Math 9

Unit 3.2

Adding Rational Numbers

Remember:

- Rational Numbers → Any number that can be made into a fraction.

- In this unit, we will "see again" how we can add Rational Numbers

Integers | Fractions | Mixed Numbers | Decimals

Adding Integers

HERE ARE THE RULES:

- when you add (+) to (+) ⇒ (+) which is bigger
- when you add (−) to (−) ⇒ (−) more negative

BUT

When you group a (+) and a (−)

↓

you subtract

↓

the bigger number gives its sign to the answer!

So :

$(+) + (+) = (+)$ Add them

$(-) + (-) = (-)$ Add them

$(-) + (+) \rightarrow$ Subtract, and the sign is that of the bigger number

$\underset{(+)}{3} + \underset{(+)}{5} = \underset{(+)}{8}$

$(-3) + (-5) = \underset{(-)}{-8}$

$(-3) + (5) =$ Since they are different:

- Subtract
- use the sign of bigger number

so

$(-3) + (+5) = (5-3)$

$= +2$

Because 5 is bigger

Adding Fractions

- SINCE IT IS EASIER TO ADD FRACTIONS WITH THE SAME DENOMINATOR, WE SHOULD TRY TO CONVERT ALL FRACTIONS TO THE SAME DENOMINATOR

- FRACTION WITH EQUAL DENOMINATOR:

add the numerators

$$\frac{2}{3} + \frac{7}{3} = \frac{2+7}{3} = 9/3$$

Keep same denominator

* ALWAYS SIMPLIFY IF YOU CAN *

- FRACTIONS WITH DIFFERENT DENOMINATORS

↓

2 Methods

#1 Find a common denominator

* Multiply each denominator by the other

$$\frac{3\times7}{5\times7} + \frac{6\times5}{7\times5}$$

↓

$$\frac{21}{35} + \frac{30}{35}$$

~~Ahora se aplica la suma~~

↓

$$\frac{21+30}{35} = \frac{51}{35}$$

* Simplify if you can *

Use the butterfly Method

$$\frac{3}{5} + \frac{6}{7}$$

- Make a butterfly!

21 multiply

30 multiply

$$\frac{3}{5} + \frac{6}{7}$$

35 multiply these 2 numbers

This is

$$\frac{(3\times7)+(5\times6)}{7\times5}$$

↓

$$\frac{21+30}{35} = \frac{51}{35}$$

Note: Any time you want, you can use a number line.

Adding Mixed Numbers

* When Adding Mixed Numbers
  ↳ Convert to Fractions
  ADD THOSE FRACTIONS

Example

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

Note: If you have a negative number, Leave it there!

- Convert to fractions

$$-3\frac{1}{3} = -\frac{[(+3)\cdot(3)]+1}{3} = -\left(\frac{+9+1}{3}\right) = -\left(\frac{+10}{3}\right)$$

$$2\frac{5}{6} = \frac{(2\times 6)+5}{6} = \frac{17}{6}$$

- $-\frac{10\times 2}{3\times 2} + \frac{17}{6}$ (Make them have same denominator)

↓

$-\frac{20}{6} + \frac{17}{6}$ Now solve $\frac{-20+17}{6} = -\frac{3}{6}$

$$\boxed{-\frac{1}{2}}$$

Be Careful:

$-4\frac{1}{2}$

→ the Mistake we make is this:

$$\frac{(-4)+1}{2}$$ But this is incorrect

$-4\frac{1}{2}$

→ this, in front, belongs to the entire Mixed number. It's the same as:

$$-\left(4\frac{1}{2}\right)$$

- So, do not include the negative number when converting to Fraction.

LEAVE IT OUTSIDE!

Adding Decimals

- When adding Decimals, you must LINE THE . UP!

3.23 + 45.92

Line them up like this:

Line them by the period!

$$\begin{array}{r} 3.23 \\ +\ 45.92 \\ \hline 49.15 \end{array}$$

Now add

notice the decimal point stays on the same place

ABOUT NUMBER LINES

- ALWAYS START AT THE FIRST NUMBER
- If you add a positive number, the arrow goes →
- If you add a negative number, the arrow goes ←