M³ Summer Institutes

(Math, Middle School, MS Common Core)

Adding and Subtracting Problems with Unlike Denominators and Repeated Additions of Fractions

Common Core State Standards:

6.NS.3

Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

7.NS.1

Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS. 3

Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)

Hook Problem: Show the solution to $1\frac{1}{3} - \frac{1}{2}$ using 2 different models.

Final Answer:

Teacher Model: Show the solution to the following:

$\frac{1}{2} + \frac{2}{3}$ using fraction circles (not fraction squares)

$$\frac{9}{12} - \frac{2}{3}$$ using number lines (measuring) or fraction squares

5 Groups of 4 people:

1. Discuss amongst yourselves if and when you add or subtract fractions in your lives. Do you avoid fractions in certain situations? What workarounds do you use? Can certain situations be easier to manage in fractions than the workarounds you use?
2. Explore with your group solutions to the following manipulative sets:

$$\frac{1}{2} + \frac{3}{4} \qquad\qquad \frac{4}{6} - \frac{1}{3}$$

3. Share results with other groups.
4. Journal your thought process to complete each of the two models.
5. In your group, determine different methods to work the following:

   John came home from football practice to find $1\frac{1}{4}$ pepperoni pizzas at his home. He ate $\frac{2}{3}$ of a pizza. How much pizza is left?

Guiding Question: Can you personally demonstrate more than one way for John to eat the pizza?

6. What mathematical practice did you use? Justify your choice. Share and journal results.
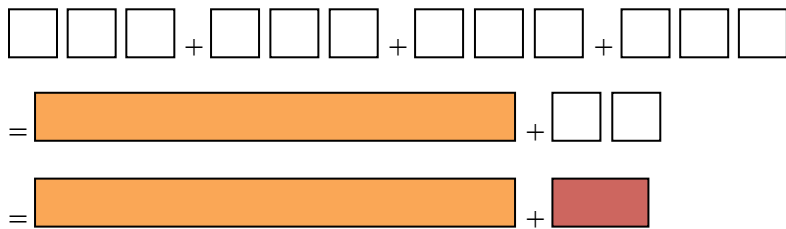
Teacher Model:

$$3 \times \frac{3}{4}$$

$$= \frac{3}{4} + \frac{3}{4} + \frac{3}{4}$$

$$= \frac{9}{4}$$

$$= \frac{4}{4} + \frac{4}{4} + \frac{1}{4}$$

$$= 2\frac{1}{4}$$

A second model:
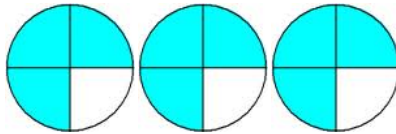
$$4 \times 0.3$$

$$= 4 \times \frac{3}{10}$$

$$= \frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10}$$

$$= \frac{12}{10}$$

$$= \frac{10}{10} + \frac{2}{10}$$

$$= 1 + \frac{2}{10}$$

$$= 1.2$$

(where the orange 10-block is defined as "1" and the white 1-block is defined as "0.1" or as "1/10.")

7. Show:

$$5 \times \frac{4}{5}$$

Reflection: What skills/problems from your curriculum can be related to these ideas?

Extra Practice:

8. A caramel cake recipe calls for 1 cup butter, 2 cups sugar, 4 eggs, 3 cups flour, and 1 cup milk. In your pantry and refrigerator, you have 2 and ¼ cups of butter, 13 cups of sugar, one dozen eggs, 7 ¾ cups flour, and 4 1/8 cups milk.

   a. How many caramel cakes can you make with what you have?

   b. How much of each ingredient will you have left over when you're done making cakes?

   c. You decide you want to make one more cake. Which ingredients will you have to buy? How much of each of those ingredients will you have to buy?

9. If your pea patch is only 7 ½ square yards and the melon plants you want to grow require 2 ¾ square yards each. How many melon plants can you put into your pea patch? Show your work and explain your reasoning.