GCSE Mathematics (1MA1) – Aiming for 4 Paper 3F (Set 4)

Spring 2022 student-friendly mark scheme

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 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$2 \times 600 = 1200$ $7 \times 120 = 840$ $2 \times 250 = 500$	M1	This mark is given for a method to find the cost of at least one item
	$1200 + 840 + 500$	M1	This mark is given for a method to find the total cost
	2540 $(2540 > 2500)$	A1	This mark is given for the correct answer only

Question 2 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	10 45	B1	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
(a)	5	B1	This mark is given for the correct answer only
(b)	5 and 6	B1	This mark is given for the correct answer only

Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$200 \div 25 = 8$	P1	This mark is given for a process to find the number of boxes of tiles
	8×9.75	P1	This mark is given for a process to find the total cost of the boxes of tiles
	78	A1	This mark is given for a correct answer only

Question 5 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	–6, –4, –3, 0, 1, 2, 7	B1	This mark is given for the correct answer only

Question 6 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	0.45	B1	This mark is given for the correct answer only

Question 7 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{40}{100}$	B1	This mark is given for the correct answer only

Question 8 (Total 1 mark)

Part	Working an or answer examiner might expect to see	Mark	Notes
	6.25	B1	This mark is given for the correct answer only

Question 9 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
		B1	This mark is given for a correct answer only

Question 10 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	80	B1	This mark is given for the correct answer read off the graph
(b)	8	B1	This mark is given for the correct answer only
(c)	For example: Yes, because 27 is greater than 7 Yes, because the drop is 20 more Yes, the gradient is steeper (in the first 3 minutes) and is then less steep (in the last 3 minutes) Yes, because the drop is 20 less in the last 3 minutes	C1	This mark is given for a conclusion and reason

Question 11 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Any two from 1, 5, 7, 35	B1	This mark is given for two correct answers

Question 12 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	<table><tr><th></th><th>Red</th><th>Blue</th><th>Black</th><th>Total</th></tr><tr><td>**Plastic**</td><td></td><td>**5**</td><td></td><td>**32**</td></tr><tr><td>**Not plastic**</td><td>**8**</td><td></td><td></td><td></td></tr><tr><td>**Total**</td><td>**12**</td><td>**14**</td><td></td><td>**56**</td></tr></table>	B1	This mark is given for the given values correctly placed in the table
	<table><tr><th></th><th>Red</th><th>Blue</th><th>Black</th><th>Total</th></tr><tr><td>**Plastic**</td><td>**4**</td><td>5</td><td></td><td>32</td></tr><tr><td>**Not plastic**</td><td>8</td><td>**9**</td><td></td><td>**24**</td></tr><tr><td>**Total**</td><td>12</td><td>14</td><td>**30**</td><td>56</td></tr></table>	B1	This mark is given for at least one more value found For example: **4** + 8 = 12, 5 + **9** = 14, 32 + **24** = 56, 12 + 14 + **30** = 56
	<table><tr><th></th><th>Red</th><th>Blue</th><th>Black</th><th>Total</th></tr><tr><td>**Plastic**</td><td>4</td><td>5</td><td>**23**</td><td>32</td></tr><tr><td>**Not plastic**</td><td>8</td><td>9</td><td>**7**</td><td>24</td></tr><tr><td>**Total**</td><td>12</td><td>14</td><td>30</td><td>56</td></tr></table>	B1	This mark is given for a fully correct table

Question 13 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{12}{16}$	M1	This mark is given for a method to find the number of shaded squares as a fraction of the total
	$\frac{3}{4}$	A1	This mark is given for the correct answer only

Question 14 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	8	B1	This mark is given for the correct answer only

Question 15 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	EJ, *EK*, *FJ*, *FK*, *GJ*, *GK*	B2	These marks are given for a fully correct list with no repeats (B1 is given for at least four correct outcomes)

Question 16 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$5x + y$	M1	This mark is given for $5x$ or y seen
		A1	This mark is given for the correct answer only
(b)	$5p = 15$	M1	This mark is given for subtracting 7 from both sides of the equation
	3	A1	This mark is given for the correct answer only

Question 17 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\frac{5}{5+4+2}$	M1	This mark is given for a method to find the probability where $\frac{5}{n}$ seen ($n > 5$) or $\frac{m}{11}$ seen ($m < 11$)
	$\frac{5}{11}$	A1	This mark is given for the correct answer only
(b)	$1 - 0.3 = 0.7$	B1	This mark is given for the correct answer only

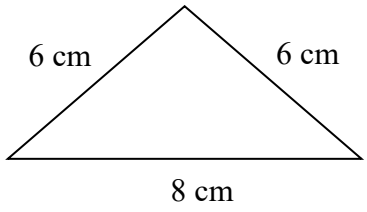
Question 18 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$300 \div 4.85$	P1	This mark is given for a process to find the number of books that can be bought
	61.8…	A1	This mark is given for a correct non-integer answer
	61	A1	This mark is given for the correctly rounding down to the nearest whole number

Question 19 (Total 1 mark)

Part	Working an or answer examiner might expect to see	Mark	Notes
	11	B1	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
	For example:  	M1	This mark is given for one line drawn with length 6 cm
		A1	This mark is given for an isosceles triangle correctly drawn

Question 21 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	Shop A: $30 \div 4 = 7.5$ so 8 packets needed Shop B: $30 \div 6 = 5$, so 5 packets needed	P1	This mark is given for a method to find the number of packets of batteries needed from each shop
	Shop A: $8 \times 1.60 = 12.80$ Shop B: $5 \times 2.70 = 13.50$	P1	This mark is given for a method to find the cost of the packets of batteries from one shop
		P1	This mark is given for a method to find the cost of the packets of batteries from both shops
	Harry should buy batteries from Shop A	C1	This mark is given for a valid conclusion following correct working
(b)	For example: No, since A is 12 and B is 13.50 No, since A is just 80p less and B is the same. No, since A is less and B has not changed. No, since A is 1.50 less No, since 40p is less than 45p	C1	This mark is given for a valid conclusion following correct working

Question 22 (Total 4 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	25	A1	This mark is given for the correct answer only
(b)	For example: Simon; he uses more trials Simon; he does 10 times more Simon, since 100 > 10	C1	This mark is given for a valid conclusion with a correct reason

Question 23 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{300}{100} = 3$	B1	This mark is given for the correct answer only

Question 24 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$4ab$	B1	This mark is given for the correct answer only
(b)	$4x - x = 3x, \quad 3 + 5 = 8$	M1	This mark is given for a method to collect terms
	$3x + 8$	A1	This mark is given for the correct answer only

Question 25 (Total 2 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$10 + 7 + 4 + 5 + (10 - 4) + (7 - 5)$ $= 26 + 6 + 2$	M1	This mark is given for a method to find the length of the perimeter
	34	A1	This mark is given for the correct answer only

Question 26 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$196 – 60 – 60 – 60 = 16$	P1	This mark is given for a process to find 196 minutes in hours and minutes
	3 hours and 16 minutes	A1	This mark is given for the correct answer only
(b)	$\frac{x}{2}$	B1	This mark is given for a correct answer only

Question 27 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	For example: The angles do not add to 360° The angles only add to 260° She is missing a 100° angle (At least) one of the angles has been measured incorrectly	C1	This mark is given for a correct explanation

Question 28 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\frac{300}{10} = 30$	B1	This mark is given for a correct answer only
(b)	$3.5 \times 12 = 42$	B1	This mark is given for a correct answer only
(c)	$\frac{1}{20}$	B1	This mark is given for a correct answer only (accept 0.05)

Question 29 (Total 2 marks)

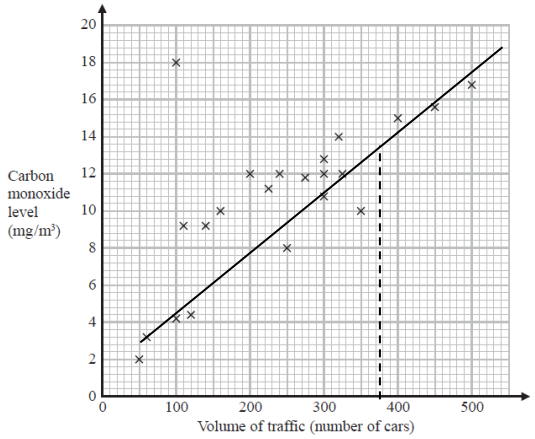
Part	Working or answer an examiner might expect to see	Mark	Notes
(a)(i)	20, 15	B1	This mark is given for a correct answer only
(a)(ii)	45, 40, 35, 30, 25, 20, 15, 10, 5, 0, –5 11th term	B1	This mark is given for a correct answer only

(b)	$(4 \times 9) + 3 = 39$	B1	This mark is given for a correct answer only

Question 30 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{13}{15} \times 600 = 520$ or $1 - \frac{13}{15} = \frac{2}{15}$	P1	This mark is given for a first step of a process to find the cost of the land
	$600 - 520$ or $\frac{2}{15} \times 600$	P1	This mark is given for a full process to find the cost of the land
	80	A1	This mark is given for the correct answer only

Question 31 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	(100, 18)	B1	This mark is given for the correct answer only
(b)		M1	This mark is given for a method to read off a line of best fit or to find a point on the grid at (370, y), where y is in the range 12.8 to 14.6
	13.7	A1	This mark is given for a correct answer in the range 12.8 to 14.6
(c)	For example: No, this point can be disregarded from the general trend	C1	This mark is given for a correct reason

Question 32 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	360 – 130 – 95 – 65 = 70	M1	This mark is given for a method to find the missing angle of the quadrilateral
	180 – 70	M1	This mark is given for a method to find the angle y
	110	A1	This mark is given for the correct answer only

Question 33 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	450 000	B1	This mark is given for a correct answer only
(b)	7×10^{-3}	B1	This mark is given for a correct answer only
(c)	4200 + 530 = 4730	M1	This mark is given for a method to find the calculation as an ordinary number
	4.73×10^{3}	A1	This mark is given for the correct answer only

Question 34 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$3 \times 80 = 240$	P1	This mark is given for a process to find the total amount of money shared
	240 – 100 – 65 = 75	P1	This mark is given for a process to find out how much money Carl has
	$75 – (3 \times 5) – 20 = 40$	P1	This mark is given for a process to find out how much money Carl has in ten pound notes
	$40 \div 10 = 4$	A1	This mark is given for the correct answer only

Aiming for 4 - Paper 3F					Edexcel averages: mean scores of students who achieved grade						
Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1	Apply four operations	2.90	3	97	2.90	2.98	2.97	2.95	2.91	2.69	1.78
2	Units of mass, length, time, money and other measures (including standard compound measures)	0.93	1	93	0.93	0.98	0.97	0.95	0.92	0.83	0.68
3	Vertical line charts	1.85	2	93	1.85	1.93	1.91	1.88	1.79	1.60	1.03
4	Apply four operations	2.77	3	92	2.77	2.97	2.96	2.89	2.65	1.82	0.57
5	Order numbers	0.92	1	92	0.92	0.97	0.96	0.94	0.90	0.78	0.51
6	Percentages and problems involving percentage change	0.90	1	90	0.90	0.97	0.97	0.94	0.89	0.75	0.49
7	Percentages and problems involving percentage change	0.89	1	89	0.89	0.98	0.97	0.93	0.83	0.64	0.29
8	Roots and powers	0.88	1	88	0.88	0.98	0.96	0.91	0.81	0.65	0.31
9	Use standard units of measure and related concepts	0.88	1	88	0.88	0.97	0.93	0.90	0.86	0.80	0.66
10	Graphs of functions in real contexts	2.58	3	86	2.58	2.79	2.72	2.63	2.45	2.15	1.38
11	Primes, factors, multiples	0.86	1	86	0.86	0.97	0.95	0.91	0.83	0.66	0.31
12	Two way tables	2.53	3	84	2.53	2.92	2.85	2.75	2.44	1.65	0.73
13	One quantity as a fraction of another	1.66	2	83	1.66	1.90	1.85	1.73	1.51	1.09	0.48
14	Calculate exactly with fractions	0.82	1	82	0.82	0.99	0.95	0.87	0.70	0.50	0.27
15	Listing strategies/Product rule for counting	1.61	2	81	1.61	1.89	1.86	1.76	1.51	1.03	0.52
16	Solve linear equations	3.16	4	79	3.16	3.80	3.66	3.37	2.66	1.62	0.58
17	Probabilities of an exhaustive set of outcomes	2.36	3	79	2.36	2.91	2.78	2.51	1.97	1.19	0.30
18	Units of mass, length, time, money and other measures (including standard compound measures)	2.35	3	78	2.35	2.93	2.78	2.58	2.17	1.44	0.68
19	Fractions, decimals and percentages as operators	0.77	1	77	0.77	0.98	0.94	0.86	0.68	0.49	0.23
20	Constructions and loci	1.50	2	75	1.50	1.84	1.73	1.57	1.29	0.88	0.36
21	Apply four operations	3.61	5	72	3.61	4.30	4.15	3.84	3.12	1.87	0.43
22	Samples and theoretical probability distributions	1.33	2	67	1.33	1.65	1.51	1.38	1.16	0.79	0.27
23	Change between standard units and compound units	0.66	1	66	0.66	0.91	0.79	0.68	0.55	0.40	0.32
24	Simplify and manipulate algebraic	1.96	3	65	1.96	2.82	2.50	2.15	1.74	1.25	0.68

	expressions and fractions										
25	Perimeters of 2D shapes	1.29	2	65	1.29	1.69	1.53	1.34	1.07	0.76	0.54
26	Change between standard units and compound units	1.86	3	62	1.86	2.59	2.16	1.95	1.75	1.39	0.82
27	Properties of angles	0.59	1	59	0.59	0.89	0.78	0.68	0.49	0.26	0.09
28	BIDMAS and inverse operations	1.75	3	58	1.75	2.23	1.95	1.78	1.61	1.37	0.91
29	Linear and non-linear sequences of diagrams and numbers	1.73	3	58	1.73	2.51	2.11	1.75	1.42	1.12	0.62
30	Calculate exactly with fractions	1.56	3	52	1.56	2.90	2.54	1.93	1.01	0.42	0.11
31	Correlation and causation	2.00	4	50	2.00	2.97	2.69	2.25	1.70	1.02	0.51
32	Properties of angles	1.45	3	48	1.45	2.73	2.18	1.47	0.83	0.53	0.16
33	Standard form	1.86	4	47	1.86	3.15	2.52	2.04	1.60	1.12	0.55
34	Apply four operations	1.67	4	42	1.67	3.14	2.52	1.71	0.94	0.57	0.24
		56.44	**80**	**71**	**56.44**	**72.13**	**66.60**	**59.78**	**49.76**	**36.13**	**18.41**

Aiming for 4 – Set 4 (Spring 2022)

Suggested grade boundaries

	Max	**5**	**4**	**3**	**2**	**1**
1F	80	69	62	53	42	32
2F	80	70	63	54	41	26
3F	80	69	63	55	43	27
Total	**240**	**208**	**188**	**162**	**126**	**85**

Grade boundaries are based on the average performance data for students answering these questions who gained grades 1-5 in the November 2020 & 2021 GCSE Mathematics examinations at Foundation tier.

Students did not answer these questions as 90-minute tests, of course; so there is some scope for adjustment. These boundaries are for guidance only.