

ACTIVITY

3



Title

Addition of Rational Numbers.



Objective

To learn addition of rational numbers with the help of number line.



Prerequisite knowledge

1. Concept of rational numbers.
2. Concept of number line.



Materials required

A drawing sheet, a scale, a pencil, a rubber and a compass.



Procedure

1. Addition of rational numbers with same denominator :

- (a) Let us add two rational numbers (say $\frac{-14}{3}$ and $\frac{5}{3}$). Draw a number line on drawing sheet.

On the number line each unit is divided into 3 - divisions (*i.e.*, each division is $\frac{1}{3}$).



Fig. (i)

To add $\frac{-14}{3}$ and $\frac{5}{3}$, start from $\frac{-14}{3}$ and move 5 divisions to the right of $\frac{-14}{3}$ *i.e.*, making 5 divisions jump to the positive side we reach $\frac{-9}{3}$ or -3 as shown in [Fig. (ii)].

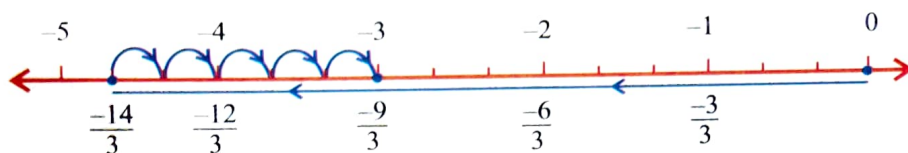


Fig. (ii)

(b) Let us add two rational numbers say $\frac{9}{4}$ and $\frac{3}{4}$. Draw a number line on a drawing sheet.

Now on the number line each unit is divided into 4-divisions (*i.e.*, each division is $\frac{1}{4}$).

To add $\frac{9}{4}$ and $\frac{3}{4}$, start from $\frac{9}{4}$ and move 3 divisions to the right of $\frac{9}{4}$ *i.e.*, making 3 divisions jump to the positive side we reach $\frac{12}{4}$ or 3 as shown in [Fig. (iii)].

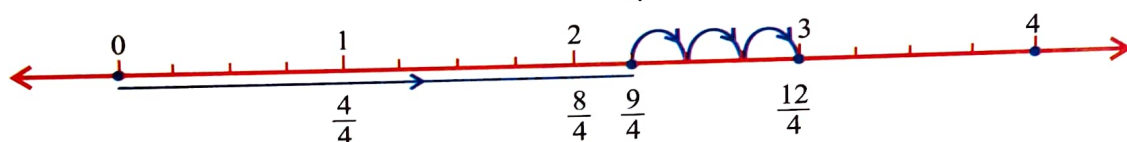


Fig. (iii)

2. Addition of rational numbers with different denominators :

Let us add two rational numbers $\frac{5}{3}$ and $-2\frac{1}{2}$. First we find equivalent fraction of both the rational numbers.

$$\text{i.e., } \frac{5}{3} = \frac{5 \times 2}{3 \times 2} = \frac{10}{6}$$

$$\text{and } -2\frac{1}{2} = \frac{-5}{2} = -\frac{5 \times 3}{2 \times 3} = \frac{-15}{6}$$

Hence on the number line each unit is divided into 6 divisions (*i.e.*, each division is $\frac{1}{6}$).

To add $\frac{10}{6}$ and $\frac{-15}{6}$, start from $\frac{10}{6}$ and move 15 divisions to the left of $\frac{10}{6}$ *i.e.*, making

15 divisions jump to the negative side we reach $-\frac{5}{6}$ as shown in [Fig. (iv)].

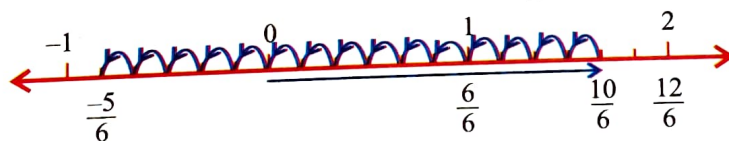


Fig. (iv)



Observation

1. If the rational numbers (addends) are of the same sign, add and put the sign of the rational numbers (addends).
2. If the rational numbers (addends) are of different signs, find the difference and the sign of the bigger fraction is placed before the answer.



Result

1. We find that while adding rational numbers with the same denominator, we add only the numerators keeping the denominator same.
2. Two rational numbers with different denominators are added by first taking the L.C.M. of the two denominators and then converting both the rational numbers to their equivalent forms having the L.C.M. as the denominator.



Learning outcome

Students will learn to add two rational numbers with same or different denominators.



Activity time

With the help of number line, evaluate the values of

(a) $\frac{3}{7} + \frac{7}{3}$

(b) $\frac{-3}{16} + \left(\frac{-2}{32}\right)$

Remarks / Notes

1. A rational number is of the form $\frac{p}{q}$, p and q are integers and $q \neq 0$.
2. There are infinite rational numbers between two distinct rational numbers.