{5}=\frac{5}{5}-\frac{2}{5}=\frac{3}{5}$of a tablespoon
* Mustard: $1-\frac{7}{10}=\frac{10}{10}-\frac{7}{10}=\frac{3}{10}$of a tablespoon
* Mayonnaise: $1-\frac{3}{8}=\frac{8}{8}-\frac{3}{8}=\frac{5}{8}$of a tablespoon
* Salsa Verde: $1-\frac{4}{9}=\frac{9}{9}-\frac{4}{9}=\frac{5}{9}$of a tablespoon