# Rational Numbers

The numbers of the form $\frac{a}{b}$ where a and b are integers and $b \neq 0$, are called rational numbers.

Ex. $\frac{5}{8}, 1, \frac{-3}{7}$

Chart

## Standard form

A rational number is said to be in standard form $(\frac{a}{b})$ if a and b are integers having no common factor other then 1, and b is positive.

Ex. Standard form of $\frac{24}{-15}$ is $\frac{-8}{5}$

## Rational No. Between two Rational No.

Q. Insert 5 rational number between $\frac{3}{8}$ and $\frac{5}{6}$

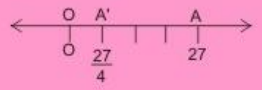
Sol. LCM of 8, 6 is 24

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

5 rational no. between $\frac{3}{8}$ and $\frac{5}{6}$ are $\frac{10}{24}, \frac{11}{24}, \frac{12}{24}, \frac{13}{24}, \frac{14}{24}$

## Graphical Representation

Q. Represent $\frac{27}{4}$ an number line




Mark point A and divide OA into four equal part then OA' will represents $\frac{27}{4}$

## Operation on rational Number

1. Addition

Ex. Add $\frac{3}{7}$ and $-\frac{2}{5}$

Sol. $\frac{3}{7} + \left(-\frac{2}{5}\right)$

$= \frac{3}{7} - \frac{2}{5} = \frac{15-14}{35} = \frac{1}{35}$

2. Subtraction

Ex. Subtract $-\frac{3}{2}$ from $\frac{1}{5}$

Sol. $\frac{1}{5} - \left(-\frac{3}{2}\right) = \frac{1}{5} + \frac{3}{2} = \frac{2+15}{10} = \frac{17}{10}$

3. Multiplication

Ex. Multiply $-\frac{3}{2}$ from $\frac{1}{5}$

Sol. $-\frac{3}{5} \times \frac{2}{7} = -\frac{6}{35}$

4. Division

Ex. Divide $-\frac{3}{2}$ from $\frac{5}{4}$

Sol. $\frac{3}{2} \div -\frac{5}{4} = \frac{3}{2} \times \frac{4}{-5} = -\frac{6}{5}$

| Property / Operation | Closure | Commutative | Associative | Distributive |
|---|---|---|---|---|
| Addition | ✓ | ✓ | ✓ | ✓ |
| Subtraction | ✓ | × | × | × |
| Mutiplication | If a , b are rational then a × b is also rational | a × b = b × a | a ×(b×c) = (a×b)×c | a ×(b+c) = a×b + a×c<br>a ×(b−c) = a×b − a×c |
| Division | ✓ | × | × | × |

in above table a, b, c are rational number

## Important Points

1. Multiplicative inverse of a is $\frac{1}{a}$.
2. Multiplicative identity is 1.
3. Additive identity is 0.
4. Additive inverse of a is −a.
5. Absolute value of a number is it's numerical value (value without sign).