MPM 1D Unit 1 Handout #2
Operations with Rational Numbers

Date: **Name:**

What is a Fraction?

- A fraction represents a part of a whole, and can be written as a decimal (sometimes it's a repeating decimal, sometimes it is a terminating decimal)

What is a Rational Number?

- A positive or negative number that can be written as a fraction. Rational numbers include integers, but can also be parts of wholes.

Operations with Rational Numbers:

- To add and subtract, you need a common denominator.
- To multiply, you multiply straight across the top and the bottom.
- To divide, flip the second fraction and multiply.

Part 1: Do the Math

1. Write each mixed number as an improper fraction in lowest terms.

   a. $5\frac{5}{9}$ b. $-3\frac{5}{7}$ c. $8\frac{5}{11}$ d. $-5\frac{1}{5}$ e. $-7\frac{1}{10}$

2. Find each sum or difference. Please show your work (find a common denominator, combine double signs, etc.) and write your final answer in lowest terms. Use a calculator to CHECK your work, not to DO your work.

   a. $-\frac{3}{5}+\frac{9}{10}$ b. $\frac{1}{7}-\left(-\frac{4}{5}\right)$ c. $\frac{2}{3}-\frac{12}{13}$

   d. $-\frac{5}{8}+\left(-\frac{3}{4}\right)$ e. $\left(-\frac{3}{11}\right)-\left(-1\frac{1}{2}\right)$ f. $2\frac{4}{9}-1\frac{11}{36}$

3. Find each product or quotient. Please show your work for division questions and write all mixed numbers as improper fractions before carrying out operations. Express your answer in lowest terms.

a. $\left(\frac{5}{8}\right)\left(-\frac{2}{3}\right)$ b. $\left(\frac{3}{4}\right) \div \left(\frac{15}{16}\right)$ c. $\left(-\frac{5}{6}\right) \div \left(-\frac{5}{36}\right)$

d. $\left(-3\frac{1}{2}\right)\left(2\frac{1}{8}\right)$ e. $\left(4\frac{2}{3}\right) \div \left(-\frac{1}{6}\right)$ f. $-3 \times \frac{5}{9}$

Part 2: Explain the Math

1. What is the denominator of a whole number like 2? If you divide a whole number by a fraction less than one (so 2 divided by ½), do you expect an answer larger or smaller than the original number? Use a diagram to show why this is true.

2. Why can't we write fractions with a denominator of three as a terminating decimal? Find another denominator that leads to the same problem.

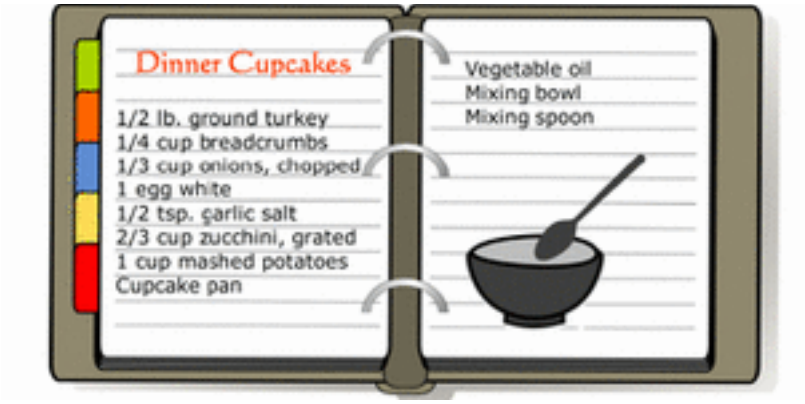
3. Explain how you would teach a younger student how to perform operations with fractions. Use examples and diagrams to help you.

Part 3: Apply the Math

1. Four friends are sharing two pizzas.
    a. If they split them evenly, what portion of a pizza would each receive?

    b. If one person eats $\frac{5}{6}$ of a pizza, another eats $\frac{1}{3}$ of a pizza, and the third eats their equal amount, how much is left for the last person? Show your work!

2. A recipe is shown below.



    a. Determine how much of each ingredient you would need if you wanted to triple the recipe.

    b. Determine how much of each ingredient you would need if you wanted to make one half of a batch of dinner cupcakes.