



STUDY COURSE MATERIALS

CLASS-VIII(2020-21)

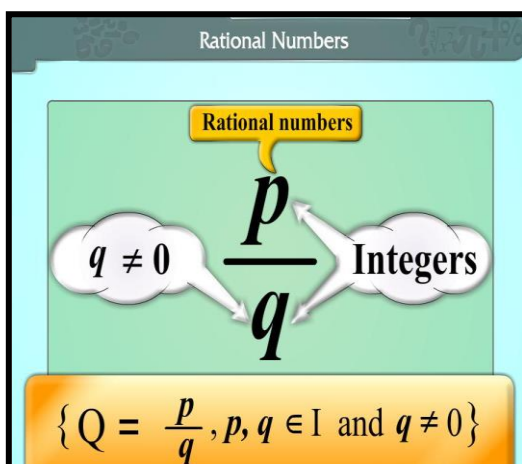
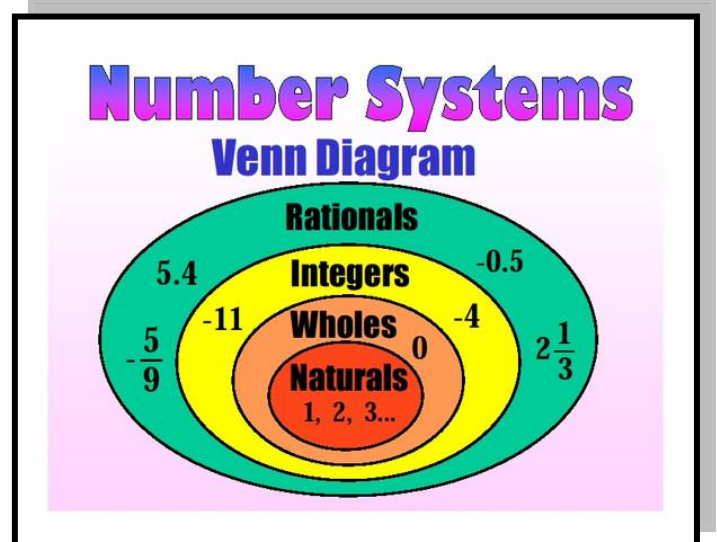
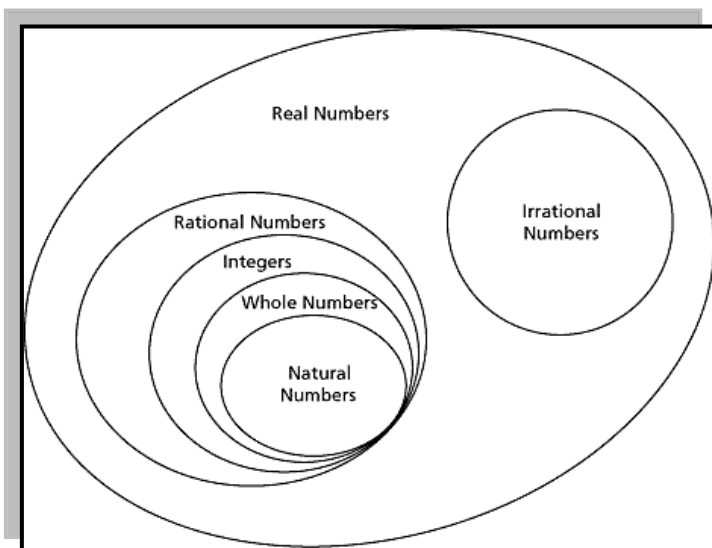
MATHS

RATIONAL NUMBERS

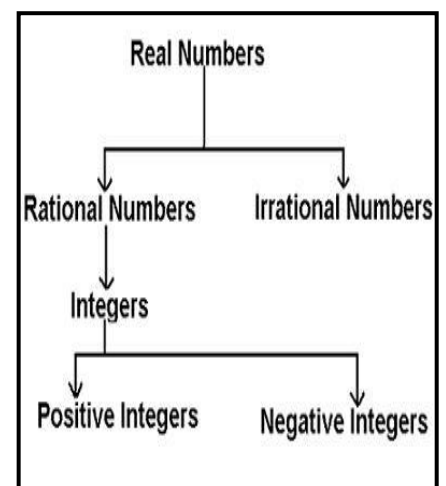
RATIONAL NUMBERS: Those numbers which are in the form of p/q where both p and q are integers and $q \neq 0$ are called rational numbers.

Ex $2/3, 8/9, 0$.

- ❖ A rational number is said to be positive if its numerator and denominator are either positive or negative.
- ❖ A rational number is said to be negative if its numerator and denominator are of opposite signs.
- ❖ A rational number a/b is said to be in standard form if a and b are integers having no common divisor except 1 and a and b are positive
- ❖ 0 is called the identity element for addition of rational numbers.



\mathbb{N} = the set of natural numbers
 \mathbb{Q} = the set of rational numbers
 \mathbb{R} = the set of real numbers
 \mathbb{P} = the set of prime numbers
 \mathbb{Z} = the set of integers
 \mathbb{E} = the set of even integers
 \mathbb{O} = the set of odd integers



Some irrational numbers - first few decimal digits:

π	=3.14159265358979323846264338327950288419716939...
$\sqrt{2}$	=1.4142135623730950488016887242096980785696718753769...
$\sqrt{3}$	=1.73205080756887729352744634150587236694280525381...

Properties of addition of Rational numbers

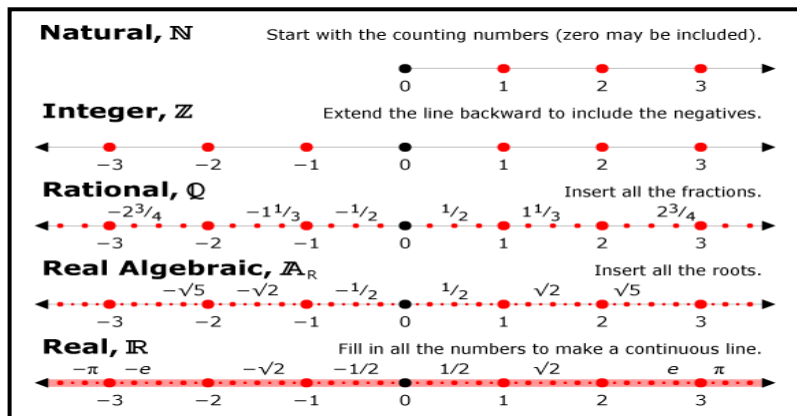
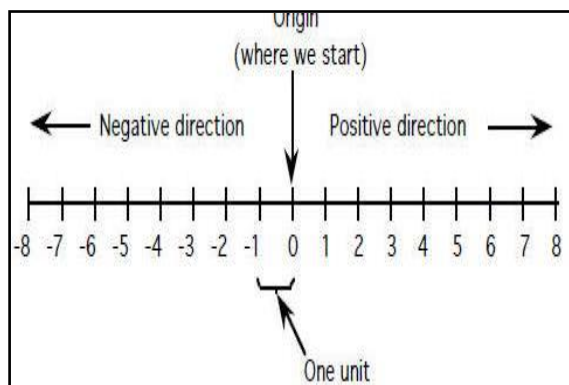
1. **Closure property** - The sum of any two rational numbers is always a rational number.
2. **Commutative property** - If a and b are two rational numbers ,then $a + b = b + a$
3. **Associative property** - If a,b,c are three rational numbers ,then $a + (b + c) = (a + b) + c$
4. **Additive identity** - The sum of any rational number and 0 is the rational number itself.

Properties of subtraction of Rational numbers

1. **Closure property** - If a and b are two rational numbers, then $a - b$ is also a rational number.
2. **Commutative property** - The subtraction of rational numbers is not always commutative.
3. **Associative property** - The subtraction of rational numbers is not associative.

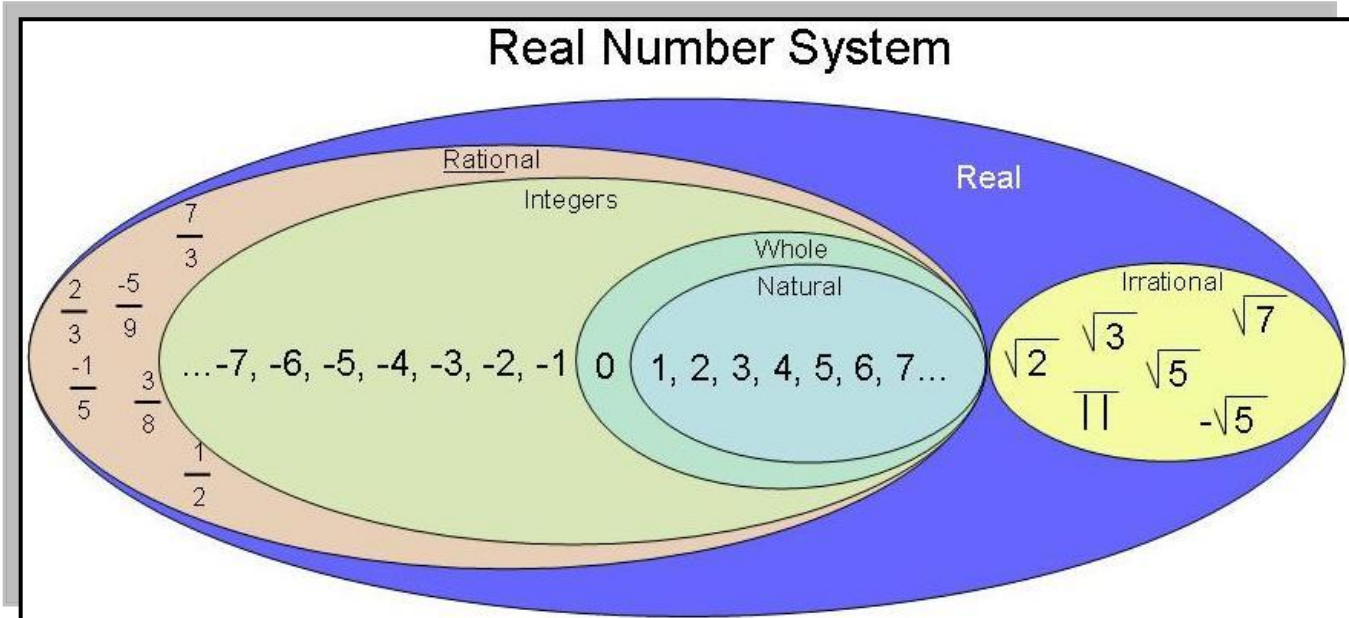
Properties of multiplication of Rational numbers

1. **Closure property**- the product of any two rational numbers is always a rational number.
- 2 **Commutative property** - If a and b are two rational numbers, then. $a \times b = b \times a$
3. **Associative property** - If a, b, c are three rational numbers, then $a \times (b \times c) = (a \times b) \times c$



- To find rational numbers between given two rational numbers - If a and b are two rational numbers where $a < b$, then $(a + b)/2$ is a rational number between a and b and same process to be continued to get more rational numbers.

Real Number System



ASSIGNMENT Section A

Write the correct answer in each of the following:

- What should be subtracted from $-3/5$ to get -2 ?
a) $7/5$ b) $-13/5$ c) $13/5$ d) None of these
- What is the additive inverse of $9/5$?
a) $-9/5$ b) 0 c) $5/9$ d) None of these
- What is the reciprocal of $-3/4$?
a) $4/3$ b) $3/4$ c) $-4/3$ d) None of these
- Which of the following numbers is in standard form?
a) $-12/26$ b) $-49/70$ c) $-3/5$ d) $2/-10$
- A rational number between $-2/3$ and $1/4$ is
a) $5/12$ b) $-5/12$ c) $-5/24$ d) $5/24$

SECTION B

- List the properties of addition that are satisfied by the following statements.
 - $\frac{1}{3} + \frac{5}{9} = \frac{5}{9} + \frac{1}{3}$
 - $\left(\frac{7}{8} + \frac{3}{8}\right) + \frac{5}{8} = \frac{7}{8} + \left(\frac{3}{8} + \frac{5}{8}\right)$
- Draw a number line and represent the following rational numbers on it.
 - $1/2$ b) $1/3$ c) $7/6$ d) $11/6$
- Using rearrangement property find the sum of the following.
 - $\frac{4}{3} + \frac{3}{5} + \frac{-2}{3} + \frac{-11}{5}$
 - $\frac{4}{7} + \frac{-8}{9} + \frac{-5}{21} + \frac{1}{3}$
- Simplify the following expressions

$$a) \frac{-2}{5} - \left(\frac{-3}{10}\right) - \left(\frac{-4}{15}\right)$$

$$b) \frac{5}{3} - \frac{7}{6} + \left(\frac{-2}{3}\right)$$

10. Verify that $a+b=b+a$, using the values of a and b given below:

$$a) a = \frac{2}{3} \quad b = \frac{-3}{5}$$

$$b) a = \frac{-1}{8} \quad b = \frac{4}{5}$$

SECTION - C

11. The sum of two rational numbers is -2 . If one of the numbers is $-14/5$, find the other.

12. The product of two numbers is $-28/27$. If one of the numbers is $14/9$. Find the other.

13. Find $(x+y) \div (x-y)$ if $x = 2/7$ and $y = 4/3$

14. What should be added to $\left(\frac{1}{2} + \frac{1}{3} + \frac{1}{5}\right)$ to get 7 ?

15. Arrange the following in ascending order.

a) $-4/9, -5/12, 7/-18, -2/3$ ($-2/3, -4/9, -5/12, 7/-18$)

b) $-3/5, 7/-10, -5/8$ ($7/-10, -5/8, -3/5$)

SECTION - D

16. Find 10 rational numbers between $1/8$ and $1/2$.

17. Amit earns Rs 16000 per month. He spends $1/4$ of his income on food, $3/10$ of the remainder on house rent and $5/21$ of the remainder on the education of the children. How much money is still left with him?

18. An aero plane covers 1020 km in an hour. How much distance will it cover in $4 \frac{1}{6}$ hours?

19. Divide the sum of $-8/7$ and $3/14$ by their difference.

20. Find a) 7 Rational numbers b) 70 rational numbers c) 100 rational numbers between $1/3$ and $3/5$

21. Represent following rational numbers on same number line $2/3, -1/5$ and $3/15$

22. The perimeter of an isosceles triangle is $10 \frac{3}{4}$ and if one of the equal side is $2 \frac{3}{4}$ find the third side

23. If $a = -2/3, b = 5/6$ and $c = -5/8$ then verify $(a+b)+c = a+(b+c)$

24. Express $17/-4$ as rational number with

a) numerator = -51

b) denominator = -20

25. Rohit travelled $9/8$ km from home to school, $5/6$ km from school to skating rink, $2/3$ km from skating rink to work and $5/16$ km from work to his home. How many km did Rohit travelled.