



**ALGEBRA**

**Equations, formulae, expressions and identities**

As outcomes, Year 8 pupils should, for example:

Recognise that algebraic operations follow the same conventions and order as arithmetic operations.

Know that contents of brackets are evaluated first, and that multiplication and division are carried out before addition and subtraction. For example:

- In  $7 - 5s$ , the multiplication is performed first.
- In  $6 - s^2$ , the square is evaluated first.
- In  $3(x - 2)$ , the expression in the brackets is evaluated first.

Use index notation for small positive integer powers.

Know that expressions involving repeated multiplication of the same number, such as:

$$n \times n \quad n \times n \times n \quad n \times n \times n \times n$$

are written as  $n^2$ ,  $n^3$  and  $n^4$ , and are referred to as  $n$  squared,  $n$  cubed,  $n$  to the power of 4, etc.

Know why the terms squared and cubed are used for to the power of 2 and to the power of 3.

Understand the different meanings of expressions such as:

$$2n \text{ and } n^2 \quad 3n \text{ and } n^3$$

Simplify expressions such as:

$$2x^2 + 3x^2 \quad n^2 \times n^3 \quad p^3 \div p^2$$

Understand and use inverse operations.

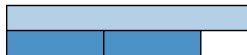
Recognise that any one of the equations:

- $a + b = c$ ,  $b + a = c$ ,  $c - a = b$  and  $c - b = a$
- $ab = c$ ,  $ba = c$ ,  $b = c/a$  and  $a = c/b$

implies each of the other three in the same set, as can be verified by substituting suitable sets of numbers into the equations.

Use coloured rods, e.g. white (1 unit), red (2 units) and yellow (5 units), to express relationships such as:

- $y = 2r + w \quad w = y - 2r \quad r = (y - w)/2$



Apply inverse operations when two successive operations are involved. For example:

- The inverse of dividing by 4 and subtracting 7 is adding 7 and multiplying by 4, i.e. if  $m/4 - 7 = n$ , then  $m = 4(n + 7)$ .

Use a **spreadsheet** to verify this, entering different numbers in column A, including negative numbers and decimals. If column C always equals column A, the inverse is probably correctly expressed.

	A	B	C		A	B	C	
1	Number	=A1/4-7	=(B1+7)*4		1	-6.75	1	
2		=A2/4-7	=(B2+7)*4		2	-6.5	2	
3		=A3/4-7	=(B3+7)*4		3	-6.25	3	
4		=A4/4-7	=(B4+7)*4		4	-6	4	
5		=A5/4-7	=(B5+7)*4		5	-5.75	5	

As outcomes, Year 9 pupils should, for example:

Apply simple instances of the index laws for multiplication and division of small integer powers.

For example:

- $n^2 \times n^3 = n^{2+3} = n^5$
- $p^3 \div p^2 = p^{3-2} = p$

See pages 59 and 4-59.

[Link to arithmetic operations \(pages 84–5\).](#)