Class 9 Maths - Number Systems

Number Systems - Class 9

1. What Are Number Systems?

A number system is a way to express numbers using digits or symbols.

Types of Numbers:

- Natural Numbers (N): 1, 2, 3, ...
- Whole Numbers (W): 0, 1, 2, 3, ...
- Integers (Z): ..., -2, -1, 0, 1, 2, ...
- Rational Numbers (Q): Numbers that can be written as p/q (e.g., 1/2, -3)
- Irrational Numbers: Cannot be written as p/q (e.g., sqrt(2), pi)
- Real Numbers (R): All rational and irrational numbers

2. Decimal Expansions:

- Terminating decimals: e.g., 0.75, 1.25
- Non-terminating, repeating decimals: e.g., 0.333..., 0.666...
- Irrational numbers have non-terminating, non-repeating decimals.

3. Representation on the Number Line:

- Rational numbers can be plotted on the number line.
- Irrational numbers like sqrt(2) can be represented geometrically.

4. Laws of Exponents for Real Numbers:

- a^m × a^n = a^(m+n)
- a^m ÷ a^n = a^(m-n)
- (a^m)^n = a^(mn)
- a^0 = 1 (where a != 0)
- a^(-n) = 1 / a^n

5. Important Notes:

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- Every natural number is a whole number.
- Every whole number is an integer.
- Every integer is a rational number.
- Every rational number is a real number.
- But the reverse is not always true.

This chapter lays the foundation for understanding algebra and higher-level math. Practice well!