Fractions

Important Vocabulary

$\frac{1}{3}$ ← numerator (number counted)

3 ← denominator (total equal pieces)

Proper fraction - a fraction in which the numerator is less than the denominator ($\frac{1}{2}$)

Improper fraction - a fraction with a numerator that is greater than the denominator ($\frac{17}{3}$)

Equivalent fractions - fractions that have the same value ($\frac{2}{4}$ and $\frac{1}{2}$)

Mixed number - a whole number and a fraction ($3\frac{1}{5}$)

Compare Fractions

Which is larger?

$$\frac{1}{2} \bigcirc \frac{3}{4}$$

Find a LCD (Least common denominator) to compare numerators.

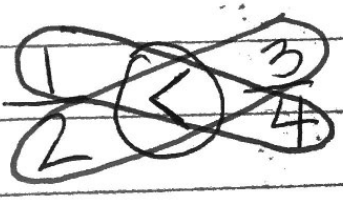
Example: $\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$

$\frac{1}{2} = \frac{2}{4} < \frac{3}{4}$ because 3 is greater than 2

or Butterfly Method

Cross multiply and compare the products of each side.

$1 \times 4 = 4$



$3 \times 2 = 6$ 6 is greater than 4

$\frac{2}{8} < \frac{5}{12}$ $\quad\quad$ $\frac{24}{96} < \frac{40}{96}$

$\frac{2}{8} \times \frac{12}{12} = \frac{24}{96}$ $\quad\quad$ $\frac{2}{8} \times \frac{3}{3} = \frac{6}{24}$

$\frac{5}{12} \times \frac{8}{8} = \frac{40}{96}$ $\quad\quad$ $\frac{5}{12} \times \frac{2}{2} = \frac{10}{24}$

$\frac{44}{110} = \frac{4}{10} < \frac{6}{11} = \frac{60}{110}$

$\frac{4}{10} \times \frac{11}{11} = \frac{44}{110}$

$\frac{6}{11} \times \frac{10}{10} = \frac{60}{110}$

$\frac{44}{50} = \frac{22}{25} > \frac{8}{10} = \frac{40}{50}$

$\frac{22}{25} \times \frac{2}{2} = \frac{44}{50}$

$\frac{8}{10} \times \frac{5}{5} = \frac{40}{50}$

ADDING AND SUBTRACTING FRACTIONS

(On a number line)

Step 1: Is the number line labeled? If not, use a common denominator to partition or divide the number line into equal parts *(make sure to make it large enough so you can make the first number and then add or subtract)*.

Step 2: Mark the first number in the problem on the number line with a dot.

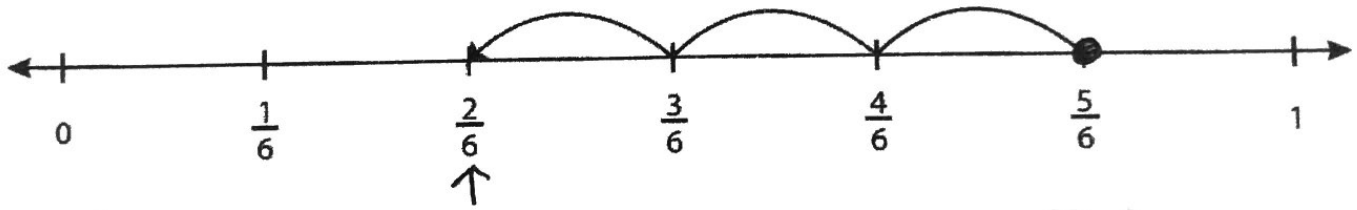
If subtracting, move down the number line the value of the 2nd number in the problem.

If adding, move up the number line of the 2nd number in the problem.

Step 3: Read the value where you ended to get your answer.

Example:

$\frac{5}{6} - \frac{3}{6} = \frac{2}{6}$

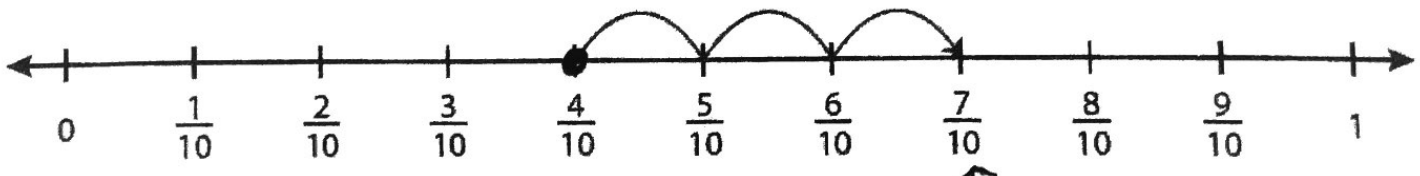


Answer **Start**

Example:

$\frac{2}{5} + \frac{3}{10} = \frac{7}{10}$

Make common denominators: $\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$



Start **Answer**

Kennedy

ADDING AND SUBTRACTING FRACTIONS

(Standard Algorithm)

Step 1: Look at the denominators, are they the same?

Step 2: If the denominators are the same, add/subtract the numerators together and <u>keep the denominators the same</u>. If denominators are different, find the LCD (Least Common Denominator) and make equivalent fractions.

Step 3: Add/subtract the numerators. <u>Keep the denominators the same.</u> Simplify or reduce your answer if the problem requires you to do so (Ex: "Write your answer in simplest form").

Example:

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

$$\frac{1}{2} \times\frac{3}{3} = \frac{3}{6} \qquad \frac{1}{3} \times\frac{2}{2} = \frac{2}{6}$$

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

ADDING AND SUBTRACTING FRACTIONS

(Using models)

Step 1: Find a common denominator.

Step 2: Divide the shape into equal parts using the denominator.

Step 3: Shade the value of the 1st number in the problem.
If adding, shade the value of the 2nd number in the problem.
If subtracting, take away or cross out the value of the 2nd number.

Step 4: Count up the total shaded to get your answer.

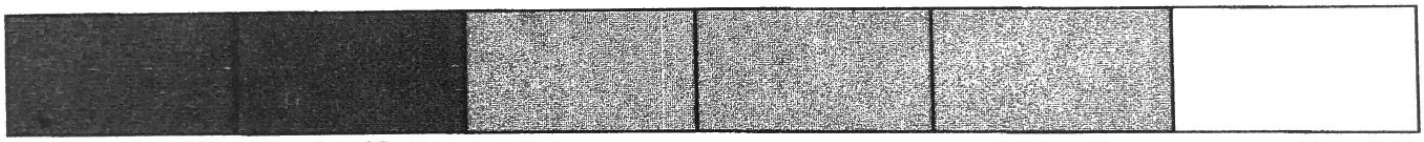
Example:

$\frac{1}{3} + \frac{1}{2} = \frac{5}{6}$

Make common denominators:

$\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$ $\quad$ $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$

$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$



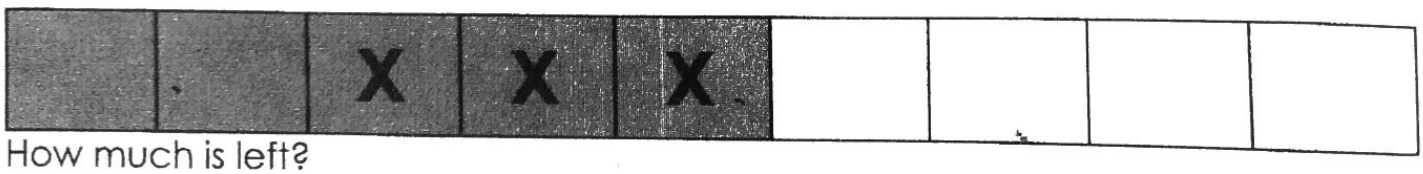
How much is shaded?

Example:

$\frac{5}{9} - \frac{1}{3} = \frac{2}{9}$

Make common denominators: $\frac{1}{3} \times \frac{3}{3} = \frac{3}{9}$

$\frac{5}{9} - \frac{3}{9} = \frac{2}{9}$



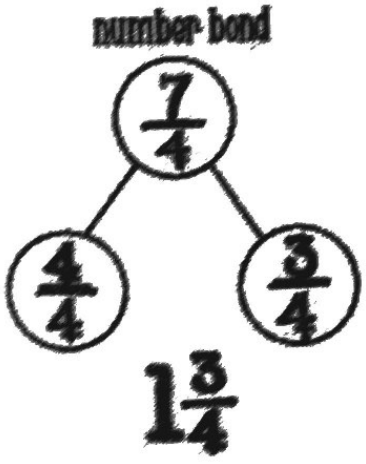
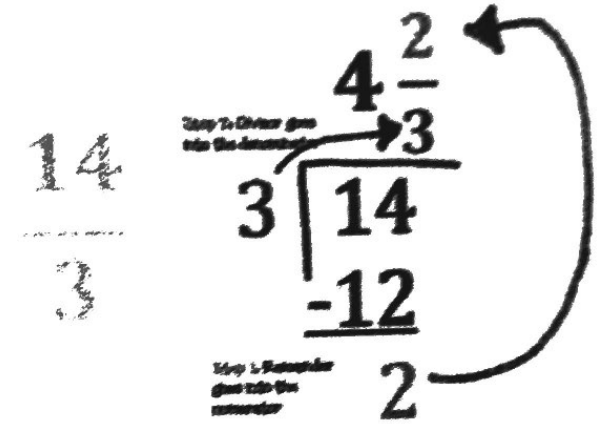
How much is left?

Converting Mixed Numbers and Improper Fractions

Remember: A <u>mixed number</u> is a whole number and a fraction ($3\frac{1}{2}$). An <u>improper fraction</u> is when the numerator is greater than or equal to the denominator ($\frac{6}{5}$)

<u>Converting an improper fraction to a mixed number</u>

There are 2 ways :

Decompose the Fraction using a number bond	**Divide the fraction**
1. Subtract one whole using the denominator. Write it under the improper fraction. 2, Write the difference after you subtract over the original denominator. 3. Add the fractions together.  	1. Divide the numerator by the denominator. 2. The remainder becomes the numerator and the divisor becomes the denominator. 

denominator.

Converting Mixed Numbers and Improper Fractions

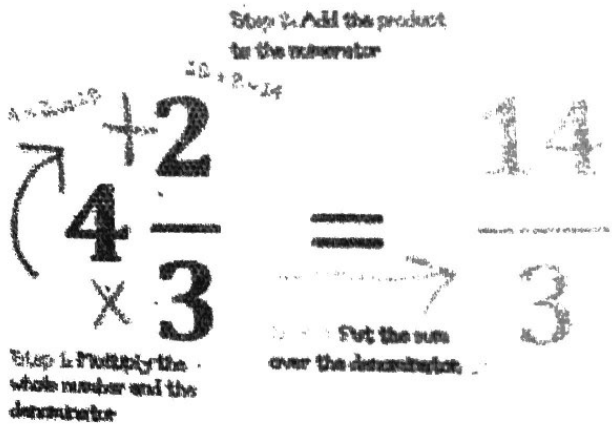
Remember: A <u>mixed number</u> is a whole number and a fraction ($3\frac{1}{2}$). An <u>improper fraction</u> is when the numerator is greater than or equal to the denominator ($\frac{6}{5}$)

<u>Converting a mixed number to an improper fraction</u>

1. Multiply the whole number and the denominator.

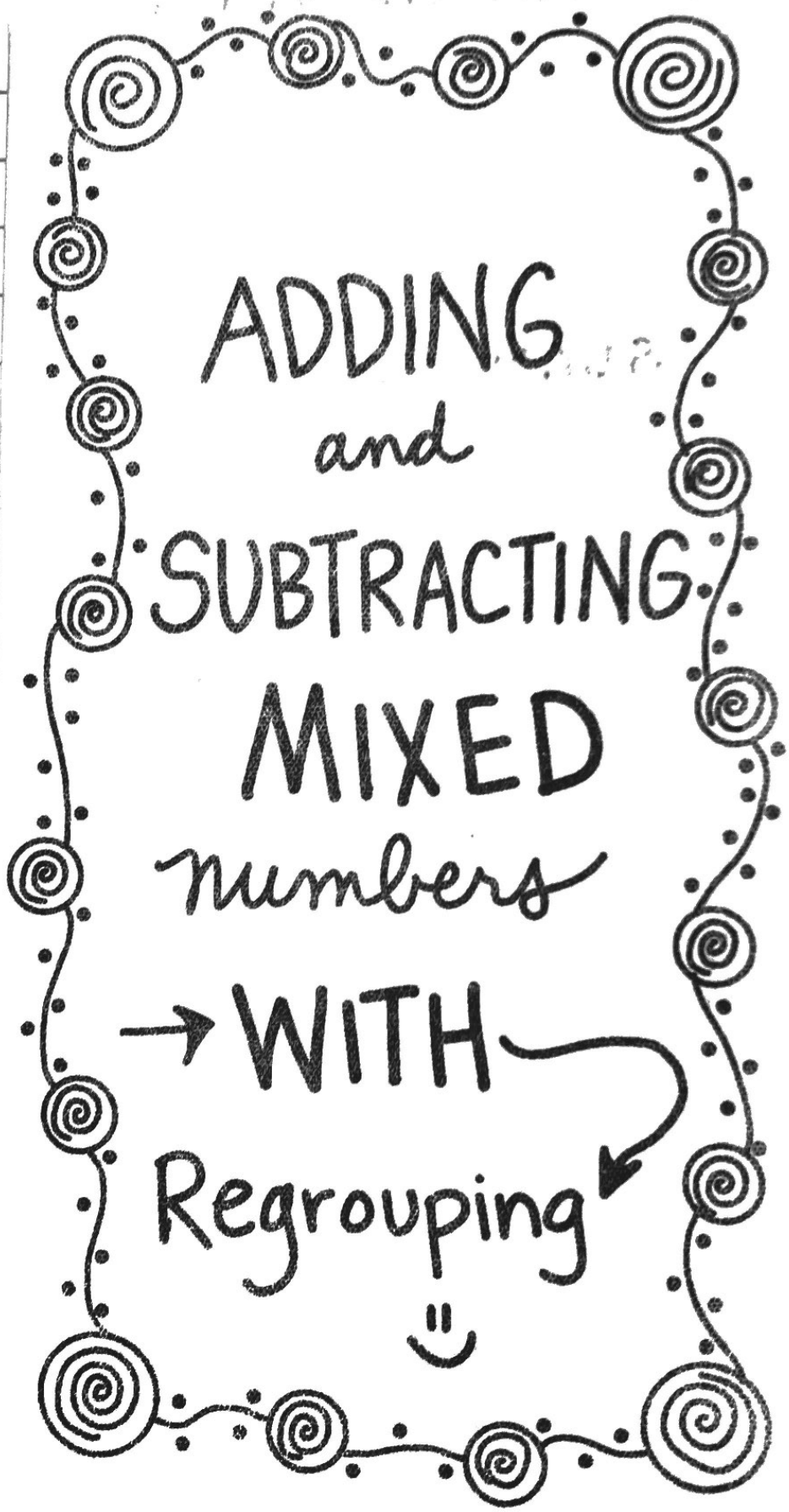
2. Add the product to the numerator. The sum is the numerator.

3. Keep the denominator the same.



EX

1. Multiply the whole


ADDING
and
SUBTRACTING
MIXED
numbers
WITH
Regrouping

When adding + subtracting fractions, ALWAYS look at the denominator FIRST. Find the LCM of the UNLIKE denominators and convert fractions.

MUST REGROUP.

Regroup ⟶

4. Rewrite equation.
5. Subtract whole numbers, subtract numerators, keep denominators the same!
6. Simplify if needed.

$4 + \frac{15}{15} + \frac{3}{15}$ don't forget this part

$4 + \frac{18}{15}$

$4\frac{18}{15} - 3\frac{10}{15} = 1\frac{8}{15}$

(18-10) ↙

(4-3) ↑ stays the same

Subtract $5\frac{1}{5} - 3\frac{2}{3} =$

☆ Write Neatly ☺

STEPS

1. If denominators are UNLIKE, find LCM of each denominator.
2. Convert fractions to equivalent fractions with LIKE denominators.

☆ Remember perform the same operation on top as bottom.

3. Rewrite equation.

CANNOT Subtrat (3-10) MUST REGROUP ∴

Regroup →

4. Rewrite equation.
5. Subtract whole numbers, subtract numerators, keep denominators the same!
6. Simplify if needed.

Show Work

$5\frac{1}{5}$
$-3\frac{2}{3}$ > need LCM

5: 5, 10, (15), 20
3: 3, 6, 9, 12, (15)

LCM is 15

$5\frac{1}{5} \times \frac{3}{3} = \frac{3}{15}$

$-3\frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$

cannot 3-10

Regroup!

$5\frac{3}{15}$ is the same as

whole + fraction part

$4 + \frac{15}{15} + \frac{3}{15}$

don't forget this part (18-10)

$4 + \frac{18}{15}$

$4\frac{18}{15} - 3\frac{10}{15} = 1\frac{8}{15}$

(4-3) ↑ stays the same

practice Problems (with regrouping)

$3\frac{1}{3} - 2\frac{10}{12} =$

$3\frac{1}{3} \times \frac{4}{4} = 3\frac{4}{12} - 2\frac{10}{12} =$ ✗

$2\frac{12}{12} + \frac{4}{12}$

$= 2\frac{16}{12} - 2\frac{10}{12} = \frac{6}{12} = \frac{1}{2}$

$5\frac{1}{8} - 1\frac{2}{3}$

$5\frac{1}{8} \times \frac{3}{3} = 5\frac{3}{24}$ $\quad 5\frac{3}{24} - 1\frac{16}{24}$

$1\frac{2}{3} \times \frac{8}{8} = 1\frac{16}{24}$ $\quad 4\frac{24}{24} + \frac{3}{24}$

$= 4\frac{27}{24} - 1\frac{16}{24} = 3\frac{11}{24}$

$2\frac{1}{2} - 1\frac{10}{14}$

$2\frac{1}{2} \times \frac{7}{7} = 2\frac{7}{14} - 1\frac{10}{14}$

$1\frac{14}{14} + \frac{7}{14}$

$= 1\frac{21}{14} - 1\frac{10}{14} = \frac{11}{14}$

(Mixed regrouping)

$6\frac{1}{4} - 1\frac{7}{8} =$

$6\frac{1}{4} \times \frac{2}{2} = 6\frac{2}{8}$

$6\frac{2}{8} - 1\frac{7}{8}$

$5\frac{8}{8} + \frac{2}{8} = 5\frac{10}{8} - 1\frac{7}{8} = 4\frac{3}{8}$

$3\frac{1}{2} - 2\frac{10}{12} =$

$3\frac{1}{2} \times \frac{6}{6} = 3\frac{6}{12} - 2\frac{10}{12}$

$2\frac{12}{12} + \frac{6}{12} - 2\frac{10}{12} = \frac{8}{12} \div \frac{4}{4} = \frac{2}{3}$

$\frac{8}{12} \div \frac{2}{2} = \frac{4}{6}$