MATH NEWS

(Permission granted for reprint from Lafayette Parish School System)

Grade 5, Mission 3, Topic C

5th Grade Math

Mission 3: Addition and Subtraction of Fractions

Math Parent Letter

Mission 3, Topic C covers Addition and Subtraction of Fractions. This newsletter will discuss Mission 3, Topic C.

Topic C: *Making Like Units Numerically*

Words to know:

- equivalence
- numerically
- sum
- difference
- mixed number
- improper fraction

Things to Remember!!!

- **Equivalence** - being equal, having the same value
- **Numerically** - using numbers
- **Sum** - the answer to an addition problem
- **Difference** - the answer to a subtraction problem
- **Number Line** - a line used to show placement of whole numbers, fractions, and mixed numbers
- **Mixed Number** – a whole number plus a fraction smaller than 1, written without the + sign, e.g. $5\frac{3}{4}$ means $5 + \frac{3}{4}$
- **Improper Fraction** – a fraction with the numerator equal to or greater than the denominator

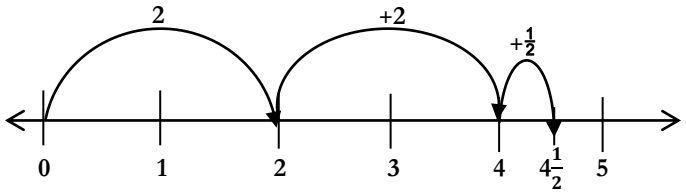
OBJECTIVES OF TOPIC C

- Add fractions to and subtract fractions from **whole numbers** using **equivalence** and the **number line** as strategies.
- Add fractions making like units **numerically.**
- Add fractions with **sums** greater than 2.
- Subtract fractions making like units **numerically.**
- Subtract fractions greater than or equal to 1.

Focus Area– Topic C: *Making Like Units*

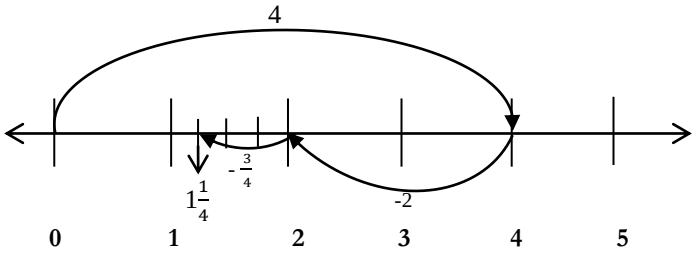
Problem 1: $2 + 2\frac{1}{2} = 4\frac{1}{2}$

Step 1: Add the whole numbers.
Step 2: Add the fraction.



Problem 2: $4 - 2\frac{3}{4} = 1\frac{1}{4}$

Step 1: Subtract the whole numbers.
Step 2: Subtract the fraction.



Problem 3: $\frac{3}{4} - \frac{1}{5} = \left(\frac{3x5}{4x5}\right) + \left(\frac{1x4}{5x4}\right)$

$\frac{15}{20} + \frac{4}{20} = \frac{19}{20}$

Step 1: Make like units **numerically.**
Step 2: Add fractions.

Problem 4: $7\frac{5}{8} + 8\frac{2}{5}$

Step 1: Add the whole numbers. $= 7 + 8 + \frac{5}{8} + \frac{2}{5}$

Step 2: Make like units **numerically.** $= 15 + \left(\frac{5 \times 5}{8 \times 5}\right) + \left(\frac{2 \times 8}{5 \times 8}\right)$

Step 3: Add fractions. $= 15 + \frac{25}{40} + \frac{16}{40}$

Step 4: If sum is an improper fraction, rename fraction as a mixed number. $= 15 + \frac{41}{40}$

$= 15 + 1 + \frac{1}{40}$

Step 5: Add whole number to fraction.

$= 16\frac{1}{40}$

Step 6: Simplify **sum** if possible.

Problem 5: $5\frac{2}{3} - 2\frac{1}{2}$

$= (5-2) + \frac{2}{3} - \frac{1}{2}$ **(Step 1:** Subtract the whole numbers.**)**

$= 3 + \frac{2}{3} - \frac{1}{2}$

$= (3 - \frac{1}{2}) + \frac{2}{3}$ **(Step 2:** Subtract the second fraction from the whole number.)

$= 2\frac{1}{2} + \frac{2}{3}$ **(Step 3:** Make like units **numerically.)**

$= 2 + \left(\frac{1x3}{2x3}\right) + \left(\frac{2x2}{3x2}\right)$

$= 2 + \frac{3}{6} + \frac{4}{6}$ **(Step 4:** Add the fractions.**)**

$= 2 + \frac{7}{6}$ **(Step 5:** If sum of the fractions is an improper fraction, rename as a whole or mixed number.**)**

$= 2 + 1 + \frac{1}{6}$ **(Step 6:** Add fraction to whole numbers.**)**

$= 3\frac{1}{6}$ **(Step 7:** Simplify fraction if possible.**)**

Problem 6: Mrs. Sanchez made $7\frac{4}{5}$ gallons of punch for a party. If there were $10\frac{1}{2}$ gallons in the mixture, how many gallons did she have left in the mixture?

$10\frac{1}{2} - 7\frac{4}{5}$

$= (10-7) + \frac{1}{2} - \frac{4}{5}$

$= 3 + \frac{1}{2} - \frac{4}{5}$

$= \left(3 - \frac{4}{5}\right) + \frac{1}{2}$

$= 2\frac{1}{5} + \frac{1}{2}$

$= 2 + \left(\frac{1x2}{5x2}\right) + \left(\frac{1x5}{2x5}\right)$

$= 2 + \frac{2}{10} + \frac{5}{10} = 2\frac{7}{10}$

There are $2\frac{7}{10}$ gallons of Mrs. Sanchez's punch mixture left.

Problem 7: Bryant has a goal to drink at least $6\frac{1}{2}$ quarts of water during his day of training for the big marathon race. On his first break he drank $1\frac{3}{4}$ quarts, and during his second break he had another $2\frac{1}{5}$ quarts. How many quarts of water should Bryant drink on his last break of the day to reach his goal?

$$6\tfrac{1}{2} - \left(1\tfrac{3}{4} + 2\tfrac{1}{5}\right) = 6\tfrac{1}{2} - \left(3\tfrac{3}{4} + \tfrac{1}{5}\right) = 6\tfrac{1}{2} - \left(3 + \tfrac{3x5}{4x5} + \tfrac{1x4}{5x4}\right) = 6\tfrac{1}{2} - \left(3 + \tfrac{15}{20} + \tfrac{4}{20}\right)$$

$$6\tfrac{1}{2} - 3\tfrac{19}{20} = (6-3) + \tfrac{1}{2} - \tfrac{19}{20} = 3 + \tfrac{1}{2} - \tfrac{19}{20} = (3 - \tfrac{19}{20}) + \tfrac{1}{2}$$

$$2\tfrac{1}{20} + \tfrac{1}{2} = 2 + \left(\tfrac{1x2}{20x2}\right) + \left(\tfrac{1x20}{2x20}\right) = 2 + \tfrac{2}{40} + \tfrac{20}{40} = 2\tfrac{22}{40} = 2\tfrac{22\div 2}{40\div 2} = 2\tfrac{11}{20}$$

Or $2\tfrac{1}{20} + \tfrac{1}{2} = 2 + \left(\tfrac{1x1}{20x1}\right) + \left(\tfrac{1x10}{2x10}\right) = 2 + \tfrac{1}{20} + \tfrac{10}{20} = 2\tfrac{11}{20}$

Students do **not** have to use the least common denominator. They are just expected to create common denominators. In the end the answers will be the same.

Bryant should drink $2\frac{11}{20}$ quarts of water to reach his goal.

*******The strategy above is a possible approach. The student could have first added $1\frac{3}{4} + 2\frac{1}{5}$. Then take the sum and subtract from $6\frac{1}{2}$.***

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Grade 5, Mission 3, Topic D

5th Grade Math

Mission 3: Addition and Subtraction of Fractions

Math Parent Letter

Mission 3, Topic D uses reasoning to estimate the value of expressions, strategize to solve problems involving more than two fractions, and assess the reasonableness of their solutions to word problems.

Topic D: Further Applications

Words to know:

- expression
- benchmark fraction
- sum
- solution
- estimate/about
- reasonableness
- difference

Things to Remember!

- **Expression** – a group of numbers and symbols that shows a mathematical relationship
  Example: $\frac{1}{3} + \frac{3}{4} + \frac{2}{3}$
- Symbol for meaning '**about**' - $\approx$
- **Benchmark fraction** - $\frac{1}{2}$ is a benchmark fraction when comparing fractions
  Example: $\frac{1}{3}$ and $\frac{5}{8}$ $\frac{1}{3}$ is less than $\frac{1}{2}$ or $\frac{1}{3} < \frac{1}{2}$
  $\frac{5}{8}$ is greater than $\frac{1}{2}$ or $\frac{5}{8} > \frac{1}{2}$
  Therefore $\frac{1}{3}$ is less than $\frac{5}{8}$ or $\frac{1}{3} < \frac{5}{8}$.

OBJECTIVES OF TOPIC D

- Use fraction benchmark numbers to assess reasonableness of addition and subtraction equations.
- Strategize to solve multi-term problems.
- Solve multi-step word problems; assess reasonableness of solutions using benchmark numbers.
- Explore part to whole relationships.

Focus Area– Topic D

Mission 3: Addition and Subtraction of Fractions

Use benchmark fraction to estimate the value of expressions:

Example 1: $\frac{1}{2} + \frac{3}{4} > 1$

We know that $\frac{1}{2} + \frac{1}{2} = 1$. Since $\frac{3}{4}$ is more than half and we are adding $\frac{1}{2}$ more, the sum will be greater than 1.

Example 2: $\frac{4}{10} + \frac{1}{3} < 1$ ***and*** $\frac{4}{10} + \frac{1}{3} < \frac{1}{2}$

Since $\frac{4}{10}$ and $\frac{1}{3}$ are less than half, the sum will be less than 1.

$$\frac{4}{10} + \frac{1}{3} < 1$$

Also $\frac{4}{10}$ needs $\frac{1}{10}$ to be a half. $\frac{1}{3}$ of a whole is greater than $\frac{1}{10}$ of the same whole, so adding $\frac{1}{3}$ more to $\frac{4}{10}$ will give us a sum greater than $\frac{1}{2}$. $\frac{4}{10} + \frac{1}{3} > \frac{1}{2}$

Example 3: $1\frac{2}{5} - \frac{2}{3} < 1$

We know $\frac{2}{5}$ is less than $\frac{1}{2}$ and $\frac{2}{3}$ is greater than $\frac{1}{2}$. We can't subtract $\frac{2}{3}$ from $\frac{2}{5}$ since $\frac{2}{3}$ is larger so we'll need to subtract $\frac{2}{3}$ from the one whole. $1 - \frac{2}{3} = \frac{3}{3} - \frac{2}{3} = \frac{1}{3}$

Since $\frac{1}{3}$ and $\frac{2}{5}$ are both less than half, we know when we combine the two fractions the answer will be less than 1.

Problem: *Use >, < or = to make the following statement true.*

$4\frac{9}{10} - 1\frac{1}{8}$ ——— $2\frac{1}{2} + \frac{2}{7}$

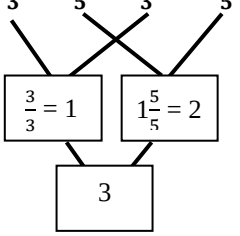
≈ 5 ≈ 1 $\quad$ $= 2\frac{1}{2}$ $\frac{2}{7} < \frac{1}{2}$

$4\frac{9}{10} - 1\frac{1}{8} \approx 4$ $\quad$ $2\frac{1}{2} + \frac{2}{7} \approx 2\frac{1}{2}$

$$4\frac{9}{10} - 1\frac{1}{8} > 2\frac{1}{2} + \frac{2}{7}$$

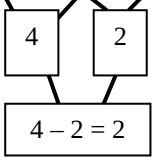
Strategize to solve an addition or subtraction problem involving more than 2 fractions and/or mixed numbers.

Example 1: $\frac{2}{3} + \frac{1}{5} + \frac{1}{3} + 1\frac{4}{5}$



This problem is adding thirds and fifths. The most efficient approach would be to first add the like units together. Then combine the sums.

Example 2: $4\frac{5}{6} - \frac{1}{2} - \frac{5}{6} - 1\frac{1}{2}$



In this problem we are subtracting $\frac{1}{2}$, $\frac{5}{6}$ and $1\frac{1}{2}$ **from** $4\frac{5}{6}$. We begin by subtracting $\frac{5}{6}$ from $4\frac{5}{6}$. Now you **don't** subtract $\frac{1}{2}$ from $1\frac{1}{2}$. ***Remember we are subtracting both $\frac{1}{2}$ and $1\frac{1}{2}$ from what is left.*** So we add $\frac{1}{2}$ and $1\frac{1}{2}$. The sum of 2 is subtracted from the 4.

Application Problem:

During lunch, Chris drinks $2\frac{3}{4}$ cups of milk. Allie drinks $\frac{3}{8}$ cup of milk. Carmen drinks $\frac{1}{4}$ cup of milk. How much milk do the 3 students drink?

$2\frac{3}{4} + \frac{3}{8} + \frac{1}{4}$

$2\frac{4}{4} = 3$

$3 + \frac{3}{8} = 3\frac{3}{8}$

Chris, Allie, and Carmen drank $3\frac{3}{8}$ cups of milk.

Assess Reasonableness of Solution:

John used $1\frac{3}{4}$ kg of salt to melt the ice on his sidewalk. He then used another $3\frac{4}{5}$ kg on the driveway. If he originally bought 10 kg of salt, how much does he have left? (This is an example of a multi-step problem.)

Possible Approach:

Step 1

$1\frac{3}{4}$ kg + $3\frac{4}{5}$ kg

$= 1\frac{15}{20} + 3\frac{16}{20}$

$= 4\frac{31}{20}$

$= 4 + \frac{20}{20} + \frac{11}{20}$

$= 5\frac{11}{20}$ kg of salt used

Step 2

10 kg - $5\frac{11}{20}$ kg

$= 5 - \frac{11}{20}$

$= 4\frac{9}{20}$

Assess reasonableness of answer:

$1\frac{3}{4} + 3\frac{4}{5}$

$\approx 2 + 4$

$= 6$

$10 - 6 = 4$

$4\frac{9}{20}$ falls between 4 and 5. Since $4\frac{9}{20}$ is less than half, $4\frac{9}{20}$ is closer to 4 than 5 which we can say the solution is reasonable.

John had $4\frac{9}{20}$ kg of salt left.