

GCSE MATHEMATICS

Expanding Brackets

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 **48**.
- 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 Expand.

(a) $8(p + 4)$

..... [1]

(b) $2(9 - 5t)$

..... [1]

(c) $6(3c - 2d)$

..... [1]

2 Here are five expressions.

Letter	Expression
A	$2(3x + 4)$
B	$6x + 4$
C	$6x + 8$
D	$2(3x + 2)$
E	$3(2x + 4)$

(a) Write down the letter of the expression that is equivalent to the expression labelled A.

..... [1]

(b) Write down the letters of another pair of equivalent expressions.

..... [1]

3 (a) Simplify.

(i) $6x \times 2x$

..... [1]

(ii) $-3p \times 5q$

..... [1]

(b) Expand $y(y + 6)$.

..... [1]

(c) Expand $5k(2k - 3)$.

..... [1]

4 Expand.

(a) $-4(h + 3)$

..... [1]

(b) $-6(2r - 1)$

..... [1]

(c) $-(5 + 3e)$

..... [1]

5 Complete each of these by writing the missing number or term in the space.

(a) $5(x - \dots) = 5x - 35$

[1]

(b) $\dots(2y + 3) = 8y + 12$

[1]

(c) $3a(\dots + 4) = 6a^2 + 12a$

[1]

6 Expand and simplify.

(a) $2(5n + 3) + 4(n - 2)$

..... [2]

(b) $8(k + 1) - 3(2k + 5)$

- 7 Ella expands and simplifies $4(3x - 2) - (x - 5)$ [2]
Her answer is $11x - 13$.
Explain why Ella's answer is wrong.

- 8 Expand and simplify. [1]
(a) $(x + 6)(x + 4)$

(b) $(t + 3)(t - 9)$ [2]

..... [2]

(c) $(y - 7)(y - 2)$

9 Expand and simplify $(4x - 3)(2x + 5)$.

..... [2]

10 Expand and simplify.

(a) $(x - 8)^2$

..... [2]

(b) $(3a + 2b)^2$

..... [2]

..... [2]

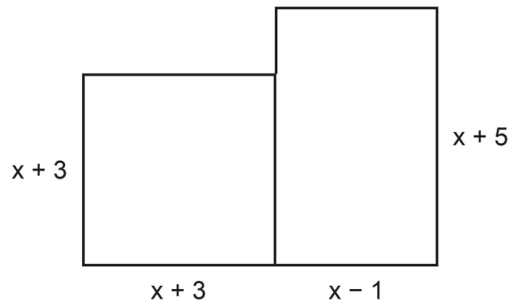
- 11 Priya says, "When $(x + 3)(x - 3)$ is expanded and simplified, the answer has a term in x ."
Is Priya correct? Show how you decide.

.....

.....

[2]

- 12 The shape is made from a square and a rectangle.



The lengths are in centimetres.

Show that the total area of the shape, in cm^2 , is $2x^2 + 10x + 4$.

.....

.....

.....

.....

.....

[3]

13 $(x + a)(x + 5) \equiv x^2 + bx + 20$

Find the value of a and the value of b .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots \quad \mathbf{[3]}$$

14 Show that $(n + 5)^2 - (n + 1)^2 \equiv 8(n + 3)$.

.....

.....

.....

.....

.....

[3]

Section B

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

15 (a) Expand $0.4(15x - 2.5)$.

.....
[1]

(b) Expand and simplify $(x - 1.6)(x + 0.5)$.

.....
[2]

16 A phone contract costs $\pounds(m + 4.50)$ each month for 24 months.

There is also a one-off charge of $\pounds35$.

Write an expression, in pounds, for the total cost of the contract. Give your answer in its simplest form.

.....
[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.
- FT means follow through; oe means or equivalent; soi means seen or implied; isw means ignore subsequent 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)	$8p + 32$	1		Accept $32 + 8p$ Do not accept $8p + 4$
1(b)	$-10t + 18$	1		Accept $18 - 10t$ Do not accept $18 - 5t$ or $18 + 10t$
1(c)	$18c - 12d$	1		Accept $-12d + 18c$ Do not accept $18c - 2d$ or $6cd$

Question	Answer	Marks	Part marks and guidance	
2(a)	C	1		B0 if any other letter is also given
2(b)	B and D	1		Both letters required B0 if an additional letter is included A and C scores B0: the question asks for another pair

Question	Answer	Marks	Part marks and guidance	
3(a)(i)	$12x^2$	1		Do not accept $12x$, $8x^2$ or $12xx$
3(a)(ii)	$-15pq$	1		Accept $-15qp$ Do not accept $15pq$ or $2pq$
3(b)	$y^2 + 6y$	1		Accept $6y + y^2$ Do not accept $2y + 6y$, $8y$ or $y^2 + 6$
3(c)	$10k^2 - 15k$	1		Accept $-15k + 10k^2$ Do not accept $10k - 15k$ or $10k^2 - 3$

Question	Answer	Marks	Part marks and guidance	
4(a)	$-4h - 12$	1		Accept $-12 - 4h$ Do not accept $-4h + 12$ or $-4h + 3$
4(b)	$-12r + 6$	1		Accept $6 - 12r$ Do not accept $-12r - 6$ or $-12r - 1$
4(c)	$-3e - 5$	1		Accept $-5 - 3e$ Do not accept $-5 + 3e$ or $5 - 3e$

Question	Answer	Marks	Part marks and guidance	
5(a)	7	1		Do not accept -7 or 35
5(b)	4	1		Do not accept 6 or $4y$
5(c)	$2a$	1		Do not accept 2 , $2a^2$ or $3a$

Question	Answer	Marks	Part marks and guidance	
6(a)	$14n - 2$	2	M1 for $10n + 6 + 4n - 8$ (at least three of the four terms correct) A1 for $14n - 2$	Accept $-2 + 14n$ A correct answer with no working scores 2 marks $14n + 14$ (4×-2 taken as $+8$) scores M1 A0 if $10n + 6 + 4n$ is seen
6(b)	$2k - 7$	2	M1 for $8k + 8 - 6k - 15$ (at least three of the four terms correct) A1 for $2k - 7$	Accept $-7 + 2k$ A correct answer with no working scores 2 marks $2k + 23$ (-3×5 taken as $+15$) scores M1 A0 if $8k + 8 - 6k$ is seen

Question	Answer	Marks	Part marks and guidance	
7	$-(x - 5)$ is $-x + 5$, not $-x - 5$, so the answer should be $11x - 3$	1	B1 for a correct explanation	Must identify the sign error in expanding $-(x - 5)$: e.g. " $-1 \times -5 = +5$ ", "the 5 should be $+5$ " or "she did not change the sign of the 5" "The answer should be $11x - 3$ " with no reason scores B0 A comment about the x terms only scores B0: $12x - x = 11x$ is correct

Question	Answer	Marks	Part marks and guidance	
8(a)	$x^2 + 10x + 24$	2	M1 for $x^2 + 4x + 6x + 24$ (at least three of the four terms correct) A1 for $x^2 + 10x + 24$	Accept the terms in any order A correct answer with no working scores 2 marks $x^2 + 24$ scores M0 A0
8(b)	$t^2 - 6t - 27$	2	M1 for $t^2 - 9t + 3t - 27$ (at least three of the four terms correct) A1 for $t^2 - 6t - 27$	Accept the terms in any order A correct answer with no working scores 2 marks $t^2 + 6t - 27$ or $t^2 - 6t + 27$ scores M1 A0 if three correct terms are seen
8(c)	$y^2 - 9y + 14$	2	M1 for $y^2 - 2y - 7y + 14$ (at least three of the four terms correct) A1 for $y^2 - 9y + 14$	Accept the terms in any order A correct answer with no working scores 2 marks $y^2 - 9y - 14$ scores M1 A0 if three correct terms are seen

Question	Answer	Marks	Part marks and guidance	
9	$8x^2 + 14x - 15$	2	M1 for $8x^2 + 20x - 6x - 15$ (at least three of the four terms correct) A1 for $8x^2 + 14x - 15$	Accept the terms in any order A correct answer with no working scores 2 marks $6x^2 + 14x - 15$ ($4x \times 2x$ taken as $6x^2$) scores M1 A0

Question	Answer	Marks	Part marks and guidance	
10(a)	$x^2 - 16x + 64$	2	M1 for $(x - 8)(x - 8)$ or $x^2 - 8x - 8x + 64$ (at least three of the four terms correct) A1 for $x^2 - 16x + 64$	Accept the terms in any order $x^2 + 64$ or $x^2 - 64$ scores M0 A0
10(b)	$9a^2 + 12ab + 4b^2$	2	M1 for $9a^2 + 6ab + 6ab + 4b^2$ (at least three of the four terms correct) A1 for $9a^2 + 12ab + 4b^2$	Accept the terms in any order, and ba for ab $9a^2 + 4b^2$ scores M0 A0 $3a^2 + 12ab + 2b^2$ scores M0 A0

Question	Answer	Marks	Part marks and guidance	
11	No, because $(x + 3)(x - 3) = x^2 - 3x + 3x - 9 = x^2 - 9$, which has no term in x	2	M1 for $x^2 - 3x + 3x - 9$ or $x^2 - 9$ A1 for "no" with $x^2 - 9$, or with the statement that $-3x$ and $+3x$ cancel	"No" with no working scores M0 A0 $x^2 - 9$ with no conclusion scores M1 A0

Question	Answer	Marks	Part marks and guidance	
12	$(x + 3)^2 = x^2 + 6x + 9$ $(x + 5)(x - 1) = x^2 + 4x - 5$ $x^2 + 6x + 9 + x^2 + 4x - 5 =$ $2x^2 + 10x + 4$	3	M1 for $x^2 + 6x + 9$ or $x^2 + 3x + 3x + 9$, the area of the square M1 for $x^2 + 4x - 5$ or $x^2 - x + 5x - 5$, the area of the rectangle A1 for adding the two areas, with both expansions seen, to reach $2x^2 + 10x + 4$	"Show that": the A1 needs both areas expanded and added; writing down the given answer scores A0 An answer using $(x + 3)(x - 1)$ or $(x + 5)(x + 3)$ for the rectangle scores M0 for that area

Question	Answer	Marks	Part marks and guidance	
13	$a = 4$ and $b = 9$	3	M1 for $5a = 20$, or for $x^2 + 5x + ax + 5a$ seen A1 for $a = 4$ B1FT for $b = 9$, or $b = \text{their } a + 5$	Accept a and b found in either order $b = 9$ with $a = 4$ and no working scores 3 marks

Question	Answer	Marks	Part marks and guidance	
14	$(n + 5)^2 = n^2 + 10n + 25$ and $(n + 1)^2 = n^2 + 2n + 1$ $n^2 + 10n + 25 - (n^2 + 2n + 1) = 8n + 24$ $8(n + 3) = 8n + 24$, so the two sides are equal	3	M1 for $n^2 + 10n + 25$ or $n^2 + 5n + 5n + 25$ M1 for $n^2 + 2n + 1$, or $-n^2 - 2n - 1$ in the subtraction A1 for $8n + 24$ from correct working, and $8(n + 3)$ shown to equal $8n + 24$	"Show that": writing down the given answer scores A0 Accept $8n + 24 = 8(n + 3)$ written either way round, as long as the expansion of $8(n + 3)$ is clear $n^2 + 10n + 25 - n^2 + 2n + 1$ (sign error) scores M1 M1 A0

Question	Answer	Marks	Part marks and guidance	
15(a)	$6x - 1$	1		Accept $-1 + 6x$ Do not accept $6x - 2.5$ or $6x + 1$
15(b)	$x^2 - 1.1x - 0.8$	2	M1 for $x^2 + 0.5x - 1.6x - 0.8$ (at least three of the four terms correct) A1 for $x^2 - 1.1x - 0.8$	Accept the terms in any order A correct answer with no working scores 2 marks $x^2 + 1.1x - 0.8$ or $x^2 - 1.1x + 0.8$ scores M1 A0 if three correct terms are seen

Question	Answer	Marks	Part marks and guidance	
16	$24m + 143$	2	M1 for $24(m + 4.50)$ or $24m + 108$ seen A1 for $24m + 143$	Accept $143 + 24m$ A correct answer with no working scores 2 marks $24m + 39.5$ (only m multiplied by 24) scores M0 A0