

Exercise walk-through

Introduction to algebra ■ E2.1

eXercise

You must be able to

- substitute numbers into an expression
- collect like terms to simplify
- use correct order of operations with letters

Method — Substituting and simplifying

- **Substitute:** $3x^2 - 2y$ with $x = 4$, $y = 5 \rightarrow 3(16) - 10 = 38$.
- **Like terms** 同类项: same letters $\rightarrow$ combine. $2a^2 + 5a^2 = 7a^2$;
 $3ab - 9ab = -6ab$.
- **Worked:** $2a^2 + 3ab - 1 + 5a^2 - 9ab + 4 = 7a^2 - 6ab + 3$.

Answer shapes: **M1** a correct method, **A1** the correct answer.

Method — Substituting and simplifying



A suspension bridge cable hangs in a parabola — the graph of a quadratic

Method — Substituting and simplifying

like terms: same letters/powers · add coefficients only

$$2a^2 + 3ab - 1 + 5a^2 - 9ab + 4$$

↓ *group like terms*

$$7a^2 - 6ab + 3$$

terms that share a colour are like terms

Terms that share the same letters are like terms and combine

Practice 2.1 ■ 2 marks

Find the value of $4x - 3y$ when $x = 5$ and $y = 2$.

Solution 2.1

Worked steps

$$4(5) - 3(2) = 20 - 6 = 14$$
 M1 **A1** *for substitution; for 14.*

Practice 2.2 ■ 2 marks

Simplify $7p + 2q - 3p + 5q$.

Solution 2.2

Worked steps

$$7p - 3p + 2q + 5q = 4p + 7q \quad \text{M1} \quad \text{A1} \quad \text{for collecting one pair; for } 4p + 7q.$$

Practice 2.3 ■ 2 marks

Find the value of $2x^2 + 1$ when $x = -3$.

Solution 2.3

Worked steps

$$2(-3)^2 + 1 = 2(9) + 1 = 19 \quad \text{M1} \quad \text{A1} \quad \text{for } (-3)^2 = 9; \text{ for } 19.$$

Exam-style 3.1 ■ 2 marks

Simplify $5a^2 - 2ab + 3 - a^2 + 6ab$.

Solution 3.1

Worked steps

$5a^2 - a^2 = 4a^2$, $-2ab + 6ab = 4ab$, so $4a^2 + 4ab + 3$ **M1** **A1** *for one correct collection; for $4a^2 + 4ab + 3$.*

Exam-style 3.2 ■ 2 marks

Find the value of $\frac{2a+b}{a-b}$ when $a = 7$ and $b = 1$.

Solution 3.2

Worked steps

$$\frac{2(7)+1}{7-1} = \frac{15}{6} = \frac{5}{2} \quad \text{M1} \quad \text{A1} \quad \text{for } \frac{15}{6}; \text{ for } \frac{5}{2}.$$

Exam-style 3.3 ■ 2 marks

Find the value of $3x^2 - 5x$ when $x = -2$.

Solution 3.3

Worked steps

$$3(-2)^2 - 5(-2) = 3(4) + 10 = 22 \quad \text{M1 A1 for } (-2)^2 = 4 \text{ and } -5(-2) = 10; \text{ for } 22.$$