FRACTIONS

A fraction is a part of whole and is written as $\frac{a}{b}$, where 'a' and 'b' are integers and $b \neq 0$ Ex: $\frac{2}{3}$

- The upper trem 'a' is called as "numerator" and lower term 'b' is called the "denominator".Thus $\boldsymbol{Fraction} = \frac{\text{Numerator}}{\text{Demominator}}$
- Value of fraction =1, if **numerator = denominator**
- Value of fraction =0, if **numerator = 0; and denominator ≠ 0**
- Value of fraction is not defined if **denominator = 0**
- Value of fraction remains unaltered if it is multiplied and divided by same number

KINDS OF FRACTIONS:

Simple Fraction
- Fraction whose both terms integers. Ex : 3/8, -7/3

Complex Fraction
- Fraction whose one or both terms are fractional numbers. Ex: 5/(8÷2) ; (9÷3)/(8÷2)

Decimal Fraction
- Faction with denominator 10, 100, 1000, 10000.....Ex: 5/10, 56/100

Vulgar Fraction
- Fraction whiose denominators are not 10, 100, 1000...Ex: 3/8, 4/2

Proper Fraction
- Fraction whose numnerator is less than or positive than its denominator. Ex-5/12, 135/245

Improper Fraction
- Fraction whose numnerator is greater than its denominator. Ex-12/7, 335/245

Mixed Fraction
- Fraction expressed as combination of an integer and a proper fraction.

Decimal Fraction $\frac{3471}{100} = 34.71$ **read as thirty four point seven one and 34 is the integral part and 0.71 is the decimal part.**

Adding or removing zeros at its extreme right will not change the value of fraction Ex: 4.3=4.300; 3.6800=3.68

Converting Decimal Fraction to Vulgar Fraction

1. Remove decimal point and write resulting number as numerator and in denominator add as many zeros to right of one (1) as decimal places in given number Ex:$0.088 = \frac{8}{1000}$

2. Reduce to simplest form $\frac{8}{1000} = \frac{11}{125}$

- **Improper fraction expressed as Mixed fraction**.
  Ex: $\frac{49}{12}$ can be written as $4\frac{5}{12}$ On dividing 49 by 12 we get 4 as quotient (Integer) as 5 as remainder (Numerator) and denominator is unaltered
- **Mixed fraction expressed as Improper fraction.**
  Ex: $5\frac{7}{8}$ can be written as $\frac{47}{8}$; Numerator = (5×8) + 7 = 40 + 7 = 47 and Denominator is unaltered.

FRACTIONS

Equivalent Fractions

- **Fractions having same value are called equivalent fractions.**
  Ex: 20/25 Dividing numnerator and denominator by 5 we get 4/5.
  28/35 on dividing by 7 we get 4/5 .
  Hence 20/25 and 28/35 are equivalent fractions

Like Fractions

- Fractions having same denominators are called like fractions.
  Ex: 3/8, 5/4, 9/8.....

Unlike Fractions

- Fractions with different denominators are called unlike fractions.
  Ex: 2/6, 7/5, 9/3.....

BODMAS

- **B**racket **O**f **D**ivision **M**ultiplication **A**ddition and **S**ubtraction
  "of" between any two fractions is to be used as multiplication

Converting Unlike to like fractions:

- **Find LCM of denominators of all given fractions**
- **Multiply each fraction's numerator and denominator with same number such that denominator is equal to the LCM**

$$\frac{3}{4},\frac{3}{5},\frac{7}{8},\frac{9}{16} \gg Lcm\ of\ 4,5,7,8\ is\ 80\ \frac{3\times20}{4\times20},\frac{3\times16}{5\times16},\frac{7\times10}{8\times10},\frac{9\times5}{16\times5}=\frac{60}{80},\frac{48}{80},\frac{70}{80},\frac{45}{80}$$

Comparing Fractions: Convert the fractions into like fractions and then the fraction with the greater numerator is greater.

Inserting Fraction between given fraction:

- **Add numerator of the given fractions to get the required numerator**
- **Similarly add denominator to get the required denominator**

$$\frac{3}{4},\frac{5}{6},\gg\frac{3}{5},\ \frac{3+5}{4+6},\frac{5}{6}\gg>\frac{3}{5},\ \frac{8}{10},\frac{5}{6}$$

Fundamental Operations on Fractions

Multiplication

- **Multiplication by an integer** Keep denominator unchanged, multiply numerator by integer and simplify Ex: $4\times\frac{4}{12}=\frac{16}{12}=\frac{4}{3}$
- **Multiplication by fraction** Multiply numerators together and denominators separately together and simplify Ex: $\frac{3}{2}\times\frac{4}{12}=\frac{3\times4}{12\times2}=\frac{12}{24}=\frac{1}{2}$

FRACTIONS

Addition and Subtraction

- **Fractions having same denominator** $6\frac{2}{5}\ and\ 4\frac{4}{5}$
  Convert into improper fraction $\frac{32}{5} \pm \frac{24}{5}$
  Add / Sub the numerators of each fraction and denominator is retained. $\frac{32 \pm 24}{5}$ If the resultant is improper fraction convert to Mixed fraction
- **Fractions having different denominator** $6\frac{2}{5}\ and\ 4\frac{4}{4}$
  Convert into improper fraction $\frac{32}{5} \pm \frac{20}{4}$ Take L.C.M of numerators L.C.M (5,4)=20 which is the denominator Multiply each fraction with LCM resultant are added/subtracted to numerator $\left(\frac{32}{5} \times 20\right) \pm \left(\frac{20}{4} \times 20\right)$=(32×4)± (20×5) = 128±100

Division

- **Division in fraction** Multiply fraction by the reciprocal of the divisor and simplify Ex: $\frac{4}{12} \div \frac{4}{2} = \frac{4}{12} \times \frac{2}{4} = \frac{1}{6}$
- **Division in decimal fraction** Division by 10, 100,1000,…..shift decimal point to left as many digits as the number of zeros Ex: $43.4 \div 100 = 0.434$
- **Division of decimal fraction by an integer** is done like ordinary division and the decimal point is placed to quotient such that its number of digits after decimal point is equal to digits after decimal point in the dividend
  Ex: $5.64 \div 2 = 2.82$