CH3 - Math 9 notes

3.1 Rational numbers

*any number that can be written in the form of $\frac{m}{n}$ where m+n are integers and $n \neq 0$

$\rightarrow \frac{1}{3} = 0.333 \leftarrow$ repeating decimal

$0.367 = \frac{367}{1000}$ or $\frac{3}{4} = 0.75 \leftarrow$ terminating decimal

$\frac{2}{1} = 2 \leftarrow$ no decimal

Fractions you should memorize:

$\frac{1}{3} = 0.\overline{33}$ $\qquad$ $\frac{2}{3} = 0.\overline{66}$

$\frac{1}{4} = 0.25$ $\qquad$ * note the pattern below

$\frac{1}{2} = 0.5$ $\qquad$ $\frac{1}{9} = 0.\overline{1}$ $\qquad$ $\frac{3}{9} = 0.\overline{33}$

$\frac{3}{4} = 0.75$ $\qquad$ $\frac{2}{9} = 0.\overline{22}$ $\qquad$ $\frac{4}{9} = 0.\overline{44}$

* Changing Fractions into decimals
  * divide the top by the bottom

ex $\frac{2}{5} = 2 \div 5 = 0.4$

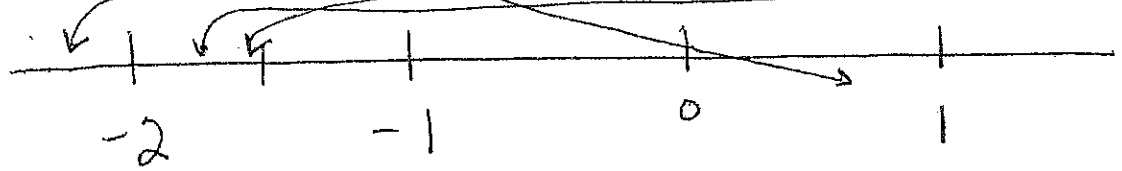
* Changing decimals to fractions:
  * remember place value

$0.2 = \frac{2}{10}$ $\qquad$ $0.348 = \frac{348}{1000}$

↑ 10ths place $\qquad$ ↑ thousandths place

* To put decimals or fractions in order use a number line

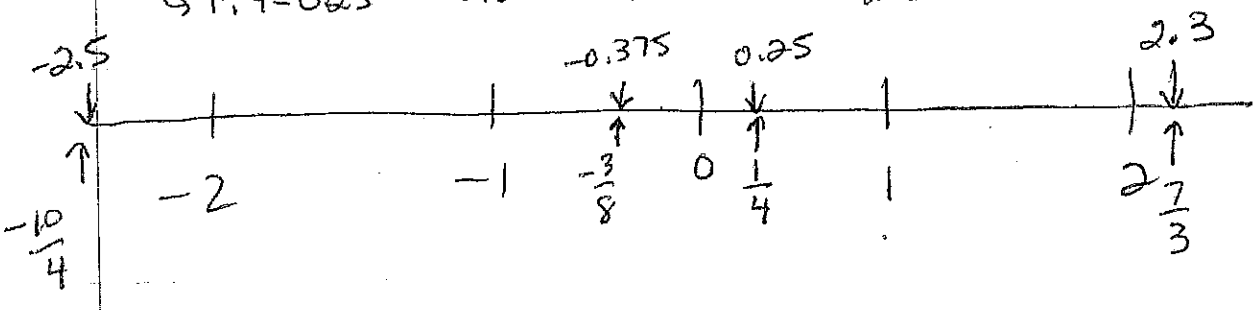
ex $0.7 \quad -2.3 \quad -0.6 \quad -0.\overline{6}$



* To order fractions - change into decimal form

$\frac{1}{4} \quad -\frac{3}{8} \quad -\frac{10}{4} \quad \frac{7}{3} \rightarrow 7 \div 3 = 2.\overline{3}$

$1 \div 4 = 0.25 \quad -3 \div 8 = -0.375 \quad -10 \div 4 = -2.5$



$\boxed{3.2}$ Adding Rational numbers

* find a common denominator

2 positive numbers

$\frac{2}{3} + \frac{1}{5} = \frac{5 \times 2}{15} + \frac{1 \times 3}{15} = \frac{10}{15} + \frac{3}{15} = \frac{13}{15}$

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1 positive + 1 negative

$\frac{2}{3} + \left(-\frac{1}{5}\right) = \frac{10}{15} + \frac{(-3)}{15} = \frac{10-3}{15} = \frac{7}{15}$

$\left(-\frac{2}{3}\right) + \frac{1}{5} = \frac{-10}{15} + \frac{3}{15} = \frac{-10+3}{15} = \frac{-7}{15}$

Adding mixed numbers

* find common denominator

2 positives

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

both go into 6
* only have to change 3

$3\frac{2\times1}{2\times3} + 2\frac{5}{6} = 3\frac{2}{6} + 2\frac{5}{6}$

add add

$= 5\frac{7}{6}$ pull out 1 who or $\frac{6}{6} = 5^{+1}\frac{7}{6}$

$= 6\frac{1}{6}$

1 positive and 1 negative

- find common denominator & change to improper fractions

$-3\frac{1}{3} + 2\frac{5}{6} = -3\frac{2}{6} + 2\frac{5}{6} \longrightarrow \frac{2\times6+5}{6} = \frac{17}{6}$

$-3\frac{2}{6} = \frac{3\times6+2}{6} = \frac{-20}{6}$

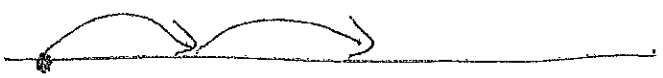
$= \frac{-20+17}{6} = \frac{-3}{6}$ or $-\frac{1}{2}$

3.3 subtracting

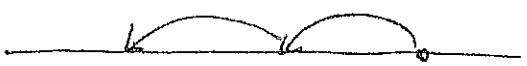
* remember $-(-2) = +2$

Using a number line

add positive



add negative



* same as subtracting positive.

3.4 multiplying rational numbers

mult + divide rules

Integer Rules

$- \times - = +$ ex. $-9 \times 2 = -18$

$- \times + = -$ $\quad -9 \times -2 = +18$

$+ \times - = -$ $\quad 9 \times -2 = -18$

$+ \times + = +$ $\quad 9 \times 2 = 18$

To multiply fractions (same above rules apply)

* change all mixed numbers into improper fractions $\longrightarrow 2\frac{1}{3} = \frac{7}{3}$

* multiply straight across (* dont forget to cross reduce if you can!)

ex $2\frac{1}{3} \times 1\frac{1}{2} = \frac{7}{3} \times \frac{3}{2} = \frac{7}{2}$ or $3\frac{1}{2}$

3.5 Dividing fractions

* follow rules from multiplying then flip the 2nd number

$2\frac{1}{3} \div 1\frac{1}{2} = \frac{7}{3} \div \frac{3}{2} = \frac{7}{3} \times \frac{2}{3} = \frac{14}{9}$ or $1\frac{5}{9}$

3.6 * Dont forget BEDMAS!!