

GCSE Mathematics (1MA1)

Themed papers – Expand and Factorise

Compiled from student-friendly mark schemes

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

Guidance on the use of codes within this mark scheme

M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.

P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.

A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.

C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

Question 1 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$5p + 15 - 2 + 4p$	M1	This mark is given for a method to expand the brackets in the expression
	$9p + 13$	A1	This mark is given for the correct answer only

Question 2 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$x^2 + 5x - 9x - 45$	M1	This mark is given for three terms correct
	$x^2 - 4x - 45$	A1	This mark is given for the correct answer only
(b)	$3(3x^2 + 2x)$	M1	This mark is given for a partial factorisation
	$3x(3x + 2)$	A1	This mark is given for the correct answer only

Question 3 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x \pm 1)(x \pm 4)$	M1	
	$(x - 1)(x + 4)$	A1	This mark is given for the correct answer or and equivalent

Question 4 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(b)	$(x - 7)(x - 5)$	M1	This mark is given for finding the two numbers that multiply to make 35
	$(x - 7)(x + 5)$	A1	This mark is given for a correct answer only

Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(2x + 1)(x + 3) = 2x^2 + 7x + 3$ or $(x + 3)(3x + 7) = 3x^2 + 16x + 21$	M1	This mark is given for a method to find the product of any two linear expressions
	$(2x^2 + 7x + 3)(3x + 7) =$ $(2x + 1)(3x^2 + 16x + 21) =$	M1	This mark is given for a method to multiply out two products with at least half the terms correct
	$6x^3 + 35x^2 + 58x + 21$	A1	This mark is given for the correct answer only

Question 6 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x + 1)(x + 2) = x^2 + x + 2x + 2$ or $(x + 2)(x + 3) = x^2 + 2x + 3x + 6$ or $(x + 1)(x + 3) = x^2 + x + 3x + 3$	M1	This mark is given for a method to find the product of any two of three linear expressions
	$(x + 3)(x^2 + x + 2x + 2)$ or $(x + 1)(x^2 + 2x + 3x + 6)$ or $(x + 2)(x^2 + x + 3x + 3)$ $= x^3 + x^2 + 2x^2 + 3x^2 + 2x + 3x + 6x + 6$	M1	This mark is given for a for method to find the full expansion of three brackets
	$x^3 + 6x^2 + 11x + 6$ $(a = 1, b = 6, c = 11, d = 6)$	A1	This mark is given for the correct answer only

Question 7 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\sqrt{5}(\sqrt{8} + \sqrt{18}) = \sqrt{5}\sqrt{8} + \sqrt{5}\sqrt{18}$	M1	This mark is given for expanding brackets
	$= \sqrt{40} + \sqrt{90}$ $= \sqrt{4}\sqrt{10} + \sqrt{9}\sqrt{10}$ $= 2\sqrt{10} + 3\sqrt{10}$	M1	This mark is given for finding an expression in terms of $\sqrt{10}$
	$= (2 + 3)\sqrt{10}$ $= 5\sqrt{10}$ $a = 5$	A1	This mark is given for the correct answer only

Question 8 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(3x + 2)(2x + 1) = 6x^2 + 5x + 2$ or $(2x + 1)(x - 5) = 2x^2 - 9x - 5$	M1	This mark is given for a method to find the product of any two linear expressions
	$(6x^2 + 5x + 2)(x - 5)$ or $(3x + 2)(2x^2 - 9x - 5)$	M1	This mark is given for a method to find the product of the quadratic expression formed with the remaining term
	$6x^3 - 23x^2 - 33x - 10$	A1	This mark is given for the correct answer only

Question 9 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x + 2)(x + 8) = x^2 + 10x + 16$	M1	This mark is given for a method to find the product of two brackets
	$(x^2 + 10x + 16)(x - 4)$ $= x^3 - 4x^2 + 10x^2 - 40x + 16x - 64$	M1	This mark is given for finding six terms
	$x^3 + 6x^2 - 24x - 64$	A1	This mark is given for the correct answer only

Question 10 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$2x^2 - 5x - 12 = (2x + 3)(x - 4)$	M1	This mark is given for factorising the denominator
	$x^2 - 16 = (x + 4)(x - 4)$	M1	This mark is given for factorising the numerator
	$\frac{x + 4}{2x + 3}$	A1	This mark is given for the correct answer only

Question 11 (Total 3 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$3x^2 - 8x - 3 = (3x + 1)(x - 3)$	M1	This mark is given for expanding the brackets of the numerator
	$2x^2 - 6x = 2x(x - 3)$	M1	This mark is given for expanding the brackets of the denominator
	$\frac{(3x + 1)(x - 3)}{2x(x - 3)} = \frac{3x + 1}{2x}$	A1	This mark is given for cancelling $(x - 3)$ for the correct answer

Question 12 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(a + b)(a - b)$	B1	This mark is given for a correct answer only
(b)	$(x^2 + 4 + x^2 - 2)(x^2 + 4 - x^2 + 2)$	M1	This mark is given for using $a = x^2 + 4$ and $b = x^2 - 2$
	$= (2x^2 + 2)(6)$	M1	This mark is given for a method to multiply out the brackets to find an expression of the form $cx^2 + d$
	$= 12x^2 + 12$ $= 12(x^2 + 1)$	A1	This mark is given for a correct answer only

Question 13 (Total 8 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(x - 2)(2x + 3)$ $= 2x^2 - 4x + 3x - 6$	M1	This mark is given for a method to find the expansion of two linear expressions
	$(2x^2 - 4x + 3x - 6)(x + 1)$ $= 2x^3 - 4x^2 + 3x^2 - 6x + 2x^2 - 4x + 3x - 6$	M1	This mark is given for a method to multiply out all three linear expressions
	$2x^3 + x^2 - 7x - 6$	A1	This mark is given for the correct answer only
(b)	$4 + n - 2 = -3$	M1	This mark is given for a method to combine indices
	$n = -3 - 4 + 2$ $n = -5$	A1	This mark is given for the correct answer only
(c)	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	M1	This mark is given for substituting $a = 5$, $b = -4$ and $c = -3$ into the formula for the quadratic equation
	$x = \frac{4 \pm \sqrt{16 + 60}}{10}$ $x = \frac{4 + \sqrt{76}}{10}$ and $\frac{4 - \sqrt{76}}{10}$	M1	This mark is given for simplifying as shown
	$x = 1.27$ and -0.472	A1	This mark is given for two correct answers only

Question 14 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x^2 + 2xy + y^2) + (3x + 3y) =$ $(x + y)(x + y + 3)$	B1	This mark is given for the correct answer only

Question 15 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	3 correct terms or 4 terms ignoring signs	M1	This mark is given for a method to find the product of any two linear expressions
		M1	This mark is given for a method of 6 products, 4 of which are correct
		A1	This mark is given for fully accurate working to give the required result

Question 16 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	The constant term should be -6 not $+6$	C1	This communication mark is given for correct evaluation of result shown

Question 17 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(x + 2)(2x - 3) = 2x^2 + 4x - 3x - 6$	M1	This mark is given for multiplying out two brackets with at least three terms out of four correct
	$(2x^2 + x - 6)(3x + 1) = 6x^3 + 2x^2 + 3x^2 + x - 18x - 6$	M1	This mark is given for a complete method to multiply all three brackets
	$6x^3 + 5x^2 - 17x - 6$	A1	This mark is given for the correct answer only

Question 18 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(3(x - y) - 2)(x - y)$	M1	This mark is given for identifying $(x - y)$ as a common factor
	$(3x - 3y - 2)(x - y)$	A1	This mark is given for the correct answer only

Question 19 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\frac{x-1}{5(x-1)(x-1)} = \frac{1}{5(x-1)}$	B1	This mark is given for the correct answer only
(b)	$2(25 - y^2)$	M1	This mark is given for taking out a factor of 2
	$2(5 + y)(5 - y)$	A1	This mark is given for the correct answer only

Question 20 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	Maryam's second line should contain +4 rather than -4	C1	This mark is given for a correct explanation
(b)	Josh's reasoning gives +6x rather than -6x	C1	This mark is given for a correct explanation

Mark scheme for 1MA1 Higher themed papers: Expand and Factorise

Performance data:

Q	Taken from			Total Marks available	TOPIC	Spec Ref	AO	% Mean marks	Edexcel mean averages Marks of candidates who achieved grade:										
	Q	Series	Paper						ALL	9	8	7	6	5	4	3	2	1	U
1	2	June 2018	3H	2	Algebra	A4	1	77	1.53	1.90	1.78	1.64	1.53	1.43	1.30	1.12	-	-	0.86
2a	1a	Nov 2019	3H	2	Algebra	A4	1	77	1.54	2.00	2.00	1.95	1.93	1.87	1.58	1.01	-	-	0.40
2b	1b	Nov 2019	3H	2	Algebra	A4	1	70	1.40	2.00	1.95	1.89	1.74	1.64	1.42	0.93	-	-	0.39
3	6	Spec Set 1	3H	2	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	11b	Mock Set 4	1H	2	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	18a	June 2019	3H	3	Algebra	A4	2	77	2.32	2.89	2.82	2.74	2.51	2.04	1.35	0.74	-	-	0.35
6	10	June 2017	1H	3	Algebra	A4	2	67	2.01	2.92	2.83	2.65	2.29	1.60	0.82	0.32	-	-	0.11
7	13	June 2018	1H	3	Number	N8	2	51	1.54	2.93	2.75	2.26	1.57	0.90	0.46	0.24	-	-	0.12
8	15	Nov 2019	2H	3	Algebra	A4	1	50	1.49	2.78	2.86	2.67	2.38	2.06	1.24	0.46	-	-	0.16
9	11	Mock Set 3	3H	3	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	14a	June 2017	3H	3	Algebra	A4	1	45	1.36	2.93	2.69	2.12	1.33	0.60	0.19	0.05	-	-	0.02
11	17	June 2018	1H	3	Algebra	A4	1	42	1.25	2.92	2.59	1.96	1.18	0.51	0.18	0.07	-	-	0.03
12a	15a	June 2018	1H	1	Algebra	A4	1	46	0.46	0.93	0.77	0.59	0.45	0.31	0.21	0.12	-	-	0.07
12b	15b	June 2018	1H	3	Algebra	A4	1	37	1.10	2.49	1.92	1.47	1.07	0.67	0.37	0.19	-	-	0.09
13a	9a	Nov 2018	3H	3	Algebra	A4	1	48	1.44	2.90	2.68	2.77	2.41	2.05	1.23	0.63	-	-	0.23
13b	9b	Nov 2018	3H	2	Algebra	A4	1	43	0.86	1.80	1.76	1.74	1.29	1.16	0.78	0.41	-	-	0.14
13c	9c	Nov 2018	3H	3	Algebra	A18	1	21	0.62	2.80	2.76	2.36	1.43	0.87	0.27	0.07	-	-	0.00
14	13b	Nov 2019	1H	1	Algebra	A4	1	2	0.02	0.44	0.22	0.08	0.04	0.01	0.00	0.00	-	-	0.00
15	13	Spec Set 1	2H	3	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	16b	Mock Set 1	1H	1	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	13a	Mock Set 2	3H	3	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	17a	Mock Set 2	1H	2	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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19a	10a	Nov 2018	1H	1	Algebra	A4	1	8	0.08	1	0.73	0.35	0.16	0.09	0.02	0.01	-	-	0
19b	10b	Nov 2018	1H	2	Algebra	A4	1	26	0.52	1.8	1.67	1.09	0.79	0.66	0.41	0.3	-	-	0.16
20a	5a	Mock Set 3	3H	1	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20b	5b	Mock Set 3	3H	1	Algebra	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				58			20	787	19.54	37.43	34.78	30.33	24.1	18.47	11.83	6.67	-	-	3.13