

# **GCSE Mathematics (1MA1) – Aiming for 7 Paper 1H (Set 2)**

## **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 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$67.2 \times 10^{-4} = 6.72 \times 10^{-3}$ $672 \times 10^4 = 6.72 \times 10^6$ $0.000672 = 6.72 \times 10^{-4}$	M1	This mark is given for converting each number into standard form
	0.000672, $67.2 \times 10^{-4}$ , $6.72 \times 10^5$ , $672 \times 10^4$	A1	This mark is given for all terms in the correct order

### Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$24 \times 50p = £12$ $£12 - £10 = £2$	M1	This mark is given for a process to find the overall profit
	$\frac{2}{10} \times 100$	M1	This mark is given for a method to find the percentage profit
	20%	A1	This mark is given for the correct answer only

### Question 3 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$220\ 000 \times 0.2 = 44\ 000$	P1	This mark is given for a process to find the amount of decrease in the value of Tamara's house
	Tamara's house at the end of 2019: $220\ 000 - 44\ 000 = 176\ 000$	P1	This mark is given for a process to find the value of Tamara's house at the end of 2019
	Rahim's house at the end of 2019: $160\ 000 \times 1.3 = 208\ 000$	A1	This mark is given for a process to find the value of Rahim's house at the end of 2019
	$208\ 000 > 176\ 000$ Rahim's house had the greater value	C1	This mark is given for a correct conclusion

#### Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
		M1	This mark is given for 6 and 18 correctly placed
		M1	This mark is given for 2 and 14 correctly placed
		C1	This mark is given for a fully correct Venn diagram

#### Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{21}{5} - \frac{8}{3}$	M1	This mark is given for a method to find mixed numbers as improper fractions
	$= \frac{63}{15} - \frac{40}{15} = \frac{23}{15}$	M1	This mark is given for a method to find fractions with a common denominator
	$= 1\frac{8}{15}$	A1	This mark is given for a correct answer only

#### Question 6 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes										
	<table border="1"> <thead> <tr> <th>Equation</th> <th>Letter of graph</th> </tr> </thead> <tbody> <tr> <td><math>y = x^3</math></td> <td>B</td> </tr> <tr> <td><math>y = x^3</math></td> <td>C</td> </tr> <tr> <td><math>y = x^3</math></td> <td>D</td> </tr> <tr> <td><math>y = \frac{1}{x}</math></td> <td>A</td> </tr> </tbody> </table>	Equation	Letter of graph	$y = x^3$	B	$y = x^3$	C	$y = x^3$	D	$y = \frac{1}{x}$	A	B2	<p>This mark is given for all four graphs correct (B1 is given for two or three graphs correct)</p>
Equation	Letter of graph												
$y = x^3$	B												
$y = x^3$	C												
$y = x^3$	D												
$y = \frac{1}{x}$	A												

**Question 7 (Total 3 marks)**

Part	Working or answer an examiner might expect to see	Mark	Notes
	$2\frac{1}{3} = \frac{7}{3}, 3\frac{3}{4} = \frac{15}{4}$	M1	This mark is given for a conversion to at least one improper fraction
	$\frac{7}{3} \times \frac{15}{4} = \frac{105}{12}$	M1	This mark is given for a method to find the multiplication as a single improper fraction
	$\frac{105}{12} = 8\frac{9}{12} = 8\frac{3}{4}$	A1	This mark is given for the correct working to show the result as required

**Question 8 (Total 2 marks)**

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\begin{array}{ccccccc} 1 & 4 & 7 & 10 & 13 \\ & 3 & 3 & 3 & 3 \end{array}$	M1	This mark is given for a method to use differences to find the coefficient of $n$
	$3n - 2$	A1	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
	<b>A and D</b>	C2	This mark is given for the correct answer only

**Question 10 (Total 6 marks)**

Part	Working or answer examiner might expect to see	Mark	Notes
(a)	$\begin{array}{r} 3.67 \\ \underline{\times} \\ 4.2 \\ \hline 15.414 \end{array}$	M1	This mark is given for a method to find a solution
		A1	This mark is given for 15414 seen
		A1	This mark is given for the correct answer only
(b)	For example $5984 \div 16$	M1	This mark is given for a method to simplify to find a solution
	$\begin{array}{r} 374 \\ 16 \overline{) 5984 } \end{array}$	A1	This mark is given for 374 seen
	37.4	A1	This mark is given for the correct answer only

**Question 11 (Total 4 marks)**

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	1	B1	This mark is given for the correct answer only
(b)	3	B1	This mark is given for the correct answer only
(c)	$\frac{1}{16}$	B1	This mark is given for the correct answer only (or equivalent)
(d)	3	B1	This mark is given for the correct answer only

**Question 12 (Total 3 marks)**

Part	Working or answer an examiner might expect to see	Mark	Notes
	$A = (x + 11)(2x + 6) - 4(x + 5)$	M1	This mark is given for a process to find area of a rectangle with sides with length $x + 11$ and $2x + 6$
		M1	This mark is given for a process to subtract the area of a rectangle with sides with length $(2x + 6) - (x + 1) = (x + 5)$ and 4
	$\begin{aligned}A &= 2x^2 + 22x + 6x + 66 - 4x - 20 \\&= 2x^2 + 24x + 46\end{aligned}$	A1	This mark is given for a completely correct solution

**Question 13 (Total 3 marks)**

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\begin{aligned}4 : 7 : 15 \\15 - 7 = 8\end{aligned}$	P1	This mark is given for a process to find how many more stickers Ibrahim has using the ratio given in the question
	$\begin{aligned}24 \div 8 = 3 \\ \text{Rosie, Matilda and Ibrahim have stickers in ratio } 12 : 21 : 45\end{aligned}$	P1	This mark is given for process to find the number of stickers each person has
	$\begin{aligned}\text{Ibrahim has } 45 - 12 \text{ more stickers than Rosie} \\= 33\end{aligned}$	A1	This mark is given for the correct answer only

### Question 14 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		M1	This mark is given for at least five of the points $(5, 4)$ , $(10, 11)$ , $(15, 24)$ , $(20, 34)$ , $(25, 38)$ , and $(30, 40)$ correctly plotted
		A1	This mark is given for a fully correct graph
(b)	13 or 14	B1	This mark is given for an answer in the range 13–14

### Question 15 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{2}{5} \times 3$ and $\frac{3}{4} \times 5$	P1	This mark is given for a process to find a multiplier to equate the fractions in terms of $b$
	$\frac{6}{15}$ and $\frac{15}{20}$	P1	This mark is given for a process to use these terms to find the ratio
	6 : 15 : 20	A1	This mark is given for the correct answer only

### Question 16 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	Area of one of the squares = $\frac{5406}{6} \text{ cm}^2$	P1	This mark is given for a process to find the area of one square
	$901 \text{ cm}^2$	P1	This mark is given for a process to find the area of one square
	$\sqrt{901} \approx 30$ Side of square is 30 cm	A1	This mark is given finding the length of the side of one square (to the nearest whole number)
(b)	Underestimate; $30^2 = 900$ so $\sqrt{901} > 30$	C1	This mark is given for a correct reason

### Question 17 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$AEB = 63$	M1	This mark is given for a method to find the size of angle $AEB$
	Corresponding angles are equal	C1	This mark is given for a correct reason stated
	$BCD = 180 - 148 = 32$	M1	This mark is given for a method to find the size of angle $EBA$
	Angles on a straight line add up to 180	C1	This mark is given for a correct reason stated
	$EAB = 180 - 63 - 32 = 85$ Angles in a triangle add up to 180	A1	This mark is given for the correct answer with a correct reason stated

### Question 18 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	5, 15, 35, 55, 70, 80	B1	This mark is given for a fully correct table
(b)		M1	This mark is given for at least five of the points $(250, 5)$ , $(300, 15)$ , $(350, 35)$ , $(400, 55)$ , $(450, 70)$ , and $(500, 80)$ correctly plotted
		A1	This mark is given for a fully correct graph
(c)	$60\% \times 80 = 48$	M1	This mark is given for reading off the graph for 60% of people
	Point on curve is $(380, 48)$	M1	This mark is given for identifying the point $(380, 48)$
	Juan is incorrect 60% of people have a weekly wage of £380 or less	C1	This mark is given for a correct conclusion following correct working

### Question 19 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Volume of liquid A = $\frac{1400}{70} = 20$ Mass of liquid B = $280 \times 30 = 8400$	P1	This mark is given for a process to find the volume of liquid A and the mass of liquid B
	Density of liquid C = $\frac{1400 + 8400}{20 + 30} = \frac{9800}{50}$	P1	This mark is given for a process to find the density of liquid C
	196	A1	This mark is given for the correct answer only

### Question 20 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Range of the girls = $170 - 150 = 20$ Range of the boys = $182 - 158 = 24$ Median of the girls = 165 Median of the boys = 168	B1	This mark is given for identifying the range of the girls' heights or the range of the boys' heights or the median of the boys' heights
	For example: the median for girls (165) is less than the median for boys (168)	C1	This mark is given for a correct comparison of medians
	For example: the range for girls (20) is smaller than the range for boys (24)	C1	This mark is given for a correct comparison of ranges

### Question 21 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{1}{2}(5 \times h) \times 25 = 750$	P1	This mark is given for a process to find an equation in $h$ for the volume of the prism
	$h = \frac{750}{62.5}$	P1	This mark is given for a process to find an equation for the height of the prism
	$h = 12$	A1	This mark is given for the correct answer only

### Question 22 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{5(4x+3)+6x}{10x}$	M1	This mark is given for a method to find a correct numerator
		M1	This mark is given for a method to find a correct denominator
	$\frac{20x+15+6x}{10x} = \frac{26x+15}{10x}$	A1	This mark is given for collecting terms to find an answer in the form $\frac{ax+b}{cx}$

### Question 23 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$g(5) = 3 \times (2 \times 5 + 1) = 33$	B1	This mark is given for the correct answer only
(b)	$f(9) = \frac{12}{\sqrt{9}} = 4$	M1	This mark is given for a method to find the value of $f(9)$
	$gf(9) = g(4) = 3 \times (2 \times 4 + 1) = 27$	A1	This mark is given for the correct answer only
(c)	$g^{-1}(y) = \frac{1}{2} \left( \frac{y}{3} - 1 \right) = \frac{y-3}{6}$	M1	This mark is given for a method to find the inverse of $g(x)$
	$g(6) = \frac{6-3}{6} = \frac{1}{2}$	A1	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
	$18 \div 3 = 6$	M1	This mark is given for method to find the area of the base of the prism
	$75 = \frac{\text{Force}}{6}$	M1	This mark is given for a method to substitute into the formula $\text{Pressure} = \frac{\text{Force}}{\text{Area}}$
	$\text{Force} = 75 \times 6 = 450$	A1	This mark is given for the correct answer only

Aiming for 7 - Paper 1H		Edexcel averages: mean scores of students who achieved grade											
Qn	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3	U
1	Standard form	1.61	2	81	1.61	1.89	1.89	1.82	1.70	1.63	1.42	1.15	1.01
2	Percentages and problems involving percentage change	2.33	3	78	2.33	2.94	2.80	2.70	2.53	2.36	1.89	1.63	1.17
3	Percentages and problems involving percentage change	3.02	4	76	3.02	3.85	3.74	3.58	3.47	3.21	2.86	2.05	1.24
	Enumerate sets and combinations of sets systematically; two-way tables, Venn diagrams and tree diagrams	2.24	3	75	2.24	2.87	2.60	2.57	2.47	2.25	2.17	1.80	1.29
4	Apply four operations	2.22	3	74	2.22	2.92	2.75	2.79	2.74	2.48	1.94	1.24	0.73
5	Graphs of functions in real contexts	1.46	2	73	1.46	1.95	1.95	1.85	1.66	1.39	1.06	0.74	0.61
6	Calculate exactly with fractions	2.16	3	72	2.16	2.92	2.86	2.71	2.54	2.16	1.62	0.69	0.39
8	The nth term of a sequence	1.29	2	65	1.29	1.93	1.84	1.66	1.48	1.22	0.92	0.46	0.33
9	Basic congruence criteria for triangles (SSS, SAS, ASA, RHS)	0.56	1	56	0.56	0.94	0.84	0.74	0.60	0.49	0.40	0.25	0.25
10	Apply four operations	3.25	6	54	3.25	5.51	4.61	4.37	3.96	3.41	2.56	1.93	1.04
11	Index notation	2.12	4	53	2.12	3.89	3.68	3.40	2.85	2.29	1.28	0.67	0.38
12	Translate situations or procedures into algebraic expressions, formulae or equations	1.43	3	48	1.43	2.97	2.93	2.79	2.24	1.56	0.45	0.08	0.00
13	Ratio in real context	1.42	3	47	1.42	2.92	2.47	2.03	1.74	1.43	1.04	0.56	0.35
14	Measures of central tendency (median, mean, mode and modal class)	1.41	3	47	1.41	2.57	1.99	1.81	1.66	1.36	1.15	0.96	0.67
15	Relate ratios to fractions and to linear functions	1.36	3	45	1.36	2.40	2.20	1.99	1.69	1.25	0.61	0.24	0.05
16	Approximation and estimation	1.77	4	44	1.77	3.66	3.42	2.81	2.35	1.59	1.05	0.81	0.45
17	Parallel lines	2.14	5	43	2.14	4.16	3.94	3.21	2.54	1.86	0.86	0.44	0.33
18	Cumulative frequency graphs	2.54	6	42	2.54	5.25	4.50	3.80	2.82	2.17	1.34	0.50	0.29
19	Use compound units	1.25	3	42	1.25	2.79	2.44	2.00	1.59	0.93	0.39	0.10	0.15
20	Stem and leaf diagrams	1.22	3	41	1.22	2.46	2.02	1.73	1.33	1.07	0.72	0.40	0.15
21	Volume cuboids and other right prisms (including cylinders)	1.16	3	39	1.16	2.86	2.40	1.99	1.55	1.07	0.62	0.30	0.17
22	Simplify and manipulate algebraic expressions and fractions	1.15	3	38	1.15	2.96	2.81	2.38	1.72	1.08	0.29	0.07	0.03
23	Inverse and composite functions;	1.86	5	37	1.86	4.58	4.10	3.31	2.21	1.23	0.44	0.11	0.11

	formal function notation												
<b>24</b>	Use compound units	1.06	3	35	1.06	2.68	1.90	1.54	1.28	0.81	0.44	0.25	0.24
		<b>42.03</b>	<b>80</b>	<b>52</b>	<b>42.03</b>	<b>73.87</b>	<b>66.68</b>	<b>59.58</b>	<b>50.72</b>	<b>40.30</b>	<b>27.52</b>	<b>17.43</b>	<b>11.43</b>

## Aiming for 7 – Set 2 (Spring 2022)

### Suggested grade boundaries

	<b>Max</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>
<b>1H</b>	80	70	63	55	45	34	22	14
<b>2H</b>	80	74	68	62	53	41	27	16
<b>3H</b>	80	73	67	61	52	39	26	15
<b>Total</b>	<b>240</b>	<b>217</b>	<b>198</b>	<b>178</b>	<b>150</b>	<b>114</b>	<b>75</b>	<b>45</b>

Grade boundaries are based on the average performance data for students answering these questions who gained grades 3-9 in the November 2020 & 2021 GCSE Mathematics examinations at Higher 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.