

Topic: Algebra

Topic/Skill	Definition/Tips	Example
Term	Either a single number or variable, or numbers and variables multiplied together	$4x$ or 7
Variable	A symbol , usually a letter , which represents a number which is usually unknown.	In the equation $x + 2 = 5$, x is the variable.
Expression	A mathematical statement written using symbols, numbers or letters	$3x + 2$ or $5y^2$
Equation	A statement showing that two expressions are equal	$2y - 17 = 15$
Identity	An equation that is true for all values of the variables An identity uses the symbol: $\equiv$	$2x \equiv x+x$
Formula	Shows the relationship between two or more variables	Area of a rectangle = length x width $A = L \times W$
Function	A special relationship where each input has a single output . It is often written as " f(x) " where x is the input value.	$f(x) = \frac{x}{2}$ ("f of x equals x divided by 2")
Simplifying Expressions	Collect 'like terms'. Be careful with negatives. x^2 and x are not like terms. x times x The answer is x^2 not $2x$. $p \times p \times p$ The answer is p^3 not $3p$ $p + p + p$ The answer is $3p$ not p^3	$2x + 3y + 4x - 5y + 3 = 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$ Squaring is multiplying by itself, not by 2. If $p=2$, then $p^3=2 \times 2 \times 2=8$, not $2 \times 3=6$ If $p=2$, then $2+2+2=6$, not $2^3 = 8$
Expand	To expand a bracket, multiply each term in the bracket by the expression outside the bracket.	$3(m + 7) = 3m + 21$
Factorise	The reverse of expanding . Factorising is writing an expression as a product of terms by ' taking out ' a common factor .	$6x - 15 = 3(2x - 5)$, where 3 is the common factor.
Solve	To find the answer /value of something Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter.	Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$
Inverse	Opposite	The inverse of addition is subtraction. The inverse of multiplication is division.
Substitution	Replace letters with numbers. Be careful of $5x^2$. You need to square first, then multiply by 5.	$a = 3, b = 2$ and $c = 5$. Find: 1. $2a = 2 \times 3 = 6$ 2. $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ 3. $7b^2 - 5 = 7 \times 2^2 - 5 = 23$

Linear Sequence	A number pattern with a common difference .	2, 5, 8, 11... is a linear sequence
Term	Each value in a sequence is called a term.	In the sequence 2, 5, 8, 11..., 8 is the third term of the sequence.
Term-to-term rule	A rule which allows you to find the next term in a sequence if you know the previous term .	First term is 2. Term-to-term rule is 'add 3' Sequence is: 2, 5, 8, 11...
Writing Formulae	Substitute letters for words in the question.	Bob charges £3 per window and a £5 call out charge. $C = 3N + 5$ Where N=number of windows and C=cost
nth term	A rule which allows you to calculate the term that is in the nth position of the sequence. Also known as the 'position-to-term' rule. n refers to the position of a term in a sequence.	nth term is $3n - 1$ The 100 th term is $3 \times 100 - 1 = 299$
Finding the nth term of a linear sequence	1. Find the difference . 2. Multiply that by n . 3. Substitute $n = 1$ to find out what number you need to add or subtract to get the first number in the sequence .	Find the nth term of: 3, 7, 11, 15... 1. Difference is +4 2. Start with $4n$ 3. $4 \times 1 = 4$, so we need to subtract 1 to get 3. nth term = $4n - 1$
Change the subject of an equation	Use inverse operations on both sides of the formula (balancing method) until you find the expression for the letter.	Make x the subject of $y = \frac{2x-1}{z}$ Multiply both sides by z $yz = 2x - 1$ Add 1 to both sides $yz + 1 = 2x$ Divide by 2 on both sides $\frac{yz + 1}{2} = x$ We now have x as the subject.
Quadratic	A quadratic expression is of the form $ax^2 + bx + c$ where a, b and c are numbers, $a \neq 0$	Examples of quadratic expressions: x^2 $8x^2 - 3x + 7$ Examples of non-quadratic expressions: $2x^3 - 5x^2$ $9x - 1$

Product of two linear expressions	When multiplying two linear expressions , every term in the first expression has to be multiplied by every term in the second expression.	$(y + 2)(y + 3)$ F: $y \times y = y^2$ O: $y \times 3 = 3y$ I: $2 \times y = 2y$ L: $2 \times 3 = 6$ $y^2 + 3y + 2y + 6 = y^2 + 5y + 6$
Where else is the Algebra topic used: Graphs Angles Measures Transformations		Links to other subjects: