

GCSE Mathematics (1MA1)

Themed papers –Inequalities

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.

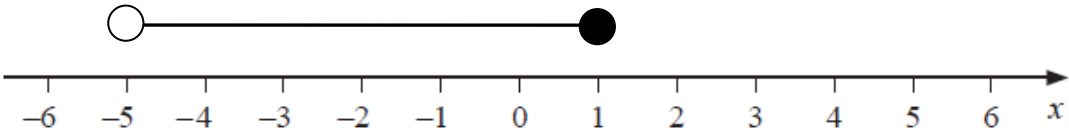
A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

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 an or answer examiner might expect to see	Mark	Notes
(a)	$14n - 11n > 6$ $3n > 6$	M1	This mark is given for a method to solve the inequality
	$n > 2$	A1	This mark is given for the correct answer only
(b)			
		M1	This mark is given for drawing a line from -5 to 1
		M1	This mark is given for an open circle drawn at -5 or a closed circle drawn at 1
		A1	This mark is given for a completely correct diagram

Question 2 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$4.755 \leq n < 4.765$	B2	These marks are given for the correct answer only (One mark is given for 4.755 or 4.765 or 4.7649 seen)

Question 3 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$y \geq -2, y \leq -2$ or $y = -2$	M1	This mark is given for y and -2 indicated in an equality or inequality
	$y \geq x, y \leq x$ or $y = x,$	M1	This mark is given for y and x indicated in an equality or inequality
	$y \leq \frac{1}{2}x + 1, y \geq \frac{1}{2}x + 1$ or $y = \frac{1}{2}x + 1,$	M1	$y = \frac{1}{2}x + 1$ indicated in an equality or inequality
	$y \geq -2, y \geq x$ and $y \leq \frac{1}{2}x + 1$	A1	This mark is given for three correct inequalities

Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(2x - 1)(x + 2) > 0$	M1	This mark is given for a first step to solve the quadratic equation
	$x = -2, x = \frac{1}{2}$	A1	This mark is given for the numbers -2 and $\frac{1}{2}$ seen
	$x < -2, x > \frac{1}{2}$	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
	$2x^2 - 5x - 12 = (2x + 3)(x - 4)$	M1	This mark is given for factorising the quadratic
	$x = -\frac{3}{2}$ and $x = 4$	A1	This mark is given for critical values of $-\frac{3}{2}$ and 4
	$x < -\frac{3}{2}$ and $x > 4$	A1	This mark is given for the correct inequalities

Question 6 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(2x + 3)(x - 1)$ Or using the formula using the formula $\frac{-1 \pm \sqrt{1^2 - 4 \times 2 \times (-3)}}{2 \times 2}$	M1	This mark is given for a first step to solve the quadratic e.g. factorisation
	$-1 \frac{1}{2} < x < 1$	A1	This mark is given for the correct answers only
	Sketch drawn	C2 (C1	2 Marks given for the solution set drawn for $-1 \frac{1}{2} < x < 1$ 1 mark is given for a correct solution set drawn for two values (not the correct solutions) or an attempt to draw the correct solution set for $-1 \frac{1}{2} < x < 1$ with some errors.)

Question 7 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$3n + 2 \leq 14$ $3n \leq 12$ $n \leq 4$	M1	This mark is given for a method to isolate n in the first expression
	$6n > n^2 + 5$ $n^2 - 6n + 5 < 0$	M1	This mark is given for rearranging the second expression into a quadratic form
	$(n - 5)(n - 1) < 0$	M1	This mark is given for factorising the quadratic in an attempt to solve
	$n > 1, n < 5$	M1	This mark is given for solving the inequality
	$n = 2, 3, 4$	A1	This mark is given for a correct answer only

Question 8 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$88 < m^2 + 7 < 128$ $81 < m^2 < 121$	M1	This mark is given for a method to rearrange for m^2
	$m^2 - 81 > 0$ $m^2 - 121 < 0$	M1	This mark is given for two correct inequalities
	$9 < m < 11$ and $-11 < m < -9$	M1	This mark is given for at least two of the critical values 9, 11, -9 and -11 seen
		M1	This mark is given for finding at least one set of critical values
		A1	This mark is given for a fully correct answer with both sets of critical values

Question 9 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x - 1)(3x - 2) = 3x^2 - 5x + 2$ $\frac{1}{2} 2x^2 = x^2$	1	This mark is given for deriving expressions for the areas of both the rectangle and triangle
	$2x^2 - 5x + 2 > 0$	1	This mark is given for finding an inequality
	$(2x - 1)(x - 2) > 0$	1	This mark is given for finding a method to solve the inequality
	$x > 2$ and $x > \frac{1}{2}$	1	This mark is given for finding the two critical values
	$x > 2$ only (since $x - \frac{1}{2} < 0$)	1	This mark is given for the correct answer only

Mark scheme for 1MA1 Higher themed papers: Inequalities

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	1a	June 2019	2H	2	Algebra	A22	1	77	1.53	1.97	1.91	1.82	1.64	1.32	0.90	0.51	-	-	0.27
1b	1b	June 2019	2H	3	Algebra	A22	2	45	1.36	2.66	2.20	1.68	1.21	0.87	0.63	0.46	-	-	0.32
2	7	June 2017	2H	2	Number	N15	1	45	0.90	1.72	1.46	1.19	0.92	0.63	0.32	0.10	-	-	0.02
3	13	June 2017	3H	4	Algebra	A22	2	34	1.37	3.25	2.66	1.98	1.29	0.67	0.24	0.06	-	-	0.02
4	19	June 2017	3H	3	Algebra	A22	1	31	0.92	2.42	1.87	1.32	0.81	0.40	0.14	0.03	-	-	0.01
5	19	Mock Set 2	3H	3															
6	18	Mock Set 4	2H	4															
7	20	June 2018	1H	5	Algebra	A22	1	30	1.52	3.97	2.72	1.84	1.35	0.94	0.58	0.32	-	-	0.15
8	19	Nov 2018	2H	5	Algebra	A22	1	14	0.71	4.30	3.53	2.78	1.82	0.90	0.27	0.02	-	-	0.02
9	23	Nov 2017	1H	5	Algebra	A22 G16 N1	1	5	0.24	4.38	3.15	1.58	0.84	0.41	0.12	0.03			0.01
				36					8.55	24.67	19.5	14.19	9.88	6.14	3.2	1.53	-	-	0.82