ADDING AND SUBTRACTING FRACTIONS

BEFORE ADDING OR SUBTRACTING FRACTIONS, YOU MUST HAVE A COMMON DENOMINATOR.

- THE DENOMINATOR IS THE (TOP/BOTTOM) OF A FRACTION.

bottom

- A COMMON DENOMINATOR, THEREFORE, MEANS THAT ALL FRACTIONS MUST HAVE THE SAME THING ON THE BOTTOM.

MY NOTES FROM THE PREVIOUS SLIDE

Before adding or subtracting fractions, need common denominator.

Same bottom

IDENTIFY THE PAIR OF FRACTIONS THAT HAS A COMMON DENOMINATOR.

$\frac{7}{2} + \frac{2}{7}$

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

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

ONCE YOU HAVE A COMMON DENOMINATOR, ADD OR SUBTRACT THE NUMERATORS.

$$\frac{4}{3} + \frac{2}{3} = \frac{6}{3}$$

Note: leave the denominator the same.

At this point, simplify your answer if possible.

$$\frac{6}{3} \quad \frac{\div 3}{\div 3} \quad \boxed{= 2}$$

TRY ONE

$$\frac{2}{7}+\frac{8}{7}-\frac{4}{7}$$

$$\frac{2}{7}+\frac{8}{7}-\frac{4}{7}$$

$$\frac{2+8-4}{7}=\frac{6}{7}$$

CREATING COMMON DENOMINATORS

- MULTIPLY TO CREATE COMMON DENOMINATORS
  - WE CAN ONLY MULTIPLY OUR FRACTIONS BY THINGS THAT ARE EQUAL TO ONE SO WE DON'T CHANGE THE VALUE.

EXAMPLES OF FRACTIONS THAT EQUAL ONE: $\frac{2}{2}, \frac{3}{3}, \frac{100}{100}$

CREATING COMMON DENOMINATORS, OPTION #1

EXAMPLE: $\frac{7}{2} + \frac{2}{7}$

We can always get a common denominator by multiplying each fraction using the denominator of the other fraction.

$$\frac{7}{2}\left(\frac{7}{7}\right) + \frac{2}{7}\left(\frac{2}{2}\right)$$

$$\frac{49}{14} + \frac{4}{14}$$

$$\frac{53}{14}$$

TRY ONE

$$\frac{7}{2} - \frac{5}{3}$$

$$\frac{7}{2} - \frac{5}{3}$$

$$\frac{7}{2}\left(\frac{3}{3}\right) - \frac{5}{3}\left(\frac{2}{2}\right)$$

Multiply each fraction by the equivalent of one using the denominator of the other.

$$\frac{21}{6} - \frac{10}{6}$$

$$\frac{11}{6}$$

Add the numerators. Leave the denominator as it is.

LET'S APPLY OPTION #1 TO THE OTHER EXAMPLE:

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

$$\frac{3}{8}\left(\frac{4}{4}\right)+\frac{3}{4}\left(\frac{8}{8}\right)$$

$$\frac{12}{32}+\frac{24}{32}$$

$$\frac{36}{32}$$

Notice that we still need to simplify this answer.

$$\frac{36\div 4}{32\div 4}=\frac{9}{8}$$

Why did we need to simplify this fraction when we didn't have to simplify the earlier examples?

ANSWER: The denominators of the two fractions we started with actually had something in common to begin with.

OPTION 2

TAKE COMMON FACTORS INTO ACCOUNT TO ENSURE THAT YOU ARE USING THE LEAST COMMON MULTIPLE AS THE COMMON DENOMINATOR.

IN OUR EXAMPLE $\frac{3}{8} + \frac{3}{4}$

Notice that 4 actually goes into 8. therefore, we can use 8 as our common denominator.

The first fraction already has 8 as its denominator. We will only need to multiply the second fraction

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

- MULTIPLY THE SECOND FRACTION BY 2/2 TO ACHIEVE A COMMON DENOMINATOR OF 8.
- ADD THE NUMERATORS.

$$\frac{3}{8} + \frac{3}{4}\left(\frac{2}{2}\right)$$

$$\frac{3}{8} + \frac{6}{8}$$

$$\frac{9}{8}$$

TRY ONE USING OPTION #2

$$\frac{4}{9} - \frac{1}{3}$$

ANSWER TO TRY ONE BY OPTION #2

$$\frac{4}{9} - \frac{1}{3}$$

$$\frac{4}{9} - \frac{1}{3}\left(\frac{3}{3}\right)$$

$$\frac{4}{9} - \frac{3}{9} = \frac{1}{9}$$

ONE FINAL EXAMPLE

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

$$\frac{2(3)+1}{3} - \frac{8}{5}$$

$$\frac{7}{3} - \frac{8}{5}$$

$$\frac{7}{3}\left(\frac{5}{5}\right) - \frac{8}{5}\left(\frac{3}{3}\right)$$

Convert mixed number to improper fraction. (Multiply whole number by denominator and add to numerator.)

$$\frac{35}{15} - \frac{24}{15}$$

$$\frac{11}{15}$$

SUMMARY: STEPS FOR ADDING/SUBTRACTING FRACTIONS

1. Get common denominator.
2. Add/subtract numerators.
3. Keep common denominator. (Don't add or subtract in denominator.)
4. Simplify.