

E2.1 Introduction to algebra

Name: _____ Class: _____ Date: _____ **Total: 12 marks**

KEY WORDS like terms 同类项 • substitute 代入 • terms and like terms 项和同类项
• introduction to algebra 代数入门 • expression 表达式

Objective

Build the skills to answer Extended exam questions on **introduction to algebra** 代数入门 — **substitution** 代入, **terms and like terms** 项和同类项, and simplifying expressions.

You must be able to:

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

1 Worked examples

■ Substituting and simplifying



Letters stand for numbers; like terms can be combined

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

$$\begin{array}{ccccccc} 2a^2 & + 3ab & - 1 & + 5a^2 & - 9ab & + 4 & \\ & & & \downarrow \text{group like terms} & & & \\ 7a^2 & - 6ab & + 3 & & & & \end{array}$$

terms that share a colour are like terms

like terms: same letters/powers • add coefficients only

Collecting like terms: group the terms that share a colour (the same letters)

- **Worked:** $2a^2 + 3ab - 1 + 5a^2 - 9ab + 4 = 7a^2 - 6ab + 3$.

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

2 Practice

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

2.2 Simplify $7p + 2q - 3p + 5q$. [2]

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

3 Exam-style questions

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

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

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

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

2.1 $4(5) - 3(2) = 20 - 6 = 14.$

2.2 $7p - 3p + 2q + 5q = 4p + 7q.$

2.3 $2(-3)^2 + 1 = 2(9) + 1 = 19.$

3.1 $5a^2 - a^2 = 4a^2$, $-2ab + 6ab = 4ab$, so $4a^2 + 4ab + 3.$

3.2 $\frac{2(7)+1}{7-1} = \frac{15}{6} = \frac{5}{2}.$

3.3 $3(-2)^2 - 5(-2) = 3(4) + 10 = 22.$