

Key Vocabulary

Expression $2x + 3y - 5a$	A collection of mathematical terms linked together with operations
Expand E.g. $2(x+3)$ or $(x+1)(x-2)$	Multiply out the bracket/remove the bracket
Factorise E.g. $5x - 10$ or $x^2 + 3x + 2$	Put the expression back into a bracket
Linear	The highest power is 1 in the expression, x or y etc
Quadratic	The highest power is 2 in the expression, there is a squared, eg x^2, y^2 etc
Term-to-term rule E.g. $+2$ or $\times 3$	The rule that takes you from one term in a sequence to the next
Position-to-term rule E.g. $5n + 3$	The rule that lets you find the 1 st , 2 nd , or any position term in a sequence
nth term E.g. $5n + 2$	The same as the position-to-term rule, allowing you to find any term in the sequence
Fibonacci sequence	Starts with 1, 1 and the next term in the sequence is found by adding the two previous terms

Key facts / Diagrams

Expand two brackets

$$(a + 4)(a + 2)$$

$$= a^2 + 2a + 4a + 8$$

$$= a^2 + 6a + 8$$

Factorise two brackets

$$a^2 + 7a + 10$$

$$= (a + 2)(a + 5)$$

The Fibonacci Sequence
1, 1, 2, 3, 5, 8, 13, 21, 34, 55,...

Common misconceptions

- Many pupils may think that $(x + a)^2 \equiv x^2 + a^2$
- Some pupils may think that $x^2 + 12 + 7x$ is not equivalent to $x^2 + 7x + 12$, and therefore think that they are wrong if the answer is given as $x^2 + 7x + 12$
- Some students may think that the second difference (of a quadratic sequence) is equivalent to the coefficient of x^2 . But you need to half the second difference!

Worked examples

- Expand and simplify
 - $(x + 7)(x + 3)$
 $x^2 + 3x + 7x + 21 = x^2 + 10x + 21$
 - $(x + 3)^2$
 $(x + 3)(x + 3) = x^2 + 3x + 3x + 9$
 $= x^2 + 6x + 9$
- Factorise $x^2 + 5x + 6$
 $2 + 3 = 5, 2 \times 3 = 6$
 $(x + 2)(x + 3)$
- Find the first 3 terms of
 - $6n + 1$
 $n = 1, \quad n = 2, \quad n = 3$
 $6 \times 1 + 1 = 7 \quad 6 \times 2 + 1 = 13 \quad 6 \times 3 + 1 = 19$ **7, 13, 19**
 - $n^2 + 2n + 5$
 $n = 1 \quad n = 2 \quad n = 3$
 $1^2 + 2 \times 1 + 5 = 8 \quad 2^2 + 2 \times 2 + 5 = 13 \quad 3^2 + 2 \times 3 + 5 = 20$ **8, 13, 20**