

ALGEBRA

KEY FACTS



Learn it.
Use it.
Crack it!

Essential algebra facts you need to know at a glance!

<p>1. VARIABLES</p> <p>A variable is a letter that represents a number.</p> <p>Examples: x, y, a, b, m, n</p> <p>The value can change.</p>	<p>2. EXPRESSIONS</p> <p>An expression is a combination of numbers, variables and operations.</p> <p>Examples: $3x, 2y + 5, 4a - b + 7$</p>	<p>3. TERMS</p> <p>Terms are the parts of an expression separated by + or -.</p> <p>Examples: In $3x + 2y - 5$ Term 1 Term 2 Term 3</p>	<p>4. COEFFICIENTS</p> <p>A coefficient is the number multiplied by a variable.</p> <p>Examples: In $5x \rightarrow$ coefficient is 5 In $-3y^2 \rightarrow$ coefficient is -3</p>
<p>5. LIKE TERMS</p> <p>Like terms have the same variable part.</p> <p>Examples: Like terms: $3x$ and $-7x$ Not like terms: $3x$ and $2y$</p>	<p>6. COMBINING LIKE TERMS</p> <p>Add or subtract the coefficients. Keep the variable part the same.</p> <p>Examples: $4x + 7x = 11x$ $9a - 3a = 6a$</p>	<p>7. ORDER OF OPERATIONS</p> <p>Follow BIDMAS</p> <ul style="list-style-type: none"> B Brackets I Indices (Powers) D Division M Multiplication A Addition S Subtraction 	<p>8. EXPANDING BRACKETS</p> <p>Multiply the term outside the brackets by each term inside.</p> <p>Examples: $3(x + 4) = 3x + 12$ $-2(2y - 5) = -4y + 10$</p>
<p>9. FACTORISING</p> <p>Write an expression as a product of its factors.</p> <p>Examples: $x + x = x(1 + 1) = 2x$ $6x + 12 = 6(x + 2)$</p>	<p>10. SOLVING LINEAR EQUATIONS</p> <p>Find the value of the variable that makes the equation true.</p> <p>Examples: $2x + 5 = 15$ $2x = 10$ $x = 5$</p>	<p>11. ONE-STEP EQUATIONS</p> <p>Solve equations with one operation to undo.</p> <p>Examples: $x + 7 = 15 \rightarrow x = 8$ $3x = 21 \rightarrow x = 7$</p>	<p>12. TWO-STEP EQUATIONS</p> <p>Solve equations with two operations to undo.</p> <p>Examples: $2x + 5 = 17$ $2x = 12$ $x = 6$</p>
<p>13. INEQUALITIES</p> <p>Show that values are not equal.</p> <p>Examples: $x > 5$ (x is greater than 5) $x < 3$ (x is less than 3) $x \geq 2$ (x is greater than or equal to 2) $x \leq 7$ (x is less than or equal to 7)</p>	<p>14. SOLVING INEQUALITIES</p> <p>Do the same operation to both sides. Remember to flip the sign if you multiply or divide by a negative.</p> <p>Examples: $x + 4 > 10 \rightarrow x > 6$ $-2x > 8 \rightarrow x < -4$</p>	<p>15. SUBSTITUTION</p> <p>Replace the variable with a value and simplify.</p> <p>Examples: If $x = 3$, find $2x + 5$ $2(3) + 5 = 6 + 5 = 11$</p>	<p>16. FORMULAE</p> <p>Algebra is used in many formulae.</p> <p>Examples: Perimeter of a rectangle: $P = 2(l + w)$ Area of a rectangle: $A = lw$ Slope of a line: $m = \frac{y_2 - y_1}{x_2 - x_1}$</p>

17. LAWS OF INDICES

For any non-zero a and integers m, n :

- $a^m \times a^n = a^{m+n}$ Product rule
- $a^m \div a^n = a^{m-n}$ Quotient rule
- $(a^m)^n = a^{mn}$ Power of a power
- $a^0 = 1$ Zero index
- $a^{-n} = \frac{1}{a^n}$ Negative index

18. SPECIAL PRODUCTS

- $(a + b)^2 = a^2 + 2ab + b^2$
- $(a - b)^2 = a^2 - 2ab + b^2$
- $(a + b)(a - b) = a^2 - b^2$

19. STRAIGHT LINE ($y = mx + c$)

The equation of a straight line.

TIP! Practice a little every day and the facts will stick!

REMEMBER!

- ✓ Keep your signs correct.
- ✓ Simplify your answers.
- ✓ Check your solutions.
- ✓ Practice makes progress!

YOU'VE GOT THIS!
KEEP PRACTISING,
KEEP IMPROVING!