B.B.S.S Sec School

Class - VIIIth   Sub - Maths

Ch-1 Rational Numbers

Rational Number →

Any number which can be expressed in the form of $\frac{a}{b}$, where a and b are integers and $b \neq 0$ is called a rational number.

Addition of Rational Numbers →

(i) When denominators are same.

If $\frac{a}{b}$ and $\frac{c}{b}$ are two rational numbers, then $\frac{a}{b}+\frac{c}{b}=\frac{a+c}{b}$

(ii) When denominators are different.

If $\frac{a}{b}$ and $\frac{c}{d}$ are two rational numbers, then $\frac{a}{b}+\frac{c}{d}=\frac{ad+bc}{bd}$

Example (i) $\frac{7}{15}+\frac{4}{15}=\frac{7+4}{15}$ $=\frac{11}{15}$ (ii) $\frac{7}{15}+\frac{4}{5}=\frac{7\times1+4\times3}{15}=\frac{7+12}{15}=\frac{19}{15}$

Subtraction of Rational numbers:

(i) Subtracting $\frac{a}{b}$ from $\frac{c}{d}$ means adding the negative of $\frac{a}{b}$ to $\frac{c}{d}$ i, e $\frac{c}{d}-\frac{a}{b}=\frac{c}{d}+\left(\frac{-a}{b}\right)$

(ii) Subtracting $\frac{c}{d}$ from $\frac{a}{b}$ means adding the negative of $\frac{c}{d}$ to $\frac{a}{b}$ i, e $\frac{a}{b}-\frac{c}{d}=\frac{a}{b}+\left(\frac{-c}{d}\right)$

Multiplication Of Rational Numbers:

If $\frac{a}{b}$ and $\frac{c}{d}$ are two rational numbers, then $\frac{a}{b}\times\frac{c}{d}=\frac{a\times c}{b\times d}$

Division Of Rational Numbers:

$\frac{a}{b}$ and $\frac{c}{d}$ be any two rational numbers. Then to divide $\frac{a}{b}$ by $\frac{c}{d}$ $(d\neq0)$ we multiply $\frac{a}{b}$ by the multiplicative inverse of $\frac{c}{d}$ i,e. $\frac{d}{c}$.

Absolute value of Rational Number:

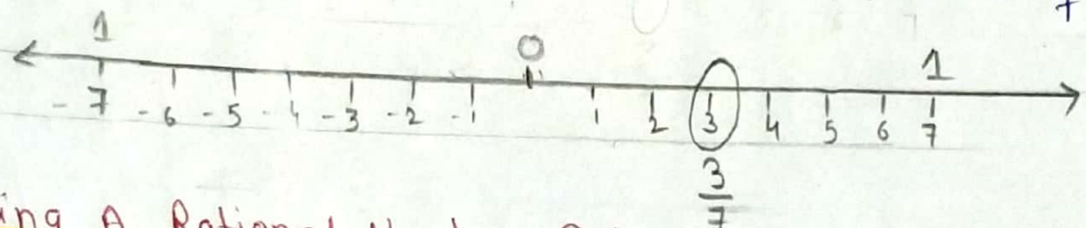
The absolute value of an integer is the number with no regard to its sign.

absolute value of $-3=|-3|=3$, absolute value of $\frac{-3}{-4}=\left|\frac{-3}{-4}\right|=\frac{3}{4}$

Representation of Rational Numbers on Number line:

To represent a Rational Number $\frac{3}{7}$ on number line:

Since $\frac{3}{7}$ can not be expressed as a mixed fraction, divide the unit part 1 in 7 equal parts, where 3rd part represents $\frac{3}{7}$ as shown.



Finding A Rational Number Between Two Given Rational Numbers:

Step-1: Express the given rational numbers with the same denominators.

Step-2: Find the different values of integers which lie between the numerator parts of two rational numbers having same denominator.

Step-3: Take the integer found in step 2 as numerator to express the different rational numbers.

Eg- Insert 5 rational numbers between $\frac{1}{5}$ and $\frac{2}{5}$

$$\frac{1}{5} \times \frac{7}{7} = \frac{7}{35}$$

$$\frac{2}{5} \times \frac{7}{7} = \frac{14}{35}$$

$\frac{8}{35}, \frac{9}{35}, \frac{10}{35}, \frac{11}{35}, \frac{12}{35}$ lie between $\frac{7}{35}$ and $\frac{14}{35}$, i.e. between $\frac{1}{5}$ and $\frac{2}{5}$

Assignment

1. Add: (i) $\frac{3}{55}, \frac{-40}{55}$ (ii) $\frac{4}{15}, \frac{2}{-5}$ (iii) $3\frac{3}{7}, 4\frac{2}{4}$

2. Subtract: (i) $\frac{-13}{33}$ from $\frac{-7}{11}$ (ii) $\frac{-13}{5}$ from $\frac{12}{7}$

3. multiply (i) $3\frac{3}{4}$ by $3\frac{1}{7}$ (ii) $\frac{19}{5}$ by $\frac{15}{57}$ (iii) $\frac{-13}{3} \times 0$

4. divide (i) $\frac{2}{5} \div \frac{-10}{4}$ (ii) $0 \div \frac{3}{4}$ (iii) $\frac{9}{5} \div \frac{3}{-10}$

5. Represent the following rational numbers on number line:
(i) $-\frac{4}{5}$ (ii) $\frac{13}{3}$ (iv) $-\frac{23}{7}$ (v) $\frac{-7}{8}$

6. Insert 10 rational numbers between:
(i) $\frac{3}{8}$ and $\frac{-1}{2}$ (ii) $\frac{-10}{17}$ and $\frac{-11}{17}$ (iii) $\frac{-3}{11}$ and $\frac{-1}{13}$

Standard form of rational numbers →

The standard form of a rational number can be defined if it's no common factors aside from one between the dividend and divisor and therefore the divisor is positive.

For Example, $\frac{12}{36}$ is a rational number. But it can be simplified as 1/3; common factors between the divisor and dividend is only one. So we can say that rational number 1/3 is in standard form.

Rational numbers properties:

i. The result of two rationals is always a rational number is we multiply, add or subtract them.

ii A rational number remain the same is we divide or multiply both numerator and denominator with the number.

iii Sum of zero and a rational number revert the same number itself.

iv The product of two rational number is always a rational number

v When a rational numbe is divided by a non zero, rational number, then the quotient is also a rational number.

Note → Do page no. 24, 26, 29, 32, 33, 35 and 36 in your note book.