

GCSE Mathematics (1MA1) – Aiming for 5 Paper 3F

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 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	7	B1	This mark is given for the correct answer only
(b)	$9 - 4 = 5$	B1	This mark is given for the correct answer only
(c)	For example: The median of the boys' shoe sizes is greater than the median of girls' shoe sizes The range of the boys' shoe sizes is greater than the median of girls' shoe sizes	C2	These marks are given for correct comparisons of both medians and ranges of girls' and boys' shoe sizes (C1 is given for one correct comparison)

Question 2 (Total 3 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)(i)	$360 - 120 - 120 - 80 = 40$	B1	This mark is given for the correct answer only
(a)(ii)	For example: The angles of a quadrilateral add up to 360	C1	This mark is given for a correct reason stated
(b)	For example: The angles of a triangle add up to 180, not 190	C1	This mark is given for a correct explanation

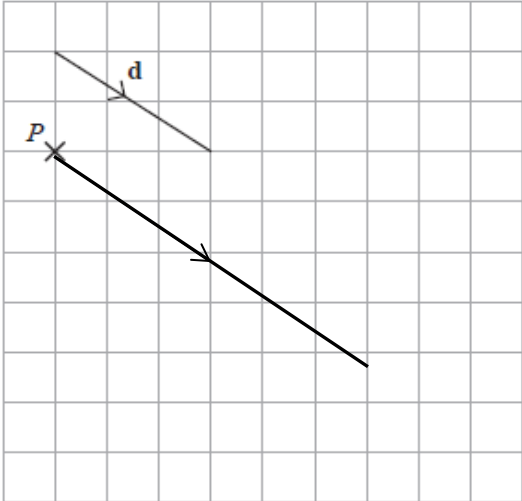
Question 3 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$24 = 3 \times 8$ $56 = 7 \times 8$	M1	This mark is given for a method to find the LCM
	$3 \times 7 \times 8 = 168$	A1	This mark is given for the correct answer only

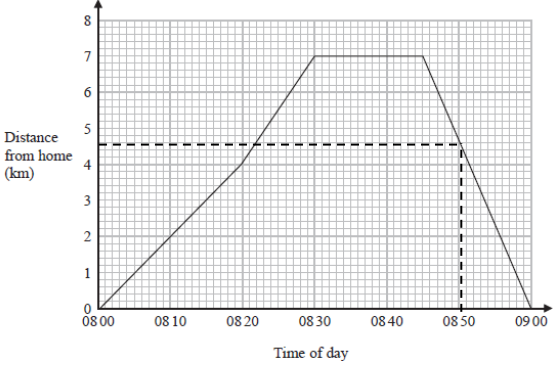
Question 4 (Total 4 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	$AB = 4.4 \times 150 = 660$ $BC = 3.5 \times 150 = 525$ $AC = 6.2 \times 150 = 930$	M1	This mark is given for a method to measure and concert at least one line to a distance in metres (accept answers in the ranges 630–690, 495–555 and 900–960 respectively)
	$660 + 525 = 1185$ $1185 - 930 =$	M1	This mark is given for a method to find out the difference between how far Parveen walks and Susan walks
	255	A1	This mark is given for a fully correct table
(b)	288	B1	This mark is given for a correct answer in the range 286 to 290

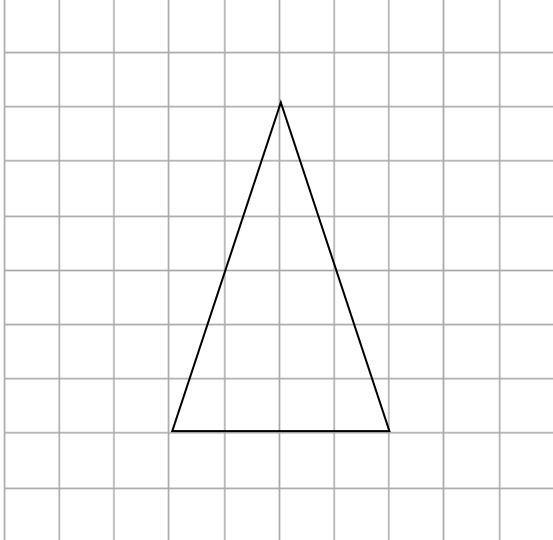
Question 5 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)(i)	$\begin{pmatrix} 2-1 \\ 3+2 \end{pmatrix} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$	B1	This mark is given for the correct answer only
(a)(ii)	$\begin{pmatrix} 4 \\ 6 \end{pmatrix} - \begin{pmatrix} 4 \\ 1 \end{pmatrix}$	M1	This mark is given for a method to find the vector $2\mathbf{a}$ before subtracting \mathbf{c}
	$\begin{pmatrix} 0 \\ 5 \end{pmatrix}$	A1	This mark is given for the correct answer only
(b)		A1	This mark is given for a correct vector drawn from the point P

Question 6 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$08\ 45 - 08\ 30 = 15$	B1	This mark is given for the correct answer only
(b)	 <p>4.6</p>	B1	This mark is given for correct answer in the range 4.4 to 4.8
(c)	$4 \div \frac{1}{3}$	M1	This mark is given for a method to use distance \div time
	12	A1	

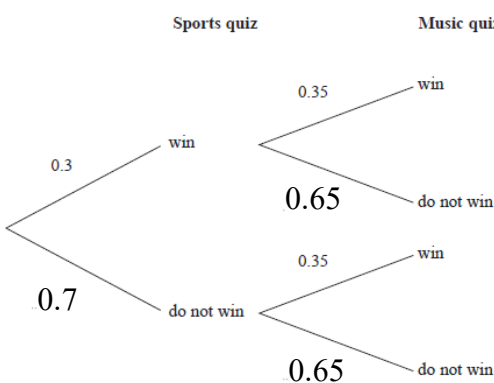
Question 7 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
		B2	<p>These marks are given for an isosceles triangle drawn with the product of the base and height equal to 24</p> <p>(B1 is given for any other isosceles triangle drawn or any other triangle with area 24)</p>

Question 8 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	2500	B1	This mark is given for the correct answer only
(b)	0.09	B1	This mark is given for the correct answer only

Question 9 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		B1	This mark is given for 0.7 on the first branch
		B1	This mark is given for 0.65 and 0.65 on the second branches
(b)	0.3×0.35	M1	This mark is given for a method to find the probability of winning both quizzes
	0.105	A1	This mark is given for the correct answer only

Question 10 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	0.000675	B1	This mark is given for the correct answer only
(b)	$\frac{(2.56 \times 4.12) \times (10^6 \times 10^{-3})}{1.6 \times 10^{-2}} = \frac{10.5472 \times 10^3}{1.6 \times 10^{-2}}$ $\frac{10.5472}{1.6} \times 10^{3 - -2}$	M1	This mark is given for 10.5472×10^3 seen or 6.592×10^n where $n \neq 5$ seen
	6.592×10^5	A1	This mark is given for the correct answer only

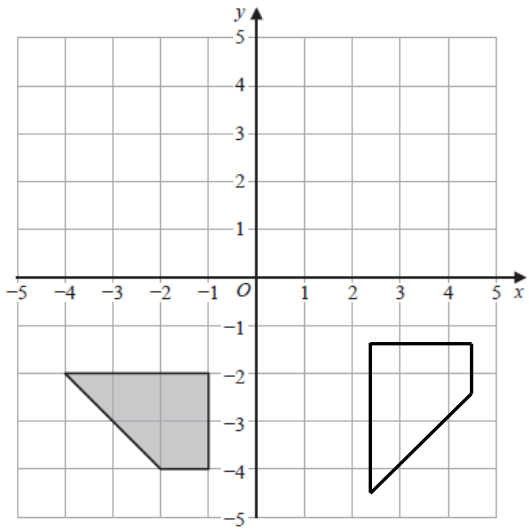
Question 11 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	For example: The labels are missing	C1	This mark is given for a valid comment about the labels
	For example: The pie chart is not drawn accurately The angles should be 108, 126 and 126	C1	This mark is given for a valid comment about the inaccuracy of the angles in the pie chart

Question 12 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	For example: 40 is missing from the frequency scale	C1	This mark is given for a mistake identified on the frequency polygon
	For example: An incorrect point (50, 5) is mapped	C1	This mark is given for a mistake identified on the frequency polygon

Question 13 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
		B2	These marks are given for a correct shape drawn at (2, -1), (2, -4), (4 -2) and (4, -1)

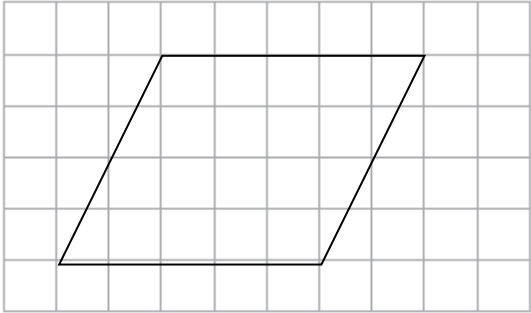
Question 14 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$R = n, S = 2n, T = 2n - 6$	P1	This mark is given for a process to develop three algebraic expressions (with at least two correct)
	$n + 2n + 2n - 6 = 54$	P1	This mark is given for a process to sum the three algebraic expressions to 54
	$5n - 6 = 54$ $n = 12$	P1	This mark is given for a process to solve the linear equation
	Ratio = 12: $(2 \times 12 - 6) = 12 : 18$	P1	This mark is given for a process to find the ratio of the number of counters Rick and Tony have
	$p = 1.5$	A1	This mark is given for the correct answer only

Question 15 (Total 5 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$\angle QPR = 56$	M1	This mark is given for a method to find the angle QPR
	$\angle PQR = (180 - 56) \div 2 = 62$	M1	This mark is given for a method to find the angle PQR
	For example: allied angles / co-interior angles add up to 180 or corresponding angles are equal or alternate angles are equal	C1	This mark is given for the a valid reason given
	118	A1	This mark is given for the correct answer only
	For example: vertically opposite angles are equal or vertically opposite angles are equal or base angles of an isosceles triangle are equal	C1	This mark is given for the a valid reason given

Question 16 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	For example: 	B2	These marks are given for an accurate drawing of a parallelogram (that is not a rectangle or a rhombus) (B1 is given for a quadrilateral with no lines of symmetry or with rotational symmetry of order 2)

Question 17 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(b)	$8.5^2 - 4^2 = 72.25 - 16 = 56.25$ $\sqrt{56.25} =$	M1	This mark is given for a method to use Pythagoras' theorem to find x
	7.5	A1	This mark is given for the correct answer only

Question 18 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$4 \times (-3)^2 - 11$ $= 36 - 11$	M1	This mark is given for a method to substitute -3 into the equation
	25	A1	This mark is given for the correct answer only
(b)	$d - 4 = 3p$ or $\frac{d}{3} - \frac{4}{3} = p$	M1	This mark is given for a first step to make p the subject of the formula
	$p = \frac{d - 4}{3}$	A1	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
	$6 \times \frac{15}{60} = 1.5$ $9 \times \frac{40}{60} = 6$	P1	This mark is given for a process to find the distance of either of the two parts of Jessica's journey
	$1.5 + 6 = 7.5$	P1	This mark is given for a process to find the total distance of Jessica's journey
	45 minutes = 0.75 hours $\frac{75}{7.5} =$	P1	This mark is given for a process to find Amy's average speed
	10	A1	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
	$p + 9 = 3a$	M1	This mark is given for a first step at a method to rearrange the formula
	$a = \frac{p+9}{3}$	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
	$30 \times 60 \times 60 = 108\,000$ metres per hour $\frac{108\,000}{1000} =$	M1	This mark is given for a method to change from metres per second to kilometres per hour
	108	A1	This mark is given for the correct answer only

Question 22 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{13\,600}{0.85}$	M1	This mark is given for a method to find the original value of Michelle's car
	16\,000	A1	This mark is given for the correct answer only

Question 23 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\frac{8000}{100 \times 100 \times 100} = 0.008$	B1	This mark is given for the correct answer only
(b)	180 km = 180 000 m 1 hour = 3600 seconds	M1	This mark is given for a method to convert km to m or hours to seconds
	$\frac{180000}{3600}$	M1	This mark is given for a method to find the speed in metres per second
	50	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
	$50 \times 167.6 = 8380$ $20 \times 182 = 3640$	P1	This mark is given for a process to find the total heights of all 50 people or the total height of the 20 men
	$\frac{8380 - 3640}{30}$	P1	This mark is given for a process to find the mean height of the 30 women
	158	A1	This mark is given for correct answers in the ranges 5.1 to 5.3 and 0.7 to 0.9

Question 25 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\pi \times 40^2 \times 160 = 804\,247\dots \text{cm}^3$	P1	This mark is given for a process to find the volume of one tank
	$4 \times 804\,247\dots = 3\,216\,990.2\dots \text{cm}^3$	P1	This mark is given for a process to find the volume of all four tanks
	32 litres = 32 000 cm ³ Amount of mixture = $101 \times 32\,000 = 3\,232\,000 \text{ cm}^3$	P1	This mark is given for a process to find how much of the mixture 32 litres will make
	$32\,320\,000 \text{ cm}^2 > 3\,216\,990 \text{ cm}^3$ Yes, Karina has enough fertiliser for the four tanks	C1	This mark is given for a valid answer supported by correct working

Question 26 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$A = \frac{1}{2}h(a + b)$ where $h = 4x$, $a = 5$ and $b = (3x + 5) - 2x = x + 5$	M1	This mark is given for a method to find an algebraic representation of the lengths used to work out the area of the trapezium <i>QUVR</i>
	$A = \frac{1}{2} \times 4x \times (5 + x + 5)$	M1	This mark is given for a method to find an algebraic representation of the area of the trapezium <i>QUVR</i>
	$A = 2x(x + 10) = 2x^2 + 20x$	C1	This mark is given for the correct expansion of brackets seen and simplification to the given answer

Aiming for 5 Paper 3F (Set 1)				Edexcel averages: mean scores of students who achieved grade							
Qn	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
Q14	Measures of central tendency (median, mean, mode and modal class)	2.10	4	53	2.10	3.21	2.73	2.15	1.53	0.89	0.41
Q13	Properties of angles	1.77	3	59	1.77	2.60	2.15	1.85	1.42	0.83	0.30
Q21	Primes, factors, multiples	1.00	2	50	1.00	1.64	1.34	1.02	0.68	0.31	0.06
Q13	Scale drawings and bearings	2.12	4	53	2.12	3.02	2.67	2.29	1.71	0.83	0.18
Q30	Vectors	1.61	4	40	1.61	3.30	2.49	1.62	0.89	0.46	0.28
Q19	Use compound units	1.86	4	47	1.86	3.20	2.45	1.89	1.40	0.86	0.43
Q16	Area of triangles, parallelograms, trapezia	0.82	2	41	0.82	1.55	1.09	0.74	0.51	0.31	0.15
Q18	Rounding; Inequality notation to specify error interval	0.78	2	39	0.78	1.47	1.09	0.72	0.46	0.24	0.08
Q26	Independent and dependent combined events	1.63	4	41	1.63	3.06	2.15	1.73	1.13	0.38	0.16
Q29	Standard form	1.08	3	36	1.08	2.11	1.54	1.08	0.75	0.45	0.23
Q16	Pie charts	0.85	2	43	0.85	1.13	0.97	0.86	0.76	0.61	0.39
Q26	Frequency polygons	0.68	2	34	0.68	1.26	0.96	0.65	0.38	0.17	0.05
Q18	Transformations	0.63	2	32	0.63	1.36	0.96	0.64	0.35	0.16	0.06
Q24	Ratio notation, reduction to simplest form	1.51	5	30	1.51	3.87	2.38	1.11	0.41	0.11	0.02
Q20	Parallel lines	1.40	5	28	1.40	3.31	2.30	1.15	0.36	0.07	0.01
Q06	Properties of 2D shapes	0.62	2	31	0.62	1.03	0.82	0.62	0.43	0.24	0.11
Q22	Pythagoras's Theorem and Trigonometry	0.50	2	25	0.50	1.54	0.76	0.26	0.09	0.05	0.02
Q23	Rearrange formulae to change the subject	0.99	4	25	0.99	2.53	1.48	0.75	0.33	0.09	0.01
Q27	Use compound units	0.90	4	23	0.90	2.43	1.31	0.59	0.28	0.19	0.10
Q21	Rearrange formulae to change the subject	0.29	2	15	0.29	1.54	0.61	0.24	0.09	0.03	0.01
Q29	Change between standard units and compound units	0.36	2	18	0.36	0.97	0.55	0.25	0.10	0.04	0.01
Q30	Percentages and problems involving percentage change	0.28	2	14	0.28	1.03	0.41	0.12	0.03	0.01	0.00
Q27	Change between standard units and compound units	0.31	4	8	0.31	2.00	0.60	0.23	0.10	0.06	0.03
Q28	Measures of central tendency (median, mean, mode and modal class)	0.16	3	5	0.16	1.47	0.35	0.11	0.02	0.02	0.02
Q24	Volume cuboids and other right prisms (including cylinders)	0.17	4	4	0.17	1.54	0.35	0.12	0.04	0.02	0.01
Q28	Translate situations or procedures into algebraic expressions, formulae or equations	0.11	3	4	0.11	0.53	0.12	0.03	0.01	0.00	0.00
		24.53	80	31	24.53	52.70	34.63	22.82	14.26	7.43	3.13

Suggested grade boundaries

Grade	5	4	3	2	1
Mark	44	29	19	11	5