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Mark Scheme (Results)

Summer 2024

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

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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. Eg. 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.

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- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.

  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

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

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Apart from questions 12, 19 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method

Values in quotation marks must come from a correct method previously seen unless clearly stated otherwise.

Q		Working	Answer	Mark	Notes
1	(a)		15 or 19	1	B1 or for both values and no other values
	(b)		48	1	B1 cao
	(c)		19	1	B1 cao
	(d)		6	1	B1 cao
					Total 4 marks

2	(a)		$\frac{13}{100}$	1	B1 oe eg $\frac{130}{1000}$
	(b)		4	1	B1 for 4 in the box
					Total 2 marks

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3	(a)		267	1	B1	cao
	(b)		2744	1	B1	cao
	(c)	eg selecting 987 and 139 **or** for 987 – *n* where *n* is a number from the list **or** m – 139 where *m* is a number from the list **or** for 987, 973, 393, 151, 139 **or** for 139, 151, 393, 973, 987		2	M1	for identifying 987 and 139, could be shown or circled **or** for 987 – *n* where *n* is a number from the list **or** m – 139 where *m* is a number from the list **or** for writing the numbers in order of size
		Correct answer scores full marks (unless from obvious incorrect working)	848		A1	cao
						Total 4 marks

4	(a)		28	1	B1	cao
	(b)		1 symbol and one small square from the symbol shown	1	B1	oe eg 5 small squares from the symbol 
	(c)		20	1	B1	cao
						Total 3 marks

5	(a)		–14, –8, –3, 12, 24	1	B1
	(b)		20	1	B1
	(c)		–16	1	B1
	(d)		11	1	B1
					Total 4 marks

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6	(a)		8	1	B1	
	(b)		*R* marked at bottom left vertex	1	B1	accept a clear unambiguous right angle symbol instead of *R*
	(c)		*O* marked at bottom right vertex	1	B1	
	(d)		42	1	B1	Allow 40 – 44
						Total 4 marks

7	(a)	72 ÷ 24 (= 3) **or** 24 ÷ 72 $\left(=\frac{1}{3}\text{ oe}\right)$ **or** $24 \div \frac{72}{360}(=120)$ **or** $96 \div 72\left(=\frac{4}{3}\text{ oe}\right)$ **or** $72 \div 96\left(=\frac{3}{4}\text{ oe}\right)$		2	M1	for a method to find the number of degrees per person **or** the number of people per degree **or** the total number of people represented by the pie chart **or** the scale factor between mahjong and chess
		Correct answer scores full marks (unless from obvious incorrect working)	32		A1	cao
	(b)	72 ÷ 24 × 40 oe eg 3 × 40 **or** 40 ÷ (24 ÷ 72) oe eg $40 \div \frac{1}{3}$ **or** $\frac{40}{24} \times 72$		2	M1ft	some working may be seen in part (a) eg 72 ÷ 24 (= 3)
		Correct answer scores full marks (unless from obvious incorrect working)	120		A1	accept 119.5 – 120.3
						Total 4 marks

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8	eg 3 × 1.8(0) (= 5.4(0)) **or** 4 × 1.2(0) (= 4.8(0)) **or** 3 × 1.8(0) + 4 × 1.2(0) (= 10.2(0))		4	M1	for a method to find the cost of the birthday cards **or** the wrapping paper **or** the total cost of the birthday cards and the wrapping paper
	eg 17.1(0) – (“5.4(0)” + “4.8(0)”) (= 6.9(0)) **or** 17.1(0) – “10.2(0)” (= 6.9(0))			M1	for a method to find the cost of 2 rolls of sticky tape
	eg “6.9(0)” ÷ 2			M1	for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	3.45		A1	if no other marks awarded, award SCB2 for an answer of 7.05 SCB1 for 14.1(0)
					Total 4 marks

9	(a)		(–4, 2)	1	B1	cao
	(b)		(–1, 3)	2	B2	(B1 for (–1, *y*) **or** (*x*, 3) **or** (3, –1) **or** the midpoint of *AB* unambiguously shown on diagram)
	(c)		(–3, –1)	2	B2	(B1 for (–3, *y*) **or** (*x*, –1) **or** (–1, –3) **or** *D* marked correctly on the diagram)
						Total 5 marks

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10	(a)	175 × 1.8 (= 315)		2	M1	for a correct first step
		Correct answer scores full marks (unless from obvious incorrect working)	347		A1	cao
	(b)	482 – 32 (= 450)		2	M1	for −32 or ÷1.8
		Correct answer scores full marks (unless from obvious incorrect working)	250		A1	cao SCB1 for answer of 464(.2...)
						Total 4 marks

11	(a)		5c	1	B1	
	(b)		$-2w + 12y$	2	B2	oe (B1 for $-2w$ or $12y$)
	(c)		3	2	B1	cao
			31		B1	cao
	(d)	$7x + 35$		3	M1	a correct expansion of the bracket (need not be in an equation)
		$7x + 3x = 8 - 35$ oe eg $10x = 8 - 35$ **or** $10x = -27$ **or** $7x + 3x = -27$			M1	for isolating terms in x and number terms ft from an incorrect expansion in the form $7x + c$ or $x + 35$
		Working required	–2.7		A1	(dep on M1) oe
						Total 8 marks

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12	*CED* = 180 – 125 (= 55) or *BCD* = 360 – (86 + 78 + 128) (= 68)		5	M1 angles may be marked on diagram or labelled unambiguously in working
	DCE = 180 – (2 × "55")(= 70)			M1 angles may be marked on diagram or labelled unambiguously in working
	Correct answer of 138 scores 3 marks (unless from obvious incorrect working)	138		A1 for 138
				B2 (dep on M2) for all correct reasons for their method (B1 (dep on M1) for one correct reason for their method) Angles on a straight line add to 180 Angles on a straight line add to 180 Isosceles triangle Angles in a triangle add to 180 Angles in a triangle add to 180 Angles in a quadrilateral add to 360 Angles in a quadrilateral add to 360
				Total 5 marks

13	(a)	2*n* **or** *n* + 7		2	M1 for 2*n* oe **or** *n* + 7 oe
		Correct answer scores full marks (unless from obvious incorrect working)	4*n* + 7		A1 oe eg 7 + 4*n*
	(b)		*T* – "(4*n* + 7)"	1	B1ft oe, ft *T* – [their answer (a)]
					Total 3 marks

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14			2	M1 for 18.4(867…) **or** 2.65(88) **or** 6.95 **or** 6.953 **or** 6.9530
	Correct answer scores full marks (unless from obvious incorrect working)	6.95304(3483...)		A1
				Total 2 marks

15	eg 35 ÷ 5 (= 7) **or** 27 ÷ 5 (= 5…) **or** 40 ÷ 5 (= 8) **or** 5 × 5 × 5 (= 125) **or** 27 × 35 × 40 (= 37 800) **or** 25 × 35 × 40 (= 35 000)		4	M1 for finding the number of boxes that fit along a side of the crate **or** the volume of the box **or** the volume taken up by the boxes
	eg "7" × "5" × "8" (= 280) **and** 5 × 5 × 5 (= 125) **or** 27 – 5 × "5" (= 2) **or** 27 × 35 × 40 (= 37 800) **and** 25 × 35 × 40 (= 35 000) **or** ("37 800" ÷ "125") – ("7" × "5" × "8") (= 22.4)			M1 for finding the total number of boxes that will fit in the crate **and** the volume of the box **or** the number of cm remaining without a box **or** the volume of the crate and the total volume of the boxes that fit **or** the volume of space left at the top in terms of number of boxes
	"37 800" – "280" × "125" oe eg "37 800" – "35 000" **or** "2" × 35 × 40 **or** "22.4" × "125"			M1 for a fully correct method to find the volume of space left
	Correct answer scores full marks (unless from obvious incorrect working)	2800		A1 cao
				Total 4 marks

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16	11 × 6 (= 66) **or** $\frac{16+15+3+2+9+x}{6}=11$		3	M1	for a correct calculation for the total **or** a correct equation for the last card eg using '*x*'
	16 + 15 + 3 + 2 + 9 + *x* = "66" oe eg 45 + *x* = "66" **or** "66" **– (**16 + 15 + 3 + 2 + 9)			M1	for a correct equation for '*x*' with no fraction **or** a correct calculation for the number on the last card
	Correct answer scores full marks (unless from obvious incorrect working)	21		A1	if the answer line is blank, check the card
					Total 3 marks

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17	$1 - (0.27 + 0.04 + 0.12)$ (= 0.57) oe **or** $2x + 0.27 + 0.04 + x + 0.12 = 1$ oe **or** 0.27×400 (= 108) and 0.04×400 (= 16) and 0.12×400 (= 48)		4	M1	for showing a clear understanding that the total of probabilities is 1 **or** for finding estimates for the number of times the spinner will land on 2 and 3 and 5
	(x =) "0.57" ÷ 3 (= 0.19) **or** ($2x$ =) "0.57" ÷ 3 × 2 (= 0.38) **or** $\frac{400 - \text{"108"} - \text{"16"} - 48\text{"}}{3}$ (= 76) oe **or** $\frac{400 - \text{"108"} - \text{"16"} - 48\text{"}}{3} \times 2 (= 152)$ oe			M1	for a method to find the value of x **or** $2x$ **or** an estimate for the number of times the spinner will land on 4 **or** 1
	($2 \times$ "0.19" + 0.04 + 0.12) × 400 **or** $2 \times$ "76" + "16" + "48"			M1	for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	216		A1	for an answer of 216 answer of $\frac{216}{400}$ oe scores M3A0
					Total 4 marks

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18	eg 200 ÷ (3 + 2) (= 40)		5	M1	for a method to find one 'share' of the ratio
	eg 3 × "40" (= 120) **and** 2 × "40"(= 80)			M1	for a method to find the number of white loaves **and** the number of brown loaves
	eg "120" × 1.50 (= 180) oe **and** "80" × 1.75 (= 140) oe **or** "120" × 0.4 (= 48) oe **and** "80" × 0.6 (= 48) oe **or** 0.4 × 1.50 (= 0.6) oe **and** 0.6 × 1.75 (= 1.05) oe			M1	for a method to find income from white loaves **and** brown loaves **or** number of white loaves **and** brown loaves that are entirely profit **or** profit from a single white loaf or a single brown loaf
	eg 0.4 × "180" (= 72) oe **and** 0.6 × "140"(= 84) oe **or** "48" × 1.50 (= 72) oe **and** "48" × 1.75 (= 84) oe **or** "0.6" × "120"(= 72) oe **and** "1.05" × "80"(= 84) oe			M1	for a complete method to find the total profit for the white loaves **and** the total profit for the brown loaves
	Correct answer scores full marks (unless from obvious incorrect working)	156		A1	cao award SCB4 for an answer of 164 or 174
					Total 5 marks

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19	$\frac{7}{3}$ and $\frac{21}{4}$		3	M1	may have $\frac{4}{21}$ rather than $\frac{21}{4}$
	$\frac{7}{3}\times\frac{4}{21}$ oe eg $\frac{49}{21}\times\frac{4}{21}$ **or** $\frac{28}{12}\div\frac{63}{12}$ oe			M1	for intention to multiply correct improper fraction and inverted fraction **or** writing the 2 fractions over the same common denominator
	eg $\frac{7}{3}\times\frac{4}{21}=\frac{28}{63}=\frac{4}{9}$ oe eg $\frac{49}{21}\times\frac{4}{21}=\frac{196}{441}=\frac{4}{9}$ **or** $\frac{\cancel{7}^{1}}{3}\times\frac{4}{\cancel{21}^{3}}=\frac{4}{9}$ oe **or** $\frac{28}{12}\div\frac{63}{12}=\frac{28}{63}=\frac{4}{9}$ *Working required*	Correctly shown		A1	for correctly completing to reach the required answer Ignore any decimals used as checking.
					Total 3 marks

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20	5200 × 1.025 (= 5330) oe **or** 5200 × 0.025 (= 130) oe		3	M1	for a method to find 2.5% **or** 102.5% of 5200	M2 for 5200×1.025^4 oe **or** for 5200×1.025^5 (= 5883…) oe
	for "5330" × 1.025 (= 5463...) oe **and** "5463.25" × 1.025 (= 5599...) oe **and** "5599.83..." × 1.025 (= 5739...) oe			M1	for a complete method	
	Correct answer scores full marks (unless from obvious incorrect working)	5740		A1	5739 – 5740 **SC:** If no other marks awarded, award B1 for 5200 × 0.1 (= 520) oe 5200 × 1.1 (= 5720) oe 5200 × 0.9 (= 4680) oe 5200 × 0.975 (= 5070) oe 5200×0.975^4 (= 4699...) oe (accept (1 + 0.025) as equivalent to 1.025 throughout but not (1 + 2.5%))	
						Total 3 marks

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21	(a)	$\pi \times 8^2 \times h = 1208$ oe **or** $\frac{1208}{\pi \times 8^2}$ oe		2	M1	for setting up an equation in *h* using the volume of the cylinder **or** a correct calculation for *h* (may be seen in stages)
		Correct answer scores full marks (unless from obvious incorrect working)	6		A1	accept 6 – 6.02
	(b)	$\frac{m}{1208} = 1.25$ oe **or** (*m* =) 1208 × 1.25 (= 1510)		2	M1	for setting up an equation using $D = M / V$ **or** for a calculation to find the mass (may convert density to kg/cm^3 first)
		Correct answer scores full marks (unless from obvious incorrect working)	1.51		A1	
						Total 4 marks

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22	(a)		g^7	1	B1	
	(b)		$5k^5 + 20k^2$	2	B2	for $5k^5 + 20k^2$
					(B1	for $5k^5$ or $20k^2$)
	(c) (i)	$(x \pm 7)(x \pm 9)$		2	M1	for $(x \pm 7)(x \pm 9)$ **or** for $(x + a)(x + b)$ where $ab = -63$ **or** $a + b = -2$ where a and b are integers
		Correct answer scores full marks (unless from obvious incorrect working)	$(x + 7)(x - 9)$		A1	for correct factors
	(ii)		$-7, 9$	1	B1	must ft from (c)(i) dep on factorising in the form $(x + p)(x + q)$ where p and q are integers
	(d)	$-2y - 3y < -12 - 7$ **or** $7 + 12 < 3y + 2y$ **or** $7 < 5y - 12$ **or** $7 - 5y < -12$ **or** $-2y < 3y - 19$ **or** $19 - 2y < 3y$		3	M1	for rearrangement with y terms on one side and numerical terms on the other in a correct inequality **or** the correct simplification of y terms or numbers on one side in a correct inequality sign can be = or the incorrect inequality sign
		$-5y < -19$ **or** $19 < 5y$ **or** $-y < \frac{-19}{5}$ **or** $y < \frac{19}{5}$ **or** $y = \frac{19}{5}$ oe			M1	for the correct simplification of y terms on one side and numbers on the other side in a correct inequality **or** a correct inequality with the wrong sign sign can be = or the incorrect inequality sign
		Correct answer scores full marks (unless from obvious incorrect working)	$y > \frac{19}{5}$		A1	oe eg $y > 3.8$ or $3.8 < y$ Must be given as the correct inequality on the answer line
						Total 9 marks

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23	$\frac{14+AB}{2}\times 15 = 360$ oe **or** $360 - 14\times 15 (=150)$ oe		6	M1	for setting up an equation using the area of the trapezium **or** method to find the area of the triangle
	AB = 34 **or** *MB* = 20 (where *M* is point on *AB* such that *MC* is perpendicular to *AB*)			A1	could be seen on diagram
	$\left(CB^2 =\right) 15^2 + 20^2 (= 625)$ **or** $\left(CB^2 =\right) 15^2 + MB^2$			M1	allow use of their *MB*
	$\left(CB =\right) \sqrt{15^2 + 20^2}\ (= 25)$ **or** $\left(CB =\right) \sqrt{15^2 + MB^2}$			M1	allow use of their *MB*
	14 + 15 + "34" + "25" oe **or** 14 + 15 + 14 + *MB* + *CB* oe			M1ft	(dep on previous two M marks) for a method to find the perimeter of the trapezium, allow use of their *MB* and *CB*
	Correct answer scores full marks (unless from obvious incorrect working)	88		A1	cao
					Total 6 marks

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24		$y = -\frac{1}{2}x + 1$	3	B3 for $y = -\frac{1}{2}x + 1$ oe but must be in form $y = mx + c$ eg $y = -0.5x + 1$ (B2 for $(L =)\ -\frac{1}{2}x + 1$ **or** for $y = -\frac{1}{2}x + c$ **or** for $y = mx + 1$ where $m \neq 0$ **or** for a correct equation in the incorrect form eg $2y + x = 2$) (B1 for $(L =)\ -\frac{1}{2}x + c$ **or** $(L =)\ mx + 1$ where $m \neq 0$ **or** $m = -\frac{1}{2}$ **or** gradient = $-\frac{1}{2}$ oe eg $\frac{3-(-1)}{-4-4}$)
				Total 3 marks

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