

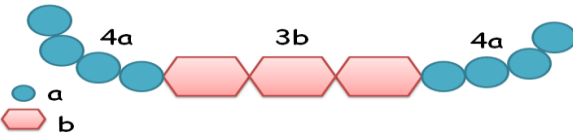
Key Vocabulary	
Product	The result when two numbers are multiplied together
Variable	Varying quantity represented by a letter or symbol
Term	One part of an expression which may be a number, variable or both
Coefficient	A number which multiplies a variable
Common factor	A whole number, which divides two or more other numbers exactly
Factorise	Finding the highest common factor when simplifying algebraic terms.
Indices / Powers / Exponents	Is a small number placed to the top of a base number, showing the number of times the base number is multiplied by itself $5^3 = 5 \times 5 \times 5$
Formula, Formulae	A mathematical rule using symbols, usually as an equation describing a certain relationship between quantities
Subject	What a formula equals
Change the subject	Rearranging the formula so it equals another variable

Key facts / Diagrams

Laws of Indices

- Multiplication: With the same base add the exponents.
 $4^5 \times 4^3 = 4^8$
- Division: With the same base subtract the exponents.
 $4^5 \div 4^3 = 4^2$
- Brackets: When raising a power to another power, you multiply the powers
 $(4^5)^3 = 4^{15}$
- Negative Indices: A negative exponent means how many times to divide by the number.
 $5^{-3} = 1 \div (5 \times 5 \times 5) = \frac{1}{5^3} = \frac{1}{125} = 0.008$
- Power 0: Always equals 1
 $3^0 = 1 \quad 4^0 = 1 \quad 6^0 = 1$



Like Terms:



The total length = $4a + 3b + 4a$
 $= 8a + 3b$

Since $4a + 4a = 8a$
 $8a$ and $3b$ are unlike terms. They cannot be combined.

Common Formulae:

- Area of a rectangle = $A = L \times B$
- Speed = $\frac{\text{distance}}{\text{time}} \quad S = \frac{d}{t}$ 
- Force = mass \times acceleration $f = ma$
- Potential difference (V) = current (I) \times resistance (R) $V = I \times R$ 
- Acceleration = $\frac{\text{velocity}}{\text{time}} \quad A = \frac{v}{t}$

Common misconceptions

- Some pupils may misapply the order of operation when changing the subject of a formula
- Many pupils may think that $a^0 = 0$
- Some pupils may not consider $4ab$ and $3ba$ as 'like terms' and therefore will not 'collect' them when simplifying expressions

Worked examples

If $a = 2$, $b = 3$ and $c = -4$

- $2b = 2 \times 3 = 6$
- $3a - 3b = 3 \times 2 - 3 \times 3 = 6 - 9 = -3$
- $5c = 5 \times -4 = -20$

$ab = ba$

Simplify: (group like terms)
 $3a^2b + 4ab^2 + 2a^2 - a^2b$
 $= 2a^2 + 2a^2b + 4ab^2$

Expanding Brackets:
 $3(a+2) = 3a + 6$
 $4a(a - 2) = 4a^2 - 8a$

Factorising: Finding Highest common factor
 $5a + 10 = 5(a + 2)$
 $12ab - 3ab^2 = 3ab(4 - b)$

Rearrange to make x the subject of the formula
 $y = 4x$ rearranged $\frac{y}{4} = x$