

Mark scheme for 1MA1 Higher themed papers: Quadratic Graphs

GCSE Mathematics (1MA1)

Themed papers – Quadratic Graphs

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.

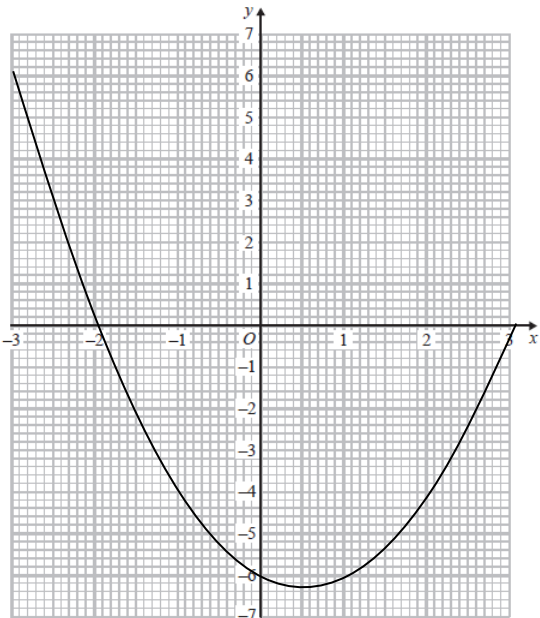
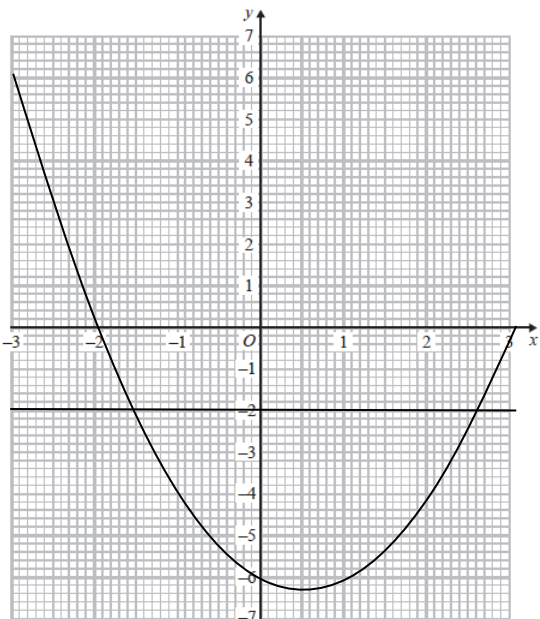
A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

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).

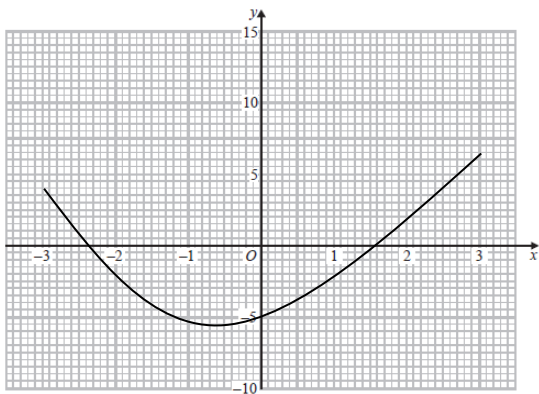
Question 1 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	0, -4, -6, -4, 0	M1	This mark is given for a correct method to find at least two values
		A1	This mark is given for finding all five values in the table
(b)		M1	This mark is given for at least 5 points correctly plotted
		A1	This mark is given for a fully correct graph
(c)		M1	This mark is given for the line $y = -2$ drawn
	2.6, -1.6	A1	This mark is given for answers in the range 2.5 to 2.7 and -1.5 to -1.7

Question 2 (Total 3 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	$(1, -3)$	B1	This mark is given for the correct answer only
(b)	$2.75, -0.75$	B1	This mark is given for the correct answers only
(c)	-2.8	B1	This mark is given for the correct answer only

Question 3 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	2, -4, 2, 8	B2	These marks are given for all four values correct (B1 is given for 2 or 3 values correct)
(b)		M1	This mark is given for at least five points of $(-3, 2)$, $(-2, -2)$, $(-1, -4)$, $(0, -4)$, $(1, -2)$, $(2, 2)$ and $(3, 8)$ plotted correctly
		A1	This mark is given for a fully correct curve drawn
(c)	-2.6 and 1.6	B1	This mark is given for two correct solutions read from the graph

Question 4 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		M1	This mark is given for the line $y = x + 4$ drawn
	-0.3 and 3.3	A1	This mark is given for answers in the ranges -0.4 to -0.2 and 3.2 to 3.4
(b)		M1	This mark is given for drawing a tangent to the curve at $x = 2$
	For example, measuring gradient between (2,3) and (4, 7)	M1	This mark is given for a method to find gradient of their tangent
	2	A1	This mark is given for an answer in the range 1.6 to 2.5

Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		B1	This mark is given for one root correct
	-1.2 and 3.2	B1	This mark is given for a second root correct
(b)	$(1, -5)$	B1	This mark is given for the correct answer only

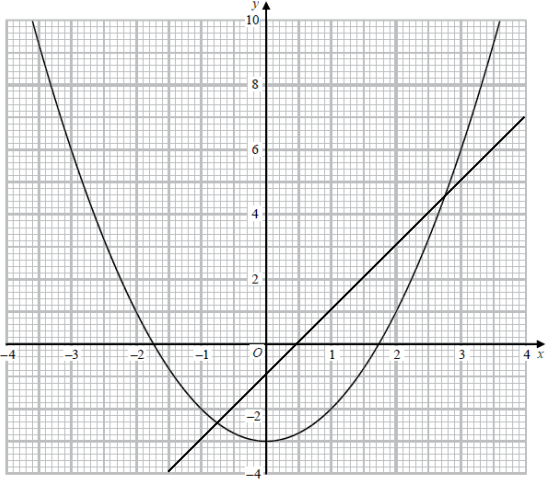
Question 6 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$-1, 3, 0, -1, 3$	B2	2 marks are given for all correct
		(B1	1 mark is given for 3 or 4 correct)
(b)		M1	This mark is given for at least 4 points from their table plotted correctly and joined
	Correct graph	A1	This mark is given for a fully correct graph

Question 7 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$x = \frac{- -8 \pm \sqrt{(-8)^2 - 4 \times 2 \times -5}}{2 \times 2}$	M1	This mark is given for a method to find the roots of $y = 0$
	$x = 2 + \sqrt{\frac{13}{2}}, \quad 2 - \sqrt{\frac{13}{2}}$	M1	This mark is given for finding the roots of $y = 0$
	x-coordinate for turning point = $\frac{1}{2} \left(2 + \sqrt{\frac{13}{2}} + 2 - \sqrt{\frac{13}{2}} \right) = 2$ When $x = 2, y = -13$	M1	This mark is given for the turning point of $y = 2x^2 - 8x - 5$
		C2	These marks are given for a fully correct parabola drawn with axes labelled, a turning point at $(2, -13)$ and intercepts at $(0, -5)$, $(2 + \sqrt{\frac{13}{2}}, 0)$ and $(2 - \sqrt{\frac{13}{2}}, 0)$ clearly shown

Question 8 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x^2 - 3) - (x^2 - 2x - 2) = 2x - 1$	P1	This mark is given for recognising $(x^2 - 3) - (x^2 - 2x - 2) = 2x - 1$
		M1	This mark is given for correctly plotting the line $y = 2x - 1$
	$x = -0.7$ and $x = 2.7$	M1	This mark is given for reading the points of intersection
		A1	This mark is given for finding x in the ranges 2.6 to 2.8 and -0.6 to -0.8

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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
1a	5a	June 2018	2H	2	Algebra	A14	1	85	1.69	1.99	1.96	1.90	1.79	1.60	1.31	0.96	-	-	0.61
1b	5b	June 2018	2H	2	Algebra	A14	2	74	1.47	1.93	1.83	1.70	1.55	1.34	1.06	0.73	-	-	0.42
1c	5c	June 2018	2H	2	Algebra	A11	2	42	0.83	1.81	1.50	1.16	0.83	0.50	0.22	0.08	-	-	0.03
2a	11a	June 2017	1H	1	Algebra	A11	2	92	0.92	0.99	0.98	0.97	0.94	0.90	0.83	0.70	-	-	0.53
2b	11b	June 2017	1H	1	Algebra	A11	2	30	0.30	0.79	0.60	0.41	0.26	0.15	0.07	0.02	-	-	0.01
2c	11c	June 2017	1H	1	Algebra	A7	2	44	0.44	0.81	0.66	0.52	0.42	0.34	0.25	0.14	-	-	0.08
3a	3a	Nov 2018	3H	2	Algebra	A14	1	74	1.47	2.00	2.00	1.93	1.87	1.71	1.46	1.12	-	-	0.81
3b	3b	Nov 2018	3H	2	Algebra	A14	2	54	1.08	1.80	1.76	1.70	1.58	1.38	1.02	0.69	-	-	0.32
3c	3c	Nov 2018	3H	1	Algebra	A12	2	20	0.20	1.00	0.76	0.67	0.47	0.26	0.10	0.04	-	-	0.02
4a	20a	June 2017	2H	2	Algebra	A18	2	6	0.11	0.78	0.24	0.09	0.04	0.02	0.01	0.00	-	-	0.00
4b	20b	June 2017	2H	3	Algebra	A15	1	21	0.63	2.54	1.65	0.77	0.31	0.14	0.07	0.03	-	-	0.02
5a	4a	Mock Set 2	2H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b	4b	Mock Set 2	2H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	8a	Mock Set 4	3H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6b	8b	Mock Set 4	3H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	21	Nov 2019	1H	5	Algebra	A18	1	5	0.23	4.11	2.05	1.03	0.37	0.18	0.03	0.01	-	-	0.00
8	17	Nov 2019	3H	4	Algebra	A18	2	2	0.06	2.22	0.78	0.21	0.10	0.02	0.01	0.00	-	-	0.00
				35					9.43	22.77	16.77	13.06	10.53	8.54	6.44	4.52	-	-	2.85