

GCSE Mathematics (1MA1) – Foundation Tier Paper 3F

November 2021 student-friendly mark scheme

Please note that this mark scheme is not the one used by examiners for marking 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 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 2 (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

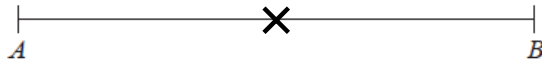
Question 3 (Total 1 mark)

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 4 (Total 1 mark)

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

Question 5 (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 6 (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 7 (Total 2 marks)

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

Question 8 (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 9 (Total 3 marks)

Part	Working or answer an examiner might expect to see					Mark	Notes																				
	<table><tr><td></td><td>Red</td><td>Blue</td><td>Black</td><td>Total</td></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>						Red	Blue	Black	Total	Plastic		5		32	Not plastic	8				Total	12	14		56	B1	This mark is given for the given values correctly placed in the table
	Red	Blue	Black	Total																							
Plastic		5		32																							
Not plastic	8																										
Total	12	14		56																							
	<table><tr><td></td><td>Red</td><td>Blue</td><td>Black</td><td>Total</td></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>						Red	Blue	Black	Total	Plastic	4	5		32	Not plastic	8	9		24	Total	12	14	30	56	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
	Red	Blue	Black	Total																							
Plastic	4	5		32																							
Not plastic	8	9		24																							
Total	12	14	30	56																							
	<table><tr><td></td><td>Red</td><td>Blue</td><td>Black</td><td>Total</td></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>						Red	Blue	Black	Total	Plastic	4	5	23	32	Not plastic	8	9	7	24	Total	12	14	30	56	B1	This mark is given for a fully correct table
	Red	Blue	Black	Total																							
Plastic	4	5	23	32																							
Not plastic	8	9	7	24																							
Total	12	14	30	56																							

Question 10 (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 the a correct non-integer answer
	61	A1	This mark is given for the correctly rounding down to the nearest whole number

Question 11(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 12 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	2.5×20	M1	This mark is given for method to measure the distance between Shelton and Trilby (2.5 cm) and use the scale
	50	A1	This mark is given for a correct answer in the range 46 – 54
(b)	$5 \times 1200 = 6000$ $6000 \div 100$	M1	This mark is given for a method to find the distance in metres represented by 5 cm
	60	A1	This mark is given for the correct answer only

Question 13 (Total 4 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	$\frac{2}{2+3} \times 100$	M1	This mark is given for a method to find the percentage required
	40	A1	This mark is given for the correct answer only
(b)	$100 - 20 = 80$	M1	This mark is given for a method to find the ratio required
	20 : 80	A1	This mark is given for a correct answer (accept an equivalent ratio given)

Question 14 (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 15 (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 16 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Enlargement with centre (1, 1)	B1	This mark is given for stating enlargement with a correct centre
	Scale factor 4	B1	This mark is given a correct scale factor

Question 17 (Total 7 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$y^2 + 5y$	B1	This mark is given for the correct answer only
(b)	$2(2a - 3)$	B1	This mark is given for the correct answer only
(c)	$10x - 8 = 21$	M1	This mark is given for a method to expand brackets
	$10x = 29$ $x = \frac{29}{10}$	M1	This mark is given for a method to solve the equation
	2.9	A1	This mark is given for the correct answer only
(d)	$4 \times 5 = 20, e^{2+1} = e^3, f^{1+3} = f^4$	M1	This mark is given for a method to correct terms
	$20e^3f^4$	A1	This mark is given for the correct answer only

Question 18 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	1 m = 100 cm $100 \times 100 = 10\,000$	B1	This mark is given for the correct answer only

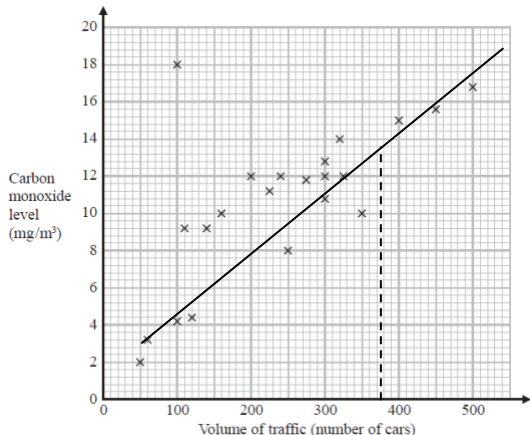
Question 19 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\text{Area of large square} = (3 + 5) \times (3 + 5) = 64$ $\text{Area of one triangle} = \frac{1}{2} \times 3 \times 5 = 7.5$	P1	This mark is given for a process to find the area of the large square or the area of one of the four triangles shown
	$64 - (4 \times 7.5) = 64 - 30$	P1	This mark is given for a process to find the size of the shaded area
	34	A1	This mark is given for the correct (numerical) answer only
	cm ²	B1	This mark is given for a the correct units used in the answer

Question 20 (Total 3 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes																									
	<table><tr><td>1</td><td> </td><td>5</td><td>7</td><td>8</td><td>9</td><td>9</td></tr><tr><td>2</td><td> </td><td>0</td><td>2</td><td>2</td><td>4</td><td>5</td><td>5</td><td>8</td></tr><tr><td>3</td><td> </td><td>2</td><td>3</td><td>5</td><td></td><td></td><td></td><td></td></tr></table>	1		5	7	8	9	9	2		0	2	2	4	5	5	8	3		2	3	5					B2	This mark is given for a fully correct ordered diagram (B1 is given for one error or omission or for a fully correct unordered diagram)
1		5	7	8	9	9																						
2		0	2	2	4	5	5	8																				
3		2	3	5																								
	For example: 1 5 represents 15 cm	B1	This mark is given for a correct key shown																									

Question 21 (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 22 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$9 + 2 + 1 = 12$	M1	This mark is given for a method to work with the ratio given
	$6000 \times \frac{2}{12} = 1000$	M1	This mark is given for a method to find the total weight of the cheese needed
	$\frac{1000}{175} = 5.71\dots$	M1	This mark is given for a method to find the number of lots of 175 g of cheese needed
	$2.25 \times 5.71\dots = 12.857\dots$	A1	This mark is given for a correct truncated or rounded answer of 12.85 or 12.86

Question 23 (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 24 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Company A : $\frac{2400}{8} \times 1.666 = 500$ minutes	P1	This mark is given for a process to find the amount of time taken by Company A
	$2.2 \times 4.54 = 9.988$ litres per minute	P1	This mark is given for a process to convert gallons to litres
	Company B : $\frac{2400}{9.988} = 240.29\dots$ minutes	P1	This mark is given for a process to find the amount of time taken by Company B
	$500 - 240.29\dots = 259.71\dots$ 260	A1	This mark is given for the correct answer (to the nearest minute) only

Question 25 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Fifth term = $3a + 5a = 8a$	P1	This mark is given for a process to find the value of the fifth term of the sequence
	$a + 2a + 3a + 5a + 8a = 19a$ $19a = 228$	P1	This mark is given for finding an equation in a to be solved
	$a = \frac{228}{19} = 12$	A1	This mark is given for the correct answer only

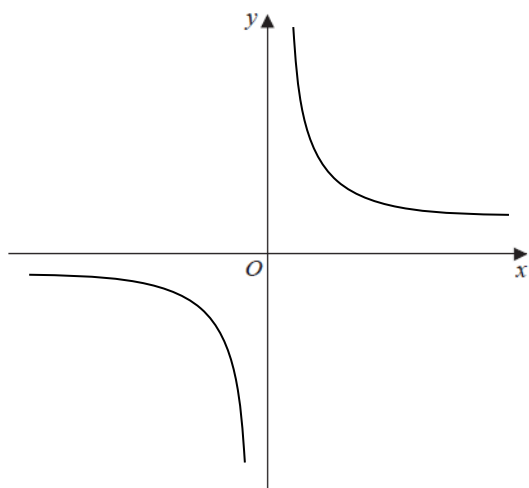
Question 26 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$1 - 0.05 - 0.15 = 0.8$	P1	This mark is given for a process to find the probability of picking a green or pink counter
	0.5, 0.3	A1	This mark is given for the correct answer only
(b)	$\frac{18}{0.15}$	M1	This mark is given for a method to find the total number of counters in the bag
	120	A1	This mark is given for the correct answer only

Question 27 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Area of triangle = $\frac{1}{2} \times 8 \times 8 = 32$	P1	This mark is given for a process to find the area of the triangle
	Area of $\frac{1}{4}$ circle = $\frac{\pi r^2}{4} = \frac{64}{4\pi} = 16\pi$	P1	This mark is given for a process to find the area of the quarter circle
	Area of shaded section = $16\pi - 32$	P1	This mark is given for a process to find the area of the shaded segment
	18.3	A1	This mark is given for a correct answer (to 3 significant figures)

Question 28 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
		M1 A1	These marks are given for a fully correct shape sketched (A1 is given for a correct shape in one quadrant or a correct graph where the lines touch the axes)