HANDOUT-4/4

Addition and Subtraction of Fractions

Addition and subtraction of fractions are discussed here with examples.

To add or subtract two or more fractions, proceed as under:

(i) Convert the mixed fractions (if any.) or natural numbers to improper fraction.

(ii) Find the L.C.M of the denominators of the fractions and place the L.C.M below a horizontal bar.

(iii) The L.C.M is then divided by each denominator and the quotient is multiplied to the corresponding numerator. The results obtained are placed above the horizontal bar with proper sign (+) or (-) to obtain a single fraction.

(iv) Reduce the fraction obtained to simplest form and then convert it into mixed form if needed.

In order to add or subtract like fractions, we add or subtract their numerators

Examples on addition or subtraction with like fractions; *and retain the common denominator.*

(i) 5/8 + 2/8

= (5 + 2)/8

= 7/8

(ii) 11/5 − 7/15

= (11 − 7)/15

= 4/15

(iii) 16/5 − 3/5 + 2/5 − 9/5

= (16 − 3 + 2 - 9)/5

= (18 − 12)/5

= 6/5

(iv) $4^2/_3 + 1/3 - 4^1/_3$

= (4 × 3 + 2)/3 + 1/3 − (4× 3 + 1)/3

= 14/3 + 1/3 − 13/3

= 2/3

In order to add and subtract unlike fractions, we follow the following steps:

STEP I: Obtain the fractions and their denominators.

STEP II: Find the LCM of the denominators.

STEP III: Convert each of the fraction into an equivalent fraction having its denominator equal to the Least Common Multiple (LCM) obtained in step II.

STEP IV: Add or subtract like fractions obtained in **step III**.

= 2/3

Examples on addition or subtraction with unlike fractions;

Examples on addition or subtraction with unlike fractions

1. Add:

(i) 7/10 + 2/15

(ii) $2^2/_3 + 3^1/_2$

Solution:

(i) 7/10 + 2/15

$$
\begin{array}{r|rr}
5 & 10, & 15 \\
\hline
 & 2, & 3
\end{array}
$$

LCM of 10 and 15 is (5 × 2 × 3) = 30.

So, we convert the given fractions into equivalent fractions with denominator 30.

7/10 = (7× 3)/(10 × 3) = 21/30 , and 2/15 = (2 × 2)/(15 × 2) = 4/30

Therefore, 7/10 + 2/15

= 21/30 + 4/30

= (21 + 4)/30

=

$$\frac{\overset{5}{\cancel{25}}}{\underset{6}{\cancel{30}}}$$

= 5/6

(ii) 2²/₃3 + 3¹/₂

= (2 × 3 + 2)/3 + (3 × 2 + 1)/2

= 8/3 +7/2

= (8× 2)/(3× 2)+ (7× 3)/(2× 3)

[Since least common multiple (LCM) of 3 and 2 is 6; so, convert each fraction to an equivalent fraction with denominator 6]

= 16/6 + 21/6

= (16 + 21)/6

= 37/6

2. Simplify:

(i) 15/16 – 11/12

(ii) 11/15 – 7/20

(i) 15/16 – 11/12

$$\begin{array}{c|cc} 4 & 16, & 12 \\ \hline & 4, & 3 \end{array}$$

Least common multiple (LCM) of 16 and 12 = (4 × 4 × 3) = 48.

= (15 × 3)/(16 × 3) – (11 × 4)/(12 × 4)

[Converting each fraction to an equivalent fraction with denominator 48]

= 45/48 – 44/48

= (45 – 44)/48

= 1/48