

GCSE Mathematics (1MA1)

Aiming for Grade 7 practice papers – Paper 2 – Calculator

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.

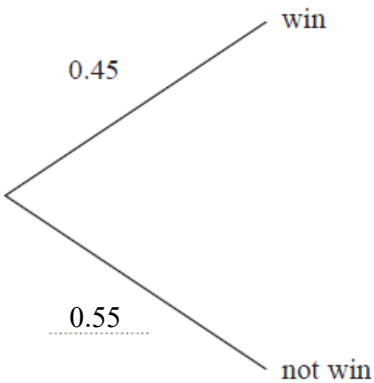
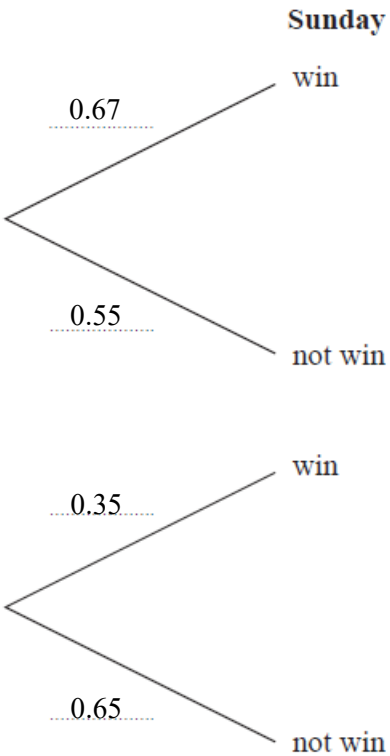
A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

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 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$1 - 0.45 = 0.55$ 	B1	This mark is given for finding the probability of not winning on Saturday in correct position
	$1 - 0.67 = 0.33$ $1 - 0.35 = 0.65$ 	B1	This mark is given for the branches for the Sunday game correct
(b)	$0.45 \times 0.33 = 0.1485$ $0.55 \times 0.35 = 0.1925$	M1	This mark is given for finding the probability of one win on Saturday and not on Sunday and a win on Sunday but not on Saturday
	$0.1485 + 0.1925$	M1	This mark is given for a correct method to find the total probability
	0.341	A1	This mark is given for the correct answer only

Question 2 (Total 2 mark)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$\overrightarrow{FE} = \overrightarrow{FC} + \overrightarrow{CD} + \overrightarrow{DE}$ $= (\mathbf{a} - \mathbf{b}) + \mathbf{a} + \mathbf{b}$	M1	This mark is given for a method to find a vector expression for $\overrightarrow{FE}$
	$= 2\mathbf{a}$	A1	This mark is given for the correct answer only

Question 3 (Total 4 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Chloe and Denesh each receive 1.5×2	P1	This mark is given for a process to find out the proportion that Chloe and Denesh each share
	$A : B : C : D = 2 : 7 : 3 : 3$	P1	This mark is given for a process to find the ratio of money that each person shares
	$\frac{7}{2+7+3+3} \times 360 = \frac{7}{15} \times 360$	P1	This mark is given for a process to find the amount of money that Ben gets
	168	A1	This mark is given for the correct answer only

Question 4 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$50\,000 \times 1.02^8$	1	The mark is given for a method to find the increase in value after 8 years
	58 600	1	This mark is given for the correct answer only

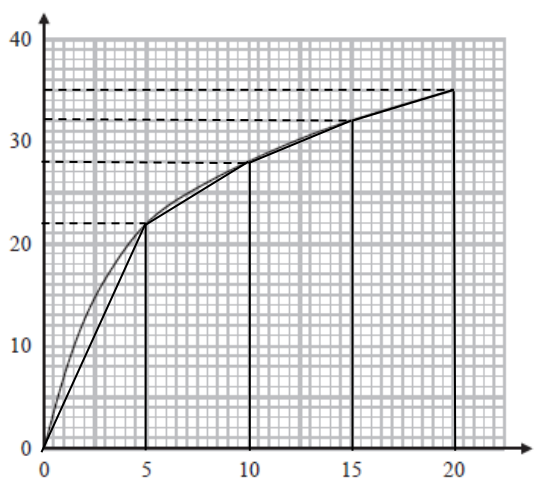
Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$26.15 \leq u \leq 26.25$ $4.25 \leq a \leq 4.35$	M1	This mark is given for a method to find at least one upper or lower bound for u or a
	$\frac{26.25^2}{2 \times 4.25}$	M1	This mark is given for a method to find an upper bound for the value of D
	80.066176...	A1	This mark is given for a correct answer in the range 81.0661 to 81.0662

Question 6 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\pi \times 7^2 = 49\pi = 153.938\dots$	P1	This mark is given for a process to find the area of the circle that the sector is part of
	$\frac{40}{49\pi} \times 360 = 93.54$	P1	This mark is given for a process to find the angle of the sector at O
	$\frac{93.54}{360} \times 2 \times \pi \times 7 = 11.43$	P1	This mark is given for a process to find the length of the arc AB
	$11.43 + 7 + 7 = 25.43$	A1	This mark is given for a correct answer in the range 25 to 25.44

Question 7 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	 $\left(\frac{1}{2} \times 5 \times (0 + 22)\right) + \left(\frac{1}{2} \times 5 \times (22 + 28)\right) + \left(\frac{1}{2} \times 5 \times (28 + 32)\right) + \left(\frac{1}{2} \times 5 \times (32 + 35)\right)$ $= 55 + 125 + 150 + 167.5$	M1	This mark is given for a method to find the area of one strip using a trapezium (or a triangle)
		M1	This mark is given for a method to find the area under the curve using four trapeziums
	497.5	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
	$\begin{array}{cccccc} 4 & 11 & 22 & 37 & 56 \\ & 7 & 11 & 15 & 19 \\ & & 4 & 4 & 4 \end{array}$ 2nd differences imply a term in $2n^2$	M1	This mark is given for a correct start to a method to find n th term
	$2n^2 + n$ gives 3, 10, 21, 36, 55...	M1	This mark is given for a method leading to $2n^2$ and either n or 1
	$2n^2 + n + 1$	A1	This mark is given for the correct answer only

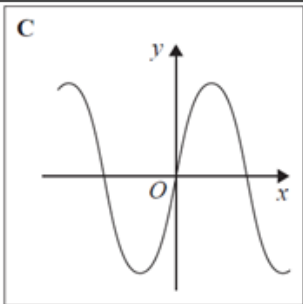
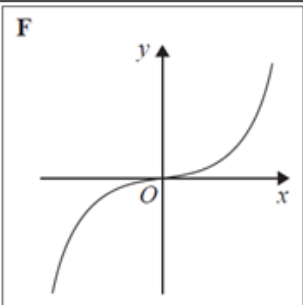
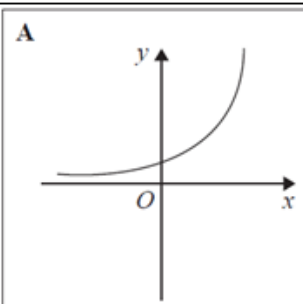
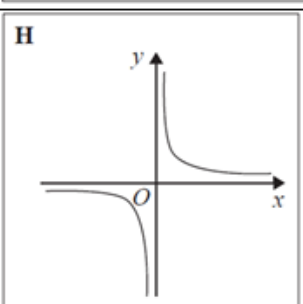
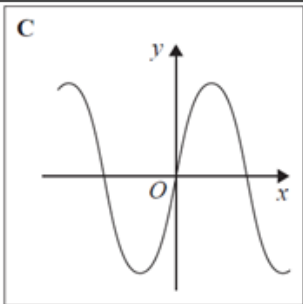
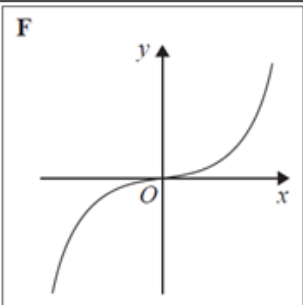
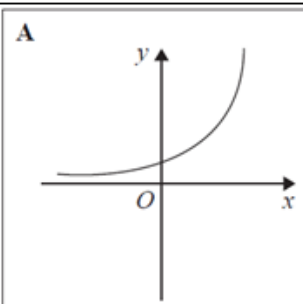
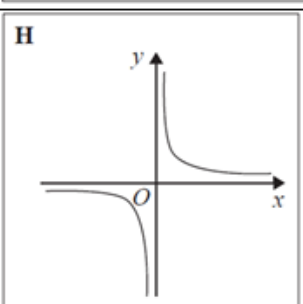
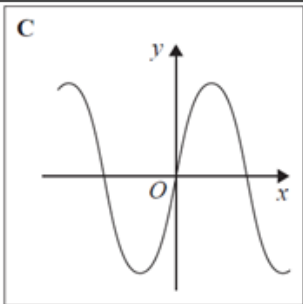
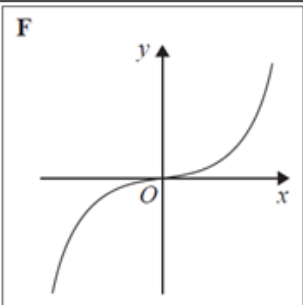
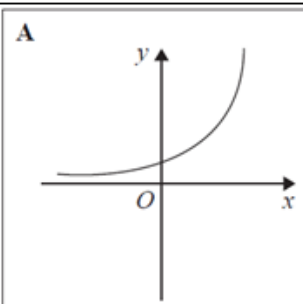
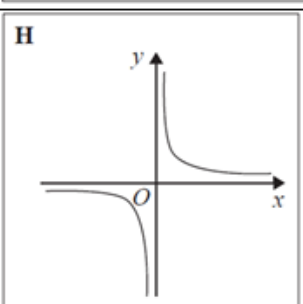
Question 9 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$BDA = \frac{180 - 40}{2} = 70^\circ$ $BCD = 180 - 70 = 110$	M1	This mark is given for a method to find the angles BDA and BCD
	Base angles at the base of an isosceles triangle are equal Opposite angles of a cyclic quadrilateral add up to 180	C1	This mark is given for two appropriate reasons stated
	$BDC = 55$	M1	This mark is given for a finding the angle BDC
	Base angles at the base of an isosceles triangle are equal	C1	This mark is given for a an appropriate reason stated
	$ADE = 180 - 55 - 70 = 75^\circ$ Angles on a straight line add up to 180°	A1	This mark is given for correctly finding the angle ADE with an appropriate reason stated

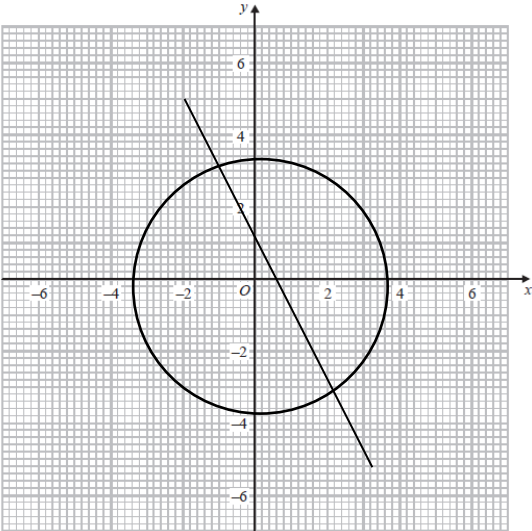
Question 10 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Let $y = 0.\dot{2}$. $10y = 2.\dot{2}$; $9y = 2$, thus $y = \frac{2}{9}$	M1	This mark is given for a method to convert $0.\dot{2}$ to a fraction
	Let $x = 0.1\dot{3}\dot{6}$ $10x = 1.3636\ldots$ $1000x = 136.3636$ $990x = 135$, thus $x = \frac{135}{990}$	M1	This mark is given for a method to convert $0.13636\ldots$ to a fraction
	$\frac{2}{9} \times \frac{135}{990} = \frac{270}{8910} = \frac{1}{33}$	C1	This mark is given for a correct arithmetic and concluding the proof

Question 11 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes										
	C, F, A, H <table><tr><th>Equation</th><th>Graph</th></tr><tr><td>$y = \sin x$</td><td> C </td></tr><tr><td>$y = x^3 + 4x$</td><td> F </td></tr><tr><td>$y = 2^x$</td><td> A </td></tr><tr><td>$y = \frac{4}{x}$</td><td> H </td></tr></table>	Equation	Graph	$y = \sin x$	C 	$y = x^3 + 4x$	F 	$y = 2^x$	A 	$y = \frac{4}{x}$	H 	B3	This mark is given for a fully correct table (Two marks are given for two or three correct, one mark is given for one correct)
Equation	Graph												
$y = \sin x$	C 												
$y = x^3 + 4x$	F 												
$y = 2^x$	A 												
$y = \frac{4}{x}$	H 												

Question 12 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		B1	This mark is given for a circle with centre (0, 0)
		B1	This mark is given for a circle with a radius of 3.5
(b)	$x = 2.0, y = -2.9$ $x = -1.2, y = 3.3$	M1	This mark is given for the line $2x + y = 1$ drawn
		A1	This mark is given for one correct pair of solutions for x and y
		A1	This mark is given for both correct pairs of solutions for x and y , unambiguously matched

Question 13 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$5 \times 0.8 = 4$ $10 \times 0.4 = 4$ $10 \times 0.6 = 6$ $5 \times 1.0 = 5$ $20 \times 0.2 = 4$	M1	This mark is given for a correct method to find at least two frequencies from bars of different widths.
	4, 6, 5, 4	A1	This mark is given for the correct answer only
(b)	$\frac{4 + 4 + 6 + 5 + 4}{4} = \frac{5.75}{4}$ so take 6th value	M1	This mark is given for a method to find the 6th value
	10 (minutes)	A1	This mark is given for the correct answer only

Question 14 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{162\,000}{0.9} = 180\,000$	P1	This mark is given for a process to find the cost of the house in 2007
	$\frac{180\,000}{1.2}$	P1	This mark is given for a process to find the cost of the house in 2003
	150 000	A1	This mark is given for the correct answer only

Question 15 (Total 2 mark)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	In the denominator on the second line, $\sqrt{3} \times -\sqrt{3} = -3$, not 3	C1	This mark is given for a correct explanation
(b)	In the numerator on the second line, $\sqrt{12} = 2\sqrt{3}$, not $3\sqrt{2}$	C1	This mark is given for a correct explanation

Question 16 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$f(m-1) = 3m + 4$	P1	This mark is given for a method to multiply both sides by $m-1$
	$fm - 3m = f + 4$ $m(f-3) = f + 4$	P1	This mark is given for a method to rearrange the formula to isolate terms in m
	$m = \frac{f+4}{f-3}$	A1	This mark is given for the correct answer only

Question 17 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$y \propto \frac{1}{x^3}$ or $y = \frac{k}{x^3}$	M1	This mark is given for constructing a proportional equation
	$44 = \frac{k}{a^3}$ so $k = 44a^3$	M1	This mark is given for a method to find a value for k
	When $x = 2a$, $y = \frac{44a^3}{(2a)^3} = \frac{44a^3}{8a^3} = 5.5$	C1	This mark is given for a complete method to show $y = 5.5$.

Question 18 (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

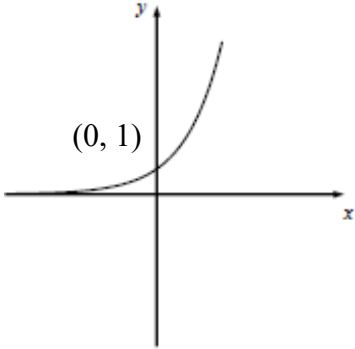
Question 19 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$1^3 + 1 = 2$ $2^3 + 2 = 10$	C1	This mark is given for substituting both 1 and 2 into $x^3 + x$
	2 is < 7 and $10 > 7$ which implies there is a solution between 1 and 2	C1	This mark is given for a correct statement

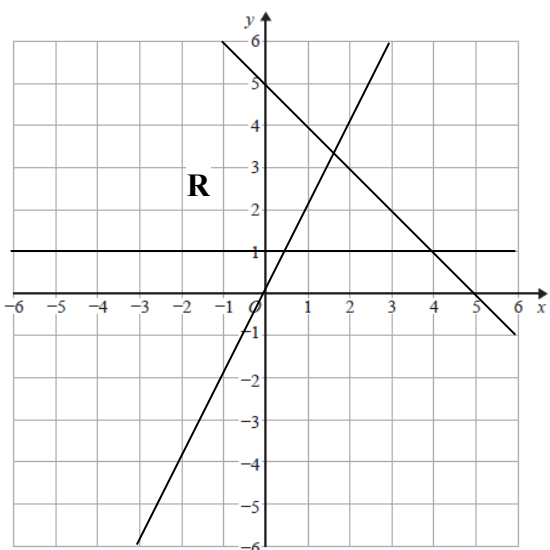
Question 20 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{6-2}{4-12} = -\frac{1}{2}$	P1	This mark is given for a process to find a gradient of the line L_1
	$L_1 = -\frac{1}{2}x + c$ When $x = 4, y = 6$ and when $x = 12, y = 2$ so $L_1 = -\frac{1}{2}x + 8$ $L_2 = -3x$	P1	This mark is given for a process to find equations for the lines L_1 and L_2
	When $-\frac{1}{2}x + 8 = -3x, \quad x = -\frac{16}{5}$ $y = -3x = \frac{48}{5}$	P1	This mark is given for a process to find the x - and y -coordinates common to both lines
	$\left(-\frac{16}{5}, \frac{48}{5}\right)$	A1	This mark is given for the correct answer only.

Question 21 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
		C1	This mark is given for a correct sketch
		C1	This mark is given for the point (0, 1) labelled on the y -axis

Question 22 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	lines $y = 1$, $x + y = 5$ and $y = 2x$ drawn	2	These two marks are given for all lines correctly drawn (1 mark is given for any two lines correctly drawn)
		1	This mark is given for a fully correct region indicated with all lines correct

Question 23 (Total 4 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$6 + \left[(x+5) \div \frac{(x+5)(x-2)}{x-1} \right]$	B1	This mark is given for factorising $x^2 + 3x - 10$
	$= 6 + \left[(x+5) \times \frac{x-1}{(x+5)(x-2)} \right]$ $= 6 + \frac{x-1}{x-2}$	M1	This mark is given for a method to rearrange the fraction in brackets and cancel through by $(x-5)$
	$= \frac{6(x-2)}{x-2} + \frac{x-1}{x-2}$ $= \frac{6(x-2) + (x-1)}{x-2}$	M1	This mark is given for putting the two terms of the expression over the same common denominator
	$\frac{7x-13}{x-2}$	A1	This mark is given for a correct answer only

Question 24 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$x_1 = 0.625$	1	This mark is given for the first correct iteration
	$x_2 = 0.6765327696$	1	This mark is given for the second correct iteration
	$x_3 = 0.6704483001$	1	This mark is given for the third correct iteration

Question	Taken from Paper/Q			Number of Marks	Edexcel averages: scores of candidates who achieved grade 7	%
1a	2H	June 18 - 2H	15a	2	1.96	98
1b	2H	June 18 - 2H	15b	3	2.63	88
2	2H	June 19 - 2H	20a	2	1.78	89
3	2H	June 19 - 2H	7	4	3.55	89
4	2H	Nov 17 - 2H	13(a)	2	1.66	83
5	3H	June 19 - 3H	19a	3	2.51	84
6	2H	June 19 - 2H	12	4	3.21	80
7	3H	June 18 - 3H	15a	3	2.22	74
8	2H	June 17 - 2H	22	3	2.09	70
9	2H	June 19 - 2H	18	5	3.49	70
10	2H	June 17 - 2H	16	3	2.03	68
11	2H	June 17 - 2H	14	3	2.00	67
12a	2H	June 18 - 2H	16a	2	1.30	65
12b	2H	June 18 - 2H	16b	3	0.79	26
13a	2H	June 18 2H	17a	2	1.88	64
13b	2H	June 18 2H	17b	2	0.69	
14	3H	June 18 - 3H	11	3	1.87	62
15a	2H	June 18 - 2H	20a	1	0.57	57
15b	2H	June 18 - 2H	20b	1	0.61	61
16	2H	June 19 2H	15	3	1.84	61
17	3H	Nov 18 - 3H	14	3	1.72	57
18	2H	Nov 18 - 2H	19	5	2.78	56
19	3H	June 18 - 3H	18a	2	1.05	53
20	2H	Nov 18 - 2H	18	4	2.01	50
21	2H	Nov 18 - 2H	14	2	0.93	47
22	2H	Nov 17 - 2H	14	3	1.35	45
23	2H	June 19 - 2H	13	4	1.71	43
24	3H	Nov 17 - 3H	15c	3	1.22	41

Suggested Grade Boundaries for Aiming for 7, Calculator: Paper 2

Grade	7	6	5	4
Mark	51	37	24	13

For example:

A student aiming for Grade 7 would be expected to score at least 51 marks on this practice paper.