• Introduction to Algebra

Algebra is the part of mathematics where we use letters/symbols to represent unknown numbers. Algebra helps in generalizing arithmetic and forming expressions, equations.

• Important terms

- **Constant**: A fixed value (e.g., 2, 5, 100)
- **Variable**: Variables represent unknown values. Symbol (like x, y, z) that can change**.**
- **Algebraic Expression**: Combination of constants, variables, and operations (e.g., $2x + 3$, $x – 4$).
- **Equation**: An expression with an equal sign (=), e.g., $x + 3 = 7$
- **Coefficient:** The numerical factor of a term is called the coefficient of the term. (e.g., in therm $2x$, 2 is the coefficient and in term xy, 1 is the coefficient

• Formation of Algebraic Expressions

- **Sum of a number and 4** → $x + 4$
- **A number decreased by 2** → $x – 2$
- **4 multiplied by a number** → $4x$
- **Half of a number** → $x \div 2$ or $x/2$
- **Twice a number plus three** → $2x + 3$
- **One-third of a number minus five** → $x/3 – 5$

• **Use of Variables in Common Rules**: Variables help write these general rules in short and simple form.

- **Commutative Law:** $a + b = b + a$
- **Distributive Law:** $a \times (b + c) = ab + ac$
- **Identity Property:** $a + 0 = a$, $a \times 1 = a$

• Solving Simple Equations

$x + 7 = 12$ → $x = 12 – 7 = 5$
$3x = 18$ → $x = 18 \div 3 = 6$

• Real-Life Examples

Let Riya’s age be x.
Her age 5 years later: $x + 5$
Her age 3 years ago: $x – 3$
Perimeter of a square with side x: $4x$