

Algebra Vocabulary

Terms	A term is separated by a + or - sign E.g: $5x-3y+2$ There are 3 terms in this equation: $5x$, $-3y$ and 2
Coefficient	The number in front. E.g: In the term $5y$, y 's coefficient is 5
Constant	Constant is the single number which does not have any letters or numbers attached to it.
Like terms	Terms including <i>exactly</i> the same letter or combination of letters. E.g: $6p$, $8p$ and $5p$ are like terms ab , $10ab$ and $-2ab$ are like terms
Unlike terms	Terms which have different letters or combination of letters. E.g: $3x$ and $3y$ are unlike terms

Simplifying Expressions

Rule	Example
Any numbers in the expression are multiplied.	$5 \times 6x = 30x$
Numbers are placed in front of letters when multiplying.	$x \times 3y = 3xy$
If there is more than one letter they are written in alphabetical order.	$2q \times 7p = 14pq$
Numbers can be multiplied separately, then multiply letters.	$6p \times 3p = 6 \times 3 \times p \times p = 18p^2$

Simplifying Expressions (cont)

Like terms can be grouped together and then added or subtracted.	Simplify: $2x + y - x + 8y$ $= (2x - x) + (y + 8y)$ $= x + 9y$
Remember , the + and - signs go with the terms on their <i>right</i> .	

Examples - Simplifying

$7 \times x = 7x$
 $x \div 5 = \frac{x}{5}$
 $7x + 2x = 9x$
 $3y - y = 2y$

Power Rules

p^4 means p multiplied by itself <i>four</i> times	p^4 $= p \times p \times p \times p$
Simplify as powers and then multiply by each other	$x \times x \times x \times y \times y$ $= x^2 y^2$
When multiplying expressions with the same base (letter), we add the powers .	$x^2 \times x^5$ $= x^{2+5}$ $= x^7$
When dividing expressions with the same base , we can subtract the powers .	$20x^4 \div 10x$ $= 20x^{4-1} \div 10$ $= 2x^3$
When it is a "power of a power", multiply the powers	$(p^4)^2$ $= p^{4 \times 2}$ $= p^8$
Power of 0 is always equal to 1	$p^0=1$, $4^0=1$, $2768^0=1$

Solving Equations

The goal of solving an equation is to get the **letter term** on the **left** of the = sign and the **number/value** on the **right**.

Remember if a number or term is moved across the equals, then you must use the opposite operation.

Solving Examples

① $17x = 5x + 96$
 ① Move $5x$ to the LEFT.
 Change operation to $-$
 $17x - 5x = 96$
 ② Simplify
 $12x = 96$
 ③ Move 12 to the right.
 Change operation $\div$
 $x = \frac{96}{12}$
 $x = 8$

② $4x - 5 = x + 13$
 $4x - x = 13 + 5$
 $3x = 18$
 $x = \frac{18}{3}$
 $x = 6$

Expanding

Multiply each term in the brackets by the outside term.
 Then add together and simplify.

Examples:

$8(c + d - e)$	$4x(2x - 5)$
$= 8 \times c + 8 \times d - 8 \times e$	$= (4x \times 2x) + (4x \times -5)$
$= 8c + 8d - 8e$	$= 8x^2 - 20x$

Expanding - FOIL



Factorising

1) Find the Highest Common Factor (number that divides in all terms equally) of all terms. Write this outside the brackets.

2) Divide each term by the HCF, putting result in the brackets.

Note: The HCF could be a number or a letter.

Factorising Example

$30x - 18$
 $30: 1, 2, 3, 5, 6, 10, 15, 30$
 $18: 1, 2, 3, 6, 9, 18$
 HCF: 6
 Divide all terms by 6.
 $30x \div 6 = 5x$
 $18 \div 6 = 3$
 $80 \dots 30x - 18 = 6(5x - 3)$

Factorising Quadratic Equations

Factorising Quadratics

Factorising quadratics is the opposite of expanding brackets and is used to solve quadratic equations. Most quadratic expressions require two brackets in the form $(x + p)(x + q)$

Example Factorise $x^2 + 2x - 15$ Factor pairs of 15 are 1 and 15 and 3 and 5
 We choose the factor pair 3 and 5 as these can be used to make 2 by addition or subtraction.
 $x^2 + 2x - 15 = (x + 5)(x - 3)$

Calculating Gradients of a Line

