Mark Scheme (Results)

Summer 2023

Pearson Edexcel International GCSE In Mathematics A (4MA1) Paper 1F

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- **Types of mark**
    - M marks: method marks
    - A marks: accuracy marks
    - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
    - cao – correct answer only
    - ft – follow through
    - isw – ignore subsequent working
    - SC – special case
    - oe – or equivalent (and appropriate)
    - dep – dependent

- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

- **No working**

  If no working is shown, then correct answers normally score full marks.

  If no working is shown, then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams) and award any marks appropriate from the mark scheme.

  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

  If a candidate misreads a number from the question. E.g. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.

  If there is no answer on the answer line, then check the working for an obvious answer.

- **Parts of question**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another,

International GCSE Maths				
Apart from questions 23 and 24 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		12 of the 15 squares shaded	1	B1 cao
(b)		$\frac{3}{4}$	1	B1 cao
(c)		0.03	1	B1 cao
(d)		14	1	B1 cao
				Total 4 marks

2 (a)		Mandarin Chinese	1	B1 allow 918 000 000, Mandarin, Chinese
(b)		115	1	B1 cao
(c)		300	1	B1 cao
(d)		Eight hundred and sixty one thousand, seven hundred	1	B1
				Total 4 marks

3	(a)			2	M1	for at least 2 correct tallies or frequencies
		Correct answer scores full marks (unless from obvious incorrect working)	Frequencies of 5, 2, 4, 3, 6		A1	mark frequencies only – in either column If no other marks awarded, award SCB1 for answers of $7\times\left(\frac{14.5-9y}{2}\right)+3y=8$
	(b)		Correct bar chart (ft (a))	3	B3	B1 for labelling the bars (can be abbreviations) B2ft for 5 column heights correct (B1ft for 3 or 4 column heights correct)
						Total 5 marks

4	(a)		16 15	1	B1	oe eg 16:15, 16.15
	(b)		5 (hours) 25 (minutes)	2	B2	(B1 for 5 (hours) **or** 25 (minutes) **or** 325 (minutes) **or** a time equivalent to 5 (hours) 25 (minutes))
						Total 3 marks

5	(a)		$4p$	1	B1	
	(b)		$12e + 4f$	2	B2	B1 for $12e$ or $4f$
	(c)		6	1	B1	cao
	(d)	$4y = 43 - 7$ oe **or** $\frac{4y}{4} + \frac{7}{4} = \frac{43}{4}$ oe **or** $(43 - 7) \div 4$		2	M1	for a correct first step to solve the equation **or** a complete calculation for finding the value of y
		Correct answer scores full marks (unless from obvious incorrect working)	9		A1	
						Total 6 marks

6	(a)	0.01×750 oe		2	M1	for a complete method
		Correct answer scores full marks (unless from obvious incorrect working)	7.5		A1	oe eg $\frac{15}{2}$, $7\frac{1}{2}$
	(b)	eg $(2000 \div 400) \times 125$ **or** $2000 \div (400 \div 125)$		2	M1	for a complete method
		Correct answer scores full marks (unless from obvious incorrect working)	625		A1	cao
						Total 4 marks

7	10 – 3 (= 7) (could be on diagram) **or** 10 + 3 + 10 + 3 (= 26) oe **or** (10 + 3 + 10 + 3) × 3 (= 78) oe **or** 6 × 10 + 4 × 3 (= 72) oe **or** 4 × 10 + 4 × 3 (= 52) oe		3	M1	for 10 – 3 (= 7) (could be on diagram) **or** for finding the perimeter of one rectangle **or** for finding the perimeter of 3 rectangles **or** for finding the perimeter including the internal sides **or** for finding the perimeter excluding the two lengths of 7
	eg 3 + 10 + 3 + 10 + 3 + 10 + 3 + "7" + 10 + "7" oe **or** 4 × 10 + 4 × 3 + 2 × "7" oe **or** "78" – (4 × 3) oe **or** "72" – (2 × 3) oe **or** "52" + (2 × "7") oe			M1	for a fully correct method to find the perimeter of the shape, with at most one error (which could be one length omitted or an extra length added)
	Correct answer scores full marks (unless from obvious incorrect working)	66		A1	
					Total 3 marks

8	use of 1 m = 100 cm eg 7 m = 700 cm or 185 cm = 1.85 m or 370 cm = 3.7 m		3	B1	for any correct conversion between metres and centimetres
	"700" – 2 × 185 (= 330) **or** 7 – 2 × "1.85" (= 3.3) oe			M1	use of their converted value for this method mark ie "700" is their converted 7 m and "1.85" is their converted 185 cm
	Correct answer scores full marks (unless from obvious incorrect working)	110		A1	allow 1.1 m or 1.1 metres
					Total 3 marks

9 (a)		146	1	B1	
(b)	64 – 9 (= 55) **or** (64 – 9) ÷ 11 **or** $11x + 9 = 64$		2	M1	for working backwards from the output of 64 **or** setting up an equation
	Correct answer scores full marks (unless from obvious incorrect working)	5		A1	
					Total 3 marks

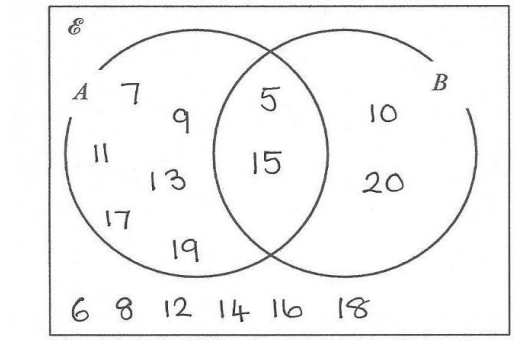
10 (a)		$\frac{13}{30}$	1	B1	oe eg 0.43(333…) or 43.(33…)%
(b)		$\frac{6}{30}$	1	B1	oe eg $\frac{1}{5}$ or $\frac{3}{15}$ or 0.2 or 20%
(c)	eg $\frac{2}{5} = \frac{16}{40}$ **or** $\frac{2}{5} \times (10 + 30)(= 16)$ oe		2	M1	for a method to work out the number of white counters now in the bag
	Correct answer scores full marks (unless from obvious incorrect working)	5		A1	
					Total 4 marks

11	94.8(0) – 3 × 12 (= 58.8(0)) oe		4	M1	for a method to find the total cost of the children's tickets
	eg 0.3 × 12 (= 3.6(0)) oe **or** (1 – 0.3) × 12 (= 8.4(0)) oe			M1	(indep) for finding 30% or 70% of 12
	"58.8(0)" ÷ (12 – "3.6(0)") oe **or** "58.8(0)" ÷ "8.4(0)" oe			M1	for a complete method to find the number of children's tickets
	Correct answer scores full marks (unless from obvious incorrect working)	7		A1	
					Total 4 marks

12	(a)		13	1	B1	cao
	(b)		2.5	1	B1	oe
	(c)	8×5 (= 40) oe		3	M1	for a method to find the total number of goals scored
		$8 \times 5 - (1 + 1 + 2 + 2 + 3 + 6 + 14)$			M1	for a complete method to work out the value of x
		Correct answer scores full marks (unless from obvious incorrect working)	11		A1	
						Total 5 marks

13	(a)	$8 + 8 + 12$ (= 28) oe **or** $\frac{8+8+12-2\times5}{2}$ (= 9) oe		3	M1	for a method to find the perimeter of the triangle **or** for a method to find the length of the rectangle (check the diagram)
		("28" – 5 – 5) ÷ 2 × 5 oe eg "9" × 5			M1	for a complete method to find the area of the rectangle
		Correct answer scores full marks (unless from obvious incorrect working)	45		A1	
	(b)	$231 \div (7 \times 6)$ **or** $7 \times 6 \times w = 231$ oe		2	M1	for a complete method to find the value of w **or** for setting up an equation for the volume of the cuboid
		Correct answer scores full marks (unless from obvious incorrect working)	5.5		A1	oe $\frac{11}{2}$, $5\frac{1}{2}$
						Total 5 marks

14	(a)	0.725(806...) or 1.53(9419...) **or** 14.8(4) **or** 2.26 **or** 2.27 **or** 2.265		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	2.2652(25539...)		A1
	(b)		2.27	1	B1 ft from (a) dep on a number that has 4 or more significant figures
					Total 3 marks

15		Numbers placed correctly in Venn diagram	3	B3 for a completely correct Venn diagram B2 for 2 or 3 correct regions B1 for 1 correct region
				Total 3 marks

16	$12 \div (5-2)\ (=4)$ **or** $2:5 = 8:20$ **or** $A = 8$ **or** $S = 20$ **or** $= 20$ eg $\frac{5}{15}x - \frac{2}{15}x = 12$ **or** $x = 60$		3	M1	for method to find the value of one share **or** working with the ratio for Arjun or Simon **or** setting up an equation **or** for finding the total number of goals (= 60)	M2 for $\frac{8}{5-2} \times 12$ oe
	eg $8 \times$ "4" **or** $8 \times \frac{8}{2}$ **or** 8 + 12 + 12 **or** $8 \times \frac{20}{5}$ **or** 20 + 12 **or** "60" $\times \frac{8}{15}$			M1	for a complete method	
	Correct answer scores full marks (unless from obvious incorrect working)	32		A1	SCB1 for $\frac{8}{15} \times 12 (= 6.4)$	
						Total 3 marks

17	$15 \times 5 + 45 \times 6 + 75 \times 8 + 105 \times 9 + 135 \times 2$ **or** $75 + 270 + 600 + 945 + 270$ [lower bound products are: 0, 180, 480, 810, 240] [upper bound products are: 150, 360, 720, 1080, 300]		3	M2	for correct products using midpoints (allow one error or omission) with attempt to add (M1 for products using a consistent value within range and attempt to add **or** for at least 4 correct products without addition)
	Correct answer scores full marks (unless from obvious incorrect working)	2160		A1	(an answer of 72 loses the final A mark but gains M2)
					Total 3 marks

18	$0.7 \times 60 \times 22$ (= 924) oe **or** $(1 - 0.7) \times 60 \times 19$ (= 342) oe **OR** $0.7 \times 60 \times \left(22 - \frac{780}{60}\right) (= 378)$ oe **or** $(1 - 0.7) \times 60 \times \left(19 - \frac{780}{60}\right) (= 108)$		4	M1	for finding income for the 22 dirhams notebooks **or** the 19 dirhams notebooks **OR** for finding the profit for the 22 dirhams notebooks **or** the 19 dirhams notebooks
	$0.7 \times 60 \times 22$ (= 924) oe **and** $(1 - 0.7) \times 60 \times 19$ (= 342) oe **OR** $0.7 \times 60 \times \left(22 - \frac{780}{60}\right) (= 378)$ oe **and** $(1 - 0.7) \times 60 \times \left(19 - \frac{780}{60}\right) (= 108)$			M1	for finding income for the 22 dirhams notebooks **and** the 19 dirhams notebooks **OR** for finding the profit for the 22 dirhams notebooks **and** the 19 dirhams notebooks, 1266 **or** 486 implies M2
	eg $\frac{"924" + "342" - 780}{780} \times 100$ **or** $\frac{"924" + "342"}{780} \times 100 - 100$ **or** $\frac{"378" + "108"}{780} \times 100$ **or** $\frac{486}{780} \times 100$			M1	for a complete method to find percentage profit
	Correct answer scores full marks (unless from obvious incorrect working)	62.3		A1	awrt 62.3, allow 62 from correct working
					Total 4 marks

19 (a)	eg $\begin{pmatrix}6--7\\12-2\end{pmatrix}\left[=\begin{pmatrix}13\\10\end{pmatrix}\right]$ **or** $\begin{pmatrix}-7-6\\2-12\end{pmatrix}\left[=\begin{pmatrix}-13\\-10\end{pmatrix}\right]$		3	M1	with or without brackets, allow 13 right and 10 up **or** (13, 10) **or** 13 left and 10 down **or** (−13, −10) **or** for one of −5 + 10 (= 5) or −3 + 10 (= 7) or 9 – 13 (= −4)
				M1	for two of −5 + 10 (= 5) or −3 + 10 (= 7) or 9 – 13 (= −4)
	Correct answer scores full marks (unless from obvious incorrect working)	$d = 5$, $e = 7$, $f = -4$		A1	
(b)		Enlargement	3	B1	with no mention of any other transformation or words such as move, flip, shift
		Scale factor 3		B1	with no mention of a vector, angle of rotation or line of symmetry
		Centre (0, 2)		B1	
(c)		Correct shape with coordinates (0, 5), (1, 6), (3, 6), (1, 5)	2	B2	B1 for a correct shape with the correct orientation in the incorrect position **or** for 3 out of 4 vertices correct **or** for a correct rotation of 90° anticlockwise about (3, 5)
					Total 8 marks

20	$7.2^2 + 5.4^2$ (= 81)		4	M1	for correct first step using Pythagoras	M1 for reaching one step from the length of *AB* if using trig eg $(EAB =)\tan^{-1}\left(\frac{5.4}{7.2}\right)(= 36.8...)$ **and** $\sin("36.8...") = \frac{5.4}{AB}$
	$\sqrt{7.2^2 + 5.4^2}$ (= 9)			M1	for complete Pythagoras method to find length of *AB*/*DC* check the diagram for sight of 9, *DC* marked as 9 implies M2	M1 for complete method to find the length of *AB*/*DC* eg $\frac{5.4}{\sin("36.8...")}(= 9)$
	7.2 + 5.4 + 6 + "9" + 6 oe			M1	for a complete method to find the perimeter	
	Correct answer scores full marks (unless from obvious incorrect working)	33.6		A1	oe	
						Total 4 marks

21	(a)		$8c^{12}d^{21}$	2	B2	(B1 for 2 correct terms as part of a product)
	(b)		5	1	B1	
	(c)		$4a^2b(4b^2 + 5a)$	2	B2	B1 for any correct partial factorisation with at least 2 factors, **or** the correct common factor with no more than 1 error inside the bracket
	(d)(i)	$(x \pm 11)(x \pm 2)$		2	M1	for $(x \pm 11)(x \pm 2)$ **or** for $(x + a)(x + b)$ with $ab = -22$ or $a + b = 9$
		Correct answer scores full marks (unless from obvious incorrect working)	$(x + 11)(x - 2)$		A1	for correct factors
	(ii)		$-11, 2$	1	B1ft	ft dep on factorising in the form $(x + p)(x + q)$
						Total 8 marks

22		$x \leq 1$	4	B1	accept $x < 1$
		$y \geq -2$		B1	accept $y > -2$
	$y = 2x + c$ or $y = mx + 4$			M1	allow = or < or ≤ or > or ≥
	Correct answer scores full marks (unless from obvious incorrect working)	$y \leq 2x + 4$		A1	oe, allow $y < 2x + 4$ oe SCB2 for the correct inequalities with all inequality signs the wrong way round
					Total 4 marks

23	(a)	eg $2 \times 2 \times 75$ **or** $3 \times 5 \times 20$ **or** $2 \times 3 \times 50$ **or** $5^2 \times 12$ **or** 2 | 300 2 | 150 | 75		2	M1	for 2 correct stages in prime factorisation with 0 incorrect stages or at least 3 stages in prime factorisation with no more than 1 incorrect stage. Each stage gives 2 factors – may be in a factor tree or a table or listed eg 2, 2, 75 (see LHS for examples of the amount of work needed for the award of this mark). Example of 3 stages with 1 incorrect stage: $300 = 100 \times 30 = 2 \times 50 \times 5 \times 6$
		Working required	$2 \times 2 \times 3 \times 5 \times 5$		A1	dep on M1, oe eg $2^2 \times 3 \times 5^2$
	(b)	($5A =$) $2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$ oe ($= 1800$) **or** ($5A =$) $2^3 \times 3^2 \times 5^2$ ($= 1800$) **or** ($7B =$) $2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 7$ oe ($= 3780$) **or** ($7B =$) $2^2 \times 3^3 \times 5 \times 7$ ($= 3780$)		2	M1	for method to find $5A$ or $7B$ as prime factors (may be seen in factor tree, table or Venn diagram) or as an integer **or** for listing at least 3 multiples of each number eg 1800, 3600, 5400... and 3780, 7560, 11340... **or** for an answer of 1080 oe eg $2^3 \times 3^3 \times 5$
		Working required	37800		A1	dep on M1, oe eg $2^3 \times 3^3 \times 5^2 \times 7$
						Total 4 marks

24	eg $21x + 9y = 24$ _ $2x + 9y = 14.5$ or $14x + 63y = 101.5$ _ $14x + 6y = 16$ **or** eg $7 \times \left(\frac{14.5 - 9y}{2} \right) + 3y = 8$		3	M1	for a correct method to eliminate x or y: multiplication of one or both equation(s) with correct operation selected (allow one arithmetic error) (if + or – is not shown then assume it is the operation that at least 2 of the 3 terms have been calculated for) **or** correct rearrangement of one equation with substitution into second
				M1	(dep on previous M1 but not on a correct first value) correct method to find second unknown – this could be a correct substitution into one of the equations given or calculated or starting again with the same style of working as for the first method mark
	Working required	$x = 0.5$ **and** $y = 1.5$		A1	oe, dep on M1
					Total 3 marks

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