

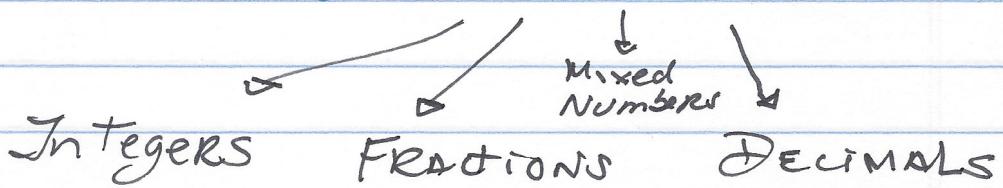
Math 9

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



Adding Integers

HERE ARE THE RULES:

- when you add $(+)$ to $(+)$ $\Rightarrow (+)$ which is bigger
- when you add $(-)$ to $(-)$ $\Rightarrow (-)$ 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

$$(+)* 3 + 5 = 8 \rightarrow (+)$$

$$(-3) + (-5) = -8 \rightarrow (-)$$

$(-3) + (5) =$ Since they are
 different:
 So \rightarrow Subtract

$$(-3) + (+5) = (5 - 3) \rightarrow$$
 use the sign of
 bigger number
 $\xrightarrow{\text{Because } 5 \text{ is bigger}} = +2$

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:

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

→ add the numerators
Keep same denominator

* ALWAYS SIMPLIFY IF YOU CAN *

• FRACTIONS WITH DIFFERENT DENOMINATORS



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Methods

#1 Find a common denominator

* Multiply each denominator by the other

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



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

~~Since we are adding fractions with the same denominator, we can ignore the denominators and just add the numerators.~~



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

* Simplify if you can *

#2 Use the butterfly Method

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

• Make a butterfly!

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

Multiplication
→ 21 → 30
→ multiply these 2 numbers

This is

$$\frac{(3 \times 7) + (5 \times 6)}{7 \times 5}$$

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

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

Adding Mixed Numbers

* When Adding Mixed Numbers

→ Convert to FRACTIONS

Example

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

ADD THOSE FRACTIONS

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

• Convert to fractions

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

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

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



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

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

 Be Careful :



$$\begin{array}{r} -4 \frac{1}{2} \\ \hline \end{array}$$

 The Mistake We make is
this:

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

incorrect

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

 this, in front, belongs to
the entire Mixed number.

It's the same as:

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

- 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:

1 → Line them by the
3.23 + period!

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

↓ 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 