

# Year 7 Algebra Cheat Sheet

## 1. Basic Algebraic Expressions

### Key Terms:

Variable: A letter representing an unknown number (e.g., x, y, a).

Constant: A fixed number (e.g., 5, -3,  $\frac{1}{2}$ ).

Coefficient: The number multiplying a variable (e.g., In  $3x$ , 3 is the coefficient).

Term: A single number or variable, or numbers and variables multiplied together (e.g., 4,  $2y$ ,  $5xy$ ).

Expression: A combination of terms (e.g.,  $3x + 2$ ).

### Simplifying Expressions:

Combine like terms (terms with the same variable):

$$3x + 5x = 8x$$

$$4y - y + 2 = 3y + 2$$

### Multiply terms:

$$2 \times 3a = 6a$$

$$x \times x = x^2$$

## 2. Solving Basic Equations

**Golden Rule:** What you do to one side of the equation, you must do to the other.

### One-Step Equations:

Addition:

$$x + 3 = 7 \rightarrow x = 7 - 3 \rightarrow x = 4$$

Subtraction:

$$x - 5 = 2 \rightarrow x = 2 + 5 \rightarrow x = 7$$

Multiplication:

$$2x = 10 \rightarrow x = 10 \div 2 \rightarrow x = 5$$

Division:

$$x \div 4 = 3 \rightarrow x = 3 \times 4 \rightarrow x = 12$$

### Two-Step Equations:

Undo addition/subtraction first.

Undo multiplication/division next.

$$3x + 1 = 10$$

$$\text{Step 1: } 3x = 10 - 1 \rightarrow 3x = 9$$

$$\text{Step 2: } x = 9 \div 3 \rightarrow x = 3$$

### 3. Formulas & Rules

Commutative Law:  $a + b = b + a$  (order doesn't matter for + and  $\times$ ).

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

$$\text{Example: } *3(x + 2) = 3x + 6*$$

### 4. Common Mistakes to Avoid

- ✗ Forgetting to combine like terms (e.g.,  $2x + 3 \neq 5x$ ).
- ✗ Not doing the same operation to both sides of an equation.
- ✗ Miswriting  $x^2$  as  $2x$  (they're different!).

### 5. Practice Problems (Answers Below)

Simplify:  $4y + 2 + 3y - 5$

Solve:  $2x - 7 = 11$

Expand:  $5(x + 4)$

Answers:

$$7y - 3$$

$$x = 9$$

$$5x + 20$$