

GCSE MATHEMATICS

Collecting Like Terms

OCR-style Topic Practice

Based on OCR GCSE (9–1) Mathematics (J560)

Tier: Foundation and Higher

Name _____

Date _____

You may use:

- geometrical instruments
- tracing paper
- a scientific or graphical calculator in Section B only

INSTRUCTIONS

- Use black ink. You may use an HB pencil for graphs and diagrams.
- Answer all the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Section A: you must not use a calculator.
- Section B: you may use a scientific or graphical calculator.

INFORMATION

- The total mark for this paper is **41**.
- The marks for each question are shown in brackets [].
- The questions suit both Foundation and Higher tier students.
- Diagrams are not drawn accurately unless the question says they are.
- Graphs drawn on a grid are accurate.

These are original, independent practice questions written in the style of OCR GCSE Mathematics. They are not official OCR examination questions and are not endorsed by OCR.

Section A

You must not use a calculator in this section.

1 Simplify.

(a) $6k + 3k$

..... [1]

(b) $2w + 5w + 4w$

..... [1]

(c) $d + 6d + 3d$

..... [1]

2 Here are six terms.

Letter	Term
A	$4x$
B	$3x^2$
C	$4y$
D	$-x$
E	$2xy$
F	$5yx$

(a) Write down the letter of the term that is like the term labelled A.

..... [1]

(b) Write down the letters of another pair of like terms.

..... [1]

(c) Add the terms labelled A, B and D.

Give your answer in its simplest form.

..... [1]

3 (a) Simplify.

(i) $5p + 2 + 3p + 6$

..... [1]

(ii) $7 + 4e + 1 + e$

(b) Simplify $2u + 5v + 6u + 3v$.

..... [1]

4 Simplify.

(a) $8j - 3j$

..... [2]

(b) $4b - 9b$

..... [1]

(c) $3n - 8n + 4n$

..... [1]

(d) $5h - 2h - 3h$

..... [1]

5 Simplify.

(a) $9a + 3 - 8a - 7$

..... [1]

(b) $3c - 2d - 7c + 5d$

..... [1]

..... [2]

(c) $6 - 4r + 2s - 9 + 4r - s$

6 Complete each of these by writing the missing term in the space. [2]

(a) $7m + \dots = 2m$

[1]

(b) $3x^2 + 4x + \dots = 3x^2 - x$

[1]

7 (a) Simplify.

(i) $5x^2 + x^2$

[1]

(ii) $4a^2 + 3b^2 - 2a^2 - 5b^2$

[2]

(b) Simplify $2y^2 + 7y - 3 - 5y^2 + y + 8$.

[2]

- 8 Ravi simplifies $4n + 2n^2 + 3n$.

His answer is $9n^2$.

Explain why Ravi's answer is wrong.

..... [1]

- 9 Kofi says, " $6xy - 2yx$ simplifies to $4xy$."

Is Kofi correct? Give a reason for your answer.

..... [1]

- 10 Simplify.

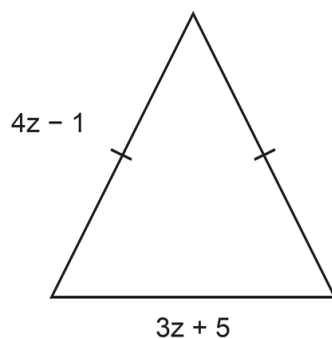
(a) $3ab + 2a - 5ba + 4a$

..... [2]

(b) $xy + 4x - 3yx + 2y - 4x$

..... [2]

- 11 The diagram shows an isosceles triangle.



The lengths are in centimetres.

Write an expression for the perimeter of the triangle. Give your answer in its simplest form.

..... cm [2]

- 12 Simplify fully.

$$5p^2 - 3pq + 2p - p^2 + 3qp - 6p + 1$$

..... [2]

Section B

You may use a scientific or graphical calculator in this section.

13 Simplify.

(a) $3.2n + 1.5n$

..... [1]

(b) $2.4x - 0.6y + 1.1x - 0.9y$

..... [2]

14 Simplify $0.8a^2 + 2.5 - 1.3a^2 + 0.75$.

..... [2]

END OF QUESTION PAPER

Mark scheme

Subject-Specific Marking Instructions

- M marks are for a correct method.
- A marks are for an accurate answer and depend on preceding M marks, so M0 A1 cannot be awarded.
- B marks are independent of method. SC marks are for special cases worthy of some credit.
- FT means follow through; oe means or equivalent; soi means seen or implied; isw means ignore subsequent working; nfwv means not from wrong working; dep means dependent on the marks indicated; cao means correct answer only.
- For methods not specifically provided for in the mark scheme, including valid visual representations, give as far as possible equivalent marks for equivalent correct work.

Question	Answer	Marks	Part marks and guidance	
1(a)	9k	1		Do not accept $9k^2$ or $18k$
1(b)	11w	1		Do not accept $11w^3$
1(c)	10d	1		Do not accept $9d$ or $10d^3$

Question	Answer	Marks	Part marks and guidance	
2(a)	D	1		B0 if any other letter is also given
2(b)	E and F	1		Both letters required B0 if an additional incorrect letter is included A and D scores B0: the question asks for another pair
2(c)	$3x^2 + 3x$	1		Accept the terms in either order, e.g. $3x + 3x^2$ Do not accept $6x^2$, $6x^3$ or $3x^2 + 5x$

Question	Answer	Marks	Part marks and guidance	
3(a)(i)	$8p + 8$	1		Accept $8 + 8p$ Do not accept $16p$
3(a)(ii)	$5e + 8$	1		Accept $8 + 5e$ Do not accept $4e + 8$ or $13e$
3(b)	$8u + 8v$	2	B2 for $8u + 8v$ B1 for $8u$ or $8v$ correct in an expression in which no unlike terms are combined	Accept the terms in either order $16uv$ or $64uv$ scores B0

Question	Answer	Marks	Part marks and guidance	
4(a)	5j	1		cao
4(b)	-5b	1		Do not accept 5b or -13b
4(c)	-n	1		Do not accept -1n, n or -n ³
4(d)	0	1		Do not accept 0h or h

Question	Answer	Marks	Part marks and guidance	
5(a)	a - 4	1		Accept -4 + a Do not accept 1a - 4, a + 4 or -3a
5(b)	-4c + 3d	2	B2 for -4c + 3d B1 for -4c or 3d correct in an expression in which no unlike terms are combined	Accept the terms in either order, e.g. 3d - 4c 4c - 3d scores B0; -4c - 3d scores B1
5(c)	s - 3	2	B2 for s - 3 B1 for s or -3 correct in an expression in which no unlike terms are combined	Accept -3 + s An answer that still contains an r term, e.g. Or + s - 3, scores B1 at most Do not accept 1s - 3 for B2

Question	Answer	Marks	Part marks and guidance	
6(a)	-5m	1		Do not accept 5m, -5 or -9m
6(b)	-5x	1		Do not accept 5x or -5x ²

Question	Answer	Marks	Part marks and guidance	
7(a)(i)	6x ²	1		Do not accept 5x ⁴ , 6x ⁴ or 6x
7(a)(ii)	2a ² - 2b ²	2	B2 for 2a ² - 2b ² B1 for 2a ² or -2b ² correct in an expression in which no unlike terms are combined	Accept the terms in either order, e.g. -2b ² + 2a ² 2a ² + 2b ² scores B1
7(b)	-3y ² + 8y + 5	2	B2 for -3y ² + 8y + 5 B1 for two of -3y ² , 8y, +5 correct in an expression in which no unlike terms are combined	Accept the terms in any order, e.g. 8y + 5 - 3y ² 5y ² + 5, 13y + 5 or -3y ² + 13 scores B0

Question	Answer	Marks	Part marks and guidance	
8	n^2 and n are not like terms, so $2n^2$ cannot be added to $4n$ and $3n$	1	B1 for a correct explanation	Must say that n^2 and n are not like terms, or have different powers "It should be $2n^2 + 7n$ " with no reason scores B0

Question	Answer	Marks	Part marks and guidance	
9	Yes, because yx is the same as xy , so they are like terms and $6 - 2 = 4$	1	B1 for "yes" with a correct reason	The reason must say that xy and yx are like terms, or that $yx = xy$ "Yes" on its own scores B0

Question	Answer	Marks	Part marks and guidance	
10(a)	$-2ab + 6a$	2	B2 for $-2ab + 6a$ B1 for $-2ab$ or $6a$ correct in an expression in which no unlike terms are combined	Accept $-2ba$ for $-2ab$, and the terms in either order, e.g. $6a - 2ab$
10(b)	$-2xy + 2y$	2	B2 for $-2xy + 2y$ B1 for $-2xy$ or $2y$ correct in an expression in which no unlike terms are combined	Accept $-2yx$ for $-2xy$, and the terms in either order, e.g. $2y - 2xy$ An answer that still contains an x term, e.g. $-2xy + 0x + 2y$, scores B1 at most

Question	Answer	Marks	Part marks and guidance	
11	$11z + 3$	2	M1 for $4z - 1 + 4z - 1 + 3z + 5$ oe, adding both equal sides and the base A1 for $11z + 3$	Accept $3 + 11z$ A correct answer with no working scores 2 marks $7z + 4$ (only one of the equal sides used) scores M0 A0

Question	Answer	Marks	Part marks and guidance	
12	$4p^2 - 4p + 1$	2	B2 for $4p^2 - 4p + 1$ B1 for two of $4p^2$, $-4p$, $+1$ correct in an expression in which no unlike terms are combined	Accept the terms in any order An answer that still contains a pq term, e.g. $4p^2 + 0pq - 4p + 1$, scores B1 at most

Question	Answer	Marks	Part marks and guidance	
13(a)	$4.7n$	1		cao
13(b)	$3.5x - 1.5y$	2	B2 for $3.5x - 1.5y$ B1 for $3.5x$ or $-1.5y$ correct in an expression in which no unlike terms are combined	Accept the terms in either order, e.g. $-1.5y + 3.5x$ $3.5x + 0.3y$ scores B1

Question	Answer	Marks	Part marks and guidance	
14	$-0.5a^2 + 3.25$	2	B2 for $-0.5a^2 + 3.25$ B1 for $-0.5a^2$ or 3.25 correct in an expression in which no unlike terms are combined	Accept the terms in either order, e.g. $3.25 - 0.5a^2$ $0.5a^2 + 3.25$ scores B1 $2.75a^2$ scores B0

Elite Learners Specification & Assessment Objectives Summary

For teachers: this section maps the paper to OCR GCSE (9–1) Mathematics J560 content and assessment objectives. It is an Elite Learners teacher resource and is not part of the OCR-style mark scheme.

Question	OCR J560 content	AO	Marks
1(a)	6.01b Collecting like terms in sums and differences of terms	AO1	1
1(b)	6.01b Collecting like terms in sums and differences of terms	AO1	1
1(c)	6.01b Collecting like terms in sums and differences of terms	AO1	1
Question 1 total			3
2(a)	6.01a Algebraic terminology; 6.01b Collecting like terms	AO1	1
2(b)	6.01a Algebraic terminology; 6.01b Collecting like terms	AO1	1
2(c)	6.01b Collecting like terms in sums and differences of terms	AO1	1
Question 2 total			3
3(a)(i)	6.01b Collecting like terms in sums and differences of terms	AO1	1
3(a)(ii)	6.01b Collecting like terms in sums and differences of terms	AO1	1
3(b)	6.01b Collecting like terms in sums and differences of terms	AO1 ×2	2
Question 3 total			4
4(a)	6.01b Collecting like terms in sums and differences of terms	AO1	1
4(b)	6.01b Collecting like terms in sums and differences of terms	AO1	1
4(c)	6.01b Collecting like terms in sums and differences of terms	AO1	1
4(d)	6.01b Collecting like terms in sums and differences of terms	AO1	1
Question 4 total			4
5(a)	6.01b Collecting like terms in sums and differences of terms	AO1	1
5(b)	6.01b Collecting like terms in sums and differences of terms	AO1 ×2	2

Question	OCR J560 content	AO	Marks
5(c)	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
Question 5 total			5
6(a)	6.01b Collecting like terms in sums and differences of terms	AO1	1
6(b)	6.01b Collecting like terms in sums and differences of terms	AO1	1
Question 6 total			2
7(a)(i)	6.01b Collecting like terms in sums and differences of terms	AO1	1
7(a)(ii)	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
7(b)	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
Question 7 total			5
8	6.01b Collecting like terms in sums and differences of terms	AO2	1
Question 8 total			1
9	6.01b Collecting like terms in sums and differences of terms	AO2	1
Question 9 total			1
10(a)	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
10(b)	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
Question 10 total			4
11	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 1$, AO3 $\times 1$	2
Question 11 total			2
12	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
Question 12 total			2
13(a)	6.01b Collecting like terms in sums and differences of terms	AO1	1
13(b)	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
Question 13 total			3
14	6.01b Collecting like terms in sums and differences of terms	AO1 $\times 2$	2
Question 14 total			2
Paper total			41

Assessment objectives

Assessment objective	Marks
AO1 use and apply standard techniques	38 (93%)
AO2 reason, interpret and communicate mathematically	2 (5%)
AO3 solve problems within mathematics and in other contexts	1 (2%)
Total	41