**UNIT 2 – Addition & Subtraction Rational Numbers**

Vocabulary:

**Repeating decimal**- a decimal whose digits repeat in groups of one or more.

**Terminating decimal**- a decimal whose digits end. Can be written as a fraction with a

 denominator of 10, 100, 1000, etc

 **Rational numbers**- numbers that can be expressed in

 the form $\frac{a}{b}$, where *a* and *b* are integers &

 integers and *b* ≠ 0

 **Irrational numbers**- numbers that cannot be

 expressed as terminating or repeating decimals,

 or in the form $\frac{a}{b}$, where *a* & *b* are integers &

 *b* ≠ 0 (not rational)

 **Real numbers**- set of all rational and irrational

 Numbers

**Fraction** – part of a whole

**Numerator** – the number on the top part of a fraction; the “part” of the whole

**Denominator** - the number on the bottom of a fraction; the “whole”

**Simplify** – to express something in a form such that it cannot be made smaller/simplier/etc

**Improper Fraction** – a fraction in which the numerator is greater than the denominator

**GCF** – greatest common factor – the largest factor 2 or more numbers have in common

**Equivalent fractions** - fractions that have the same value when in SIMPLEST FORM.

*What is SIMPLEST FORM?*

* *When the GCF of the numerator and denominator is 1.*
* *When there are no more common factors between the numerator and denominator except for 1.*

**Simplifying Fractions**

1)*Look at the numerator and denominator to see what factors the two numbers will have in common.*

* *Does it have to be the largest factor? No, but it will take less steps if the largest common factor is used.*

2) *Use a common factor to divide BOTH the numerator and denominator.*

* *Divide by a common factor until the only factor that the numerator and denominator have in common is 1.*
* *(if you choose the largest, you only have to divide once)*

Example: step 1 $\frac{30}{45}$

*Factors: 1, 2, 3, 5, 6, 10, 15, 30 common factors*

*Factors: 1, 3, 5, 9, 15, 45 are circled*

 step 2:

If you have a mixed number, k*eep* the whole number and simplify the fractional part as usual

*Ex.*

*Answer is the whole number plus the simplified fraction*

2 $\frac{5}{25}$ *= 2* $\frac{5}{25}$$\frac{÷5}{÷5}$= *2* $\frac{1}{5}$

*Divide the num. & denom. by the GCF*

*Keep the whole number & just focus on the fractional part*

**How can I tell when two fractions are equivalent?**

* *They can be simplified to the same fraction*
* *There is a factor that BOTH the numerator and denominator of the first fraction can be multiplied by to get the other fraction.*

Examples: Simplify $\frac{30}{45}$ and $\frac{6}{9}$

*Simplifies to same fraction, therefore they are equivalent*

*Multiplied both numerator & denominator by 9 AND got the fraction as an answer therefore they are equivalent.*

 Multiply $\frac{3}{4}$ and $\frac{27}{36}$

**Adding/Subtracting Fractions**  (don’t forget to use integer rules if you have negatives)

When denominators are the *same*

1. Add or subtract the numerators
2. Put sum or difference “over” the denominator
3. Simplify

Examples:

 1) $\frac{2}{3}$ + $\frac{4}{3}$ = $\frac{6}{3}$ = 2 2) $-\frac{8}{7}$ – $-\frac{9}{7}$ = $-\frac{8}{7}$ + $\frac{9}{7}$ = $\frac{1}{7}$

When denominators are *different*

* 1. Find the lowest common denominator (LCD)\*
	2. Rewrite each fraction as its *equivalent fraction* using the LCD
	3. Add or subtract the numerators
	4. Put sum or difference “over” the common denominator
1. Simplify

\*to find the LCD

 - look at the largest denominator

 - ask yourself if the other denominator(s) will “go into” that denominator evenly

 - if yes, that number is your common denominator

 - if no, find the next multiple of that denominator and ask yourself the same

 question- continue trying multiples until your answer is yes

Examples:

1) $\frac{5}{2}$ + $\frac{ 6}{8}$ LCD = 8 2) $\frac{7}{6}$ – $\frac{ 3}{4}$



 $\frac{20}{8}$ + $\frac{6}{8}$ = $\frac{26}{8}$ = 4¼

 $\frac{14}{12}$ + $\frac{-9}{12}$ = $\frac{5}{12}$

**Adding & Subtracting Decimals** (don’t forget to use integer rules if you have negatives)

To add or subtract decimals:

1. line up the decimal points (this will automatically line up your place values)
2. add or subtract as usual.

Ex. 2**.**4 + 3**.**1 6**.**78 – **.**345

 2**.**4 6**.**78*0 (put in the 0 placeholder)*

 + 3**.**1 - **.**345

 5.1 6**.**435

**Converting Fractions to Decimals**

**Method 1:**

* *Write an* ***equivalent fraction*** *using a denominator that’s a* ***multiple of 10***
* Change the equivalent fraction into a decimal

$\frac{4}{5 }$ **=**$\frac{8}{10}$ *= .8*

**Method 2:**

We use **LONG DIVISION**

* Divide the numerator (dividend) by the denominator (divisor)

8

$\frac{4}{5}$ **=**

-40

 0

Therefore, $\frac{4}{5}$ is equivalent to **.**8

**Converting decimals to fractions**

* Determine the place value of the last digit in the decimal
* Write the decimal (without decimal point) in numerator
* Write place value in denominator

*WRITE IT THE WAY YOU SAY IT*

*SIMPLIFY*

* Simplify

Ex 0.485 = $\frac{485÷5}{100÷5}$ = $\frac{229}{500}$