

### I should already know:

- How to apply the 4 operations to integers
- How numbers work below 0

### I will learn:

To represent and order negative numbers

To add and subtract negative numbers

To multiply and divide negative numbers

To form algebraic equations, expressions and inequalities

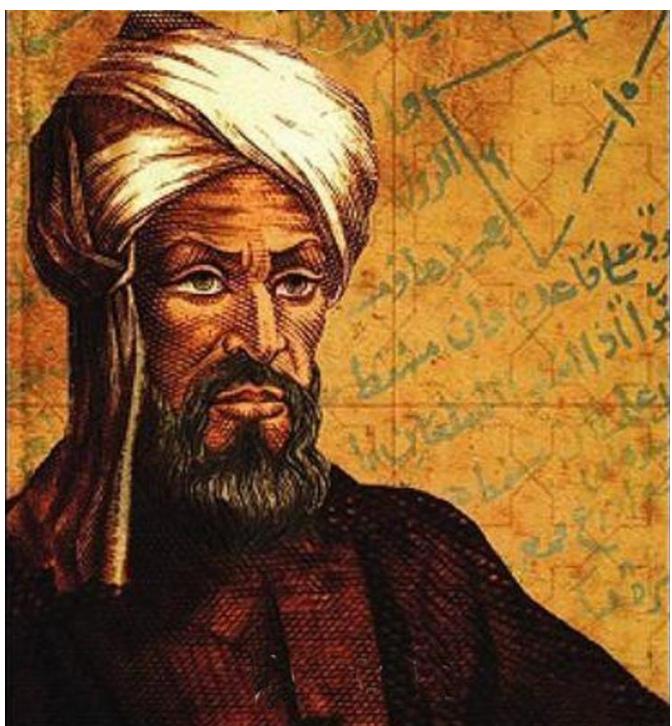
To substitute into and solve expressions and equations

### This will help in the future:

Developing a sense of algebra allows the true power of maths to be uncovered. Algebra allows calculations to be generalized so that maths can solve problems

### Key Words

<b>Variable</b>	A letter used to represent an unknown number e.g. $x$
<b>Term</b>	Each part of an expression e.g. $2x$ ; $4$ ; $x^2$
<b>Expression</b>	A mixture of numbers and letters e.g. $2x + 5$
<b>Equation</b>	Two expressions equal to one another e.g. $2x + 5 = 10$
<b>Solve</b>	Find the value of the variable



*Muhammad ibn Mūsā al-Khwārizmī, whose book al-Kitāb al-mukhtaṣar fī ḥisāb al-jabr wal-muqābala is the origin of the word algebra*

### Greater Depth Challenge

Can you use algebra to explain areas of maths that you have studied before?

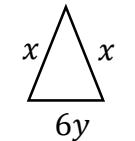
### Further Reading

Hegarty Maths

### Unit 5 – positive and negative numbers

No	Question	Answer	Example
5.1	What is an integer?	A whole number	7, 10, (-5), 123
5.2	What is a positive number?	Any number greater than zero	2, 10, 150
5.3	What is a negative number?	Any number smaller than zero	(-4), (-5), -123
5.4	What is absolute value of a number	The distance it is from zero	The absolute value of -3 is 3. The absolute value of 2 is 2.
5.5	What does > mean?	Greater than.	$3 > 2$
5.6	What does < mean?	Smaller than	$2 < 3$
5.7	What does = mean?	Equal to	$3 = 3$
5.8	How can we think of adding?	Translating a point on a number line	$(-3) + 5$ is translating (-3) by 5 spaces to the right
5.9	What does sum mean?	Add	The sum of 4 and 5 is 9
5.10	What does subtract mean?	Take away	10 subtract 4 is 6
5.11	What is a scale factor?	How much the number has been scaled by	$3 \times (-10) = 30$ . This is stretching (-10) by a scale factor of 3.
5.12	What is a negative scale factor?	How much the number has been scaled by in the opposite direction	$(-3) \times (-8) = (-24)$ . This is stretching (-8) by a scale factor of (-3).
5.13	What is commutativity?	The operation can be applied to two numbers in any order	$(-2) \times (-7) = (-14)$ $(-7) \times (-2) = (-14)$
5.14	What is associativity?	Grouping numbers to make the calculation easier	$5 \times (-18)$ is the same as $5 \times 2 \times (-9)$ $= 10 \times (-9)$ $= 90$

### Unit 6 – expressions, equations and inequalities

No	Question	Answer	Example
6.1	What does $7y$ mean?	$7 \times y$	
6.2	What does $ab$ mean?	$a \times b$	
6.3	What does $3uv$ mean?	$3 \times u \times v$	
6.4	What does $\frac{x}{4}$ mean?	$x \div 4$	
6.5	What is a term?	The separate parts of an expression	7, a, 2a, $a^2$
6.6	What is a variable?	An unknown number represented by a letter	a, b, x, y
6.7	What is an expression?	A mixture of numbers and letters (no equals sign)	$7a + b - 3c$
6.8	What does substitute mean?	Replace the letters with the numbers	a = 3, b = 5, c = 2 so... $a + b + c$ is... $3 + 5 + 2 = 10$
6.9	What are algebraic constants?	Like terms that have the same letter and same index	3p, 9p, -5p $4x^2$ , $12x^2$ , $-x^2$
6.10	What does simplify mean?	Collect the like terms	$2 + b + 3 + 2b = 5 + 3b$
6.11	What does expand mean?	Multiply the coefficient outside the brackets with each term inside the brackets	$4(3 + x) = 12 + 4x$
6.12	What does factorise mean?	Use the distributive law to write an expression using a bracket	$12 + 4x = 4(3 + x)$
6.13	What is an equation?	Two things are equal to one another (equal sign and two 'sides')	$7a + 1 = 8$
6.14	What is a coefficient?	The number in front of the variable	3x (3 is the coefficient of x)
6.15	What is an inequality?	A symbol to compare two expressions	$2x < 5x$
6.16	What is the perimeter?	The total length of all the sides of a shape	 Perimeter $P = x + x + 6y$ $= 2x + 6y$
6.17	What does strategic mean?	Working in a logical way	Counting rows of dots instead of randomly

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