

GRADE 8 | 2024

Algebra: Expressions & Equations

Mathematics

CAPS ALIGNED

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1. Algebraic Expressions

An algebraic expression contains variables (letters), numbers, and operations. Examples: $3x + 2$, $2a - 5b + 1$.

Key Terms

- Term: a single number or variable or product ($3x$, $-5b$, 7)
- Coefficient: the number in front of the variable (in $3x$, the coefficient is 3)
- Like terms: terms with the same variable and exponent ($3x$ and $-2x$ are like terms)
- Constant: a term with no variable (the 7 in $3x + 7$)

2. Simplifying Expressions

Collect like terms by adding or subtracting their coefficients.

EXAMPLE: Simplify

$$\begin{aligned} 3x + 5y - x + 2y \\ = (3x - x) + (5y + 2y) \\ = 2x + 7y \end{aligned}$$

FORMULA: Distributive law: $a(b + c) = ab + ac$

EXAMPLE: Expand

$$3(2x - 4) = 6x - 12$$

3. Solving Linear Equations

The goal is to get the variable on its own (isolate it). Whatever you do to one side, do to the other.

EXAMPLE: Solve

$$\begin{aligned} 2x + 5 &= 13 \\ 2x &= 13 - 5 \\ 2x &= 8 \\ x &= 4 \end{aligned}$$

EXAMPLE: Solve with fractions

$$\begin{aligned} x/3 &= 4 \\ x &= 4 \times 3 = 12 \end{aligned}$$

4. Substitution

Replace variables with given values and calculate.

EXAMPLE: Substitute

$$\begin{aligned} \text{If } a = 2 \text{ and } b = -3, \text{ find } 3a - 2b \\ = 3(2) - 2(-3) = 6 + 6 = 12 \end{aligned}$$

KEY POINT: Always show every step. Marks are given for method, not just the answer.