

Y7 Maths Knowledge Organiser Topic 8: Algebra Essentials

What must I be able to do?	Key vocabulary	
<ul style="list-style-type: none"> □ Represent an unknown number using a letter □ Write and understand simple algebraic expressions <ul style="list-style-type: none"> ➤ Sparx M813 □ Substitute numerical values into formulae and expressions <ul style="list-style-type: none"> ➤ Sparx M417, M327, M208, M979 □ Collect like terms and simplify expressions <ul style="list-style-type: none"> ➤ Sparx M795, M531 □ Multiply out single brackets <ul style="list-style-type: none"> ➤ Sparx M237, M792 	Expression	A <u>mathematical sentence</u> with at least two terms and an operation.
	Expand	<u>Remove the brackets</u> , by <u>multiplying everything</u> inside the brackets by what is on the outside and not separated by an operation.
	Substitution	To <u>replace variables</u> with a given <u>value</u> .
	Simplify	Write an expression in its most <u>compact</u> or <u>efficient</u> way without changing the value of the expression. Also known as <u>collecting like terms</u> .
	Variable	A letter representing a number which may not be known or could change.
	Term	A single number or variable. It can also be the product of numbers and variables e.g. 3, a, or 3a
Coefficient	A number which multiplies a variable e.g. in 3a, 3 is the coefficient.	

Substitution

Replace letters with their known values and then work out the answer

e.g. Given that $a = 4$, $b = 5$, $c = -6$

then $a + b = 4 + 5 = 9$ and $ac + 2b = 4 \times -6 + 2 \times 5 = -24 + 10 = -14$

←————— BIDMAS! —————→

Remember that 2 terms with no sign between mean that you multiply them so $2b$ means $2 \times b$ and ac means $a \times c$

Expanding/multiplying out brackets

Multiply all terms inside the bracket by the term in front of the bracket being careful with any negative numbers

e.g. $4(3a - 6) = 12a - 24$
 as $4 \times 3a = 12a$ and $4 \times -6 = -24$

Collecting like terms/simplifying expressions

Collect terms with the same letter together by adding or subtracting them as appropriate e.g.

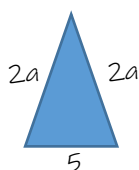
$2a + 4a = 6a$ (all like terms)
 $4a + 3b + 2a = 6a + 3b$ (a and b are not like terms)
 $4a + 2b - 3a = a + 2b$
 $3a \times 2a = 6a^2$ ($3 \times 2 = 6$ and $a \times a = a^2$)
 $4a \times 3b = 12ab$

Writing expressions

We can use algebra to express values which are unknown to us

e.g. 2 more than w would be $w + 2$
 3 lots of w would be $3w$
 5 fewer than w would be $w - 5$

We can also use it to write formulas or expressions for shapes e.g. the perimeter of this triangle is $4a + 5$

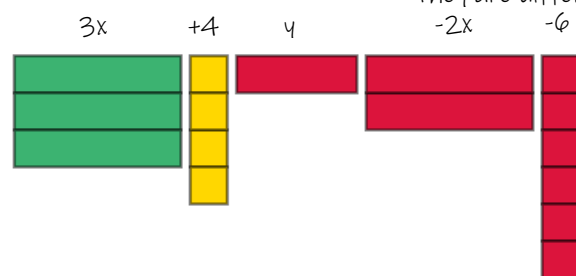


Using algebra tiles to collect like terms

Simplify the following expression:

$3x + 4 - y - 2x - 6$

Draw the diagram



Note that the boxes for x and y are different sizes as they are different letters

Look for zero pairs and cancel these out



Final answer: $x - y - 2$