

Foundation unit 2

Algebra

Exam hint

You must show how you worked out your answer so that the examiner can see your method.

Exam hint

ma means $m \times a$

Key point 1

A **term** is a number, a letter, or a number and a letter multiplied together.

Like terms contain the same letter to the same power (or do not contain a letter). You can simplify an expression by collecting like terms.

$3x$ $7x$ These are 'like terms' as the **letters** are the same.

$3x$ $7y$ $2x^2$ These are not 'like terms' as the letters are different or the powers are different.

expression
 $3x + 1$
terms

Example 1

Simplify these expressions by collecting like terms.

a $2a + 3 + a + 4$

b $2x^2 - 2x + 7x^2 + 4x$

a $2a + 3 + a + 4 = 3a + 7$

b $2x^2 - 2x + 7x^2 + 4x = 9x^2 + 2x$

Add the letter terms: $2a + a$. Add the numbers: $3 + 4$

x^2 and x are not like terms.

Key point 2

Terms can be simplified when multiplying or dividing, even when they are not like terms.

$$a \times b = ab \qquad x \div y = \frac{x}{y}$$

When multiplying:

- write letters in alphabetical order
- write numbers before letters

Example 3

Simplify $2a \times 3b$

$$2a \times 3b = 2 \times 3 \times a \times b$$

$$= 6ab$$

Multiply the numbers first: 2×3 .
Then multiply the letters: $a \times b$

Put the number first, then the letters in alphabetical order.

Example 4

When $x = 2$ and $y = 5$ work out the value of

a $x + y$

a $2 + 5 = 7$

b xy

b $2 \times 5 = 10$

c $\frac{5x}{y}$

c $5 \times 2 \div 5 = 10 \div 5 = 2$

d $4x + 3y$

d $4 \times 2 + 3 \times 5 = 8 + 15 = 23$

Replace x and y with the values given.

Use the priority of operations.

Example 8

Factorise

a $y^2 + y$

b $2ef + 4f$

a $y^2 + y = y(y + 1)$

b $2ef + 4f = 2f(e + 2)$

The HCF is y

The HCF is $2f$

Example 6

Expand $4(3a + 2)$

$4(3a + 2) = 12a + 8$

Multiply each term in the bracket by the term on the outside.

Example 7

Factorise $10y + 25$

The highest common factor of $10y$ and 25 is 5 .

$10y + 25 = 5(2y + 5)$

$5(2y + 5) = 10y + 25$

Write the HCF of both terms outside the bracket. Work out the terms inside the bracket by dividing each term in the expression by the HCF.

Check your answer by expanding.