BASIC OPERATIONS ON FRACTIONS

Addition and Subtraction

We can only add or subtract the numerators of fractions directly if they have the same denominators. For example,

$$\frac{2}{9}+\frac{5}{9}=\frac{2+5}{9}=\frac{7}{9}$$

If fractions have different denominators, we follow the following steps to perform either addition or subtraction operations on them:

a. Find a common denominator (preferably the lowest)
b. Express each fraction as an equivalent fraction using that denominator
c. Add or subtract the numerators

Example: $\frac{5}{6}+\frac{3}{8}$

Solving

The LCM of 6 and 8 is 24

$$\frac{5}{6}+\frac{3}{8}=\frac{5\times 3}{6\times 4}+\frac{3\times 3}{8\times 3}=\frac{20}{24}+\frac{9}{24}=\frac{20+9}{24}=\frac{29}{24}$$

Multiplication

$4\times\frac{1}{3}$ means $\frac{1}{3}$ plus itself into 4 places or times, i.e.

$$\frac{1}{3}+\frac{1}{3}+\frac{1}{3}+\frac{1}{3}=\frac{1+1+1+1}{3}=\frac{4}{3}$$

We solve this simply by multiplying the whole number to the numerator of the fraction.

$$4\times\frac{1}{3}=\frac{4\times 1}{3}=\frac{4}{3}$$

$\frac{2}{3}\times\frac{5}{7}$ can be multiplied simply by multiplying the numerators together and the denominators together.

$$\frac{2}{3}\times\frac{5}{7}=\frac{2\times 5}{3\times 7}=\frac{10}{21}$$

Division

Every fraction has its reciprocal or opposite. Its reciprocal is formed by turning its numbers upside down. For example: $\frac{20}{13}$, its reciprocal is $\frac{13}{20}$.

To divide by a fraction, simply means to multiply with its reciprocal. For example:

$$21 \div \frac{20}{13} = 21 \times \frac{13}{20} = \frac{283}{20}$$