Mark Scheme (Results)

Summer 2024

Pearson Edexcel International GCSE In Mathematics A (4MA1) Paper 2FR

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Summer 2024
Question Paper Log Number P73468A
Publications Code 4MA1_2FR_2406_MS

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.
- **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.

International GCSE Maths

Apart from Questions 17 and 22a 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)		5, 39, 71, 122, 150	1	B1
	(b)		0.074, 0.13, 0.37, 0.7, 3.77	1	B1
	(c)		5084	1	B1
	(d)		3 hundreds	1	B1 accept 300, hundreds
					Total 4 marks

2	(a)		Bar drawn of height 44	1	B1
	(b)		North America	1	B1
	(c)		Asia	1	B1
	(d)		68	1	B1
					Total 4 marks

3	(a)		57.6	1	B1
	(b)		Arrow pointing at 240	1	B1
	(c)		0.79	1	B1
					Total 3 marks

4	(a)		kite	1	B1
	(b)(i)		Prism	1	B1 accept triangular prism
	(ii)		9	1	B1
					Total 3 marks

5	5 × 1000 or 5000 **or** 280 ÷ 1000 or 0.28	M2 for 17 × 280 or 4760 or 17 × 0.28 oe or 4.76 oe		3	M1	for a correct conversion between ml and litres
	eg 5000 ÷ 280 **or** 5 ÷ 0.28 **or** 17.8…… or $\frac{125}{7}$ or $17\frac{6}{7}$ oe				M1	for a complete method ft incorrect conversion but an attempt must have been made to convert
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)		17		A1	
						Total 3 marks

6	(a)		11.56	1	B1	oe eg $\frac{289}{25}$ or $11\frac{14}{25}$
	(b)		72	1	B1	
	(c)		7^4	1	B1	
	(d)(i)		(5 + 3) × 2 = 16	1	B1	
	(ii)		10 − 8 − (10 − 6) ÷ 2 = 0	1	B1	
						Total 5 marks

7	(a)(i)		37	1	B1	
	(ii)		Added 8	1	B1	eg ‘added 8’, ‘add 8’, +8, rule is $8n - 11$, goes up by 8, $8 \times 6 - 11$ (= 37)
	(b)	**Acceptable answers** 1. (the) sequence is odd 2. (326) is even or not odd 3.‘*n*th term is $8n - 11$ which will always be odd’ 4. ‘sequence goes 325, 333’ 5. (the) 42nd term is 325 6. should be 325 (not 326) 7. it would be 333 (not 326) 8. $8n - 11$ so n is not an integer/whole number 9. $337 \div 8$ oe (= 42.125) not an integer/whole number 10. not 11 less than a multiple of 8 11. does not end with 1, 3, 5, 7 and 9 (must have all 5 numbers) 12. each digit has an odd digit at the end/does not end in an odd number **Not acceptable answers** 1. adding 8 each time will not lead to 326 2. it goes past 326 3. $326 \div 8$ (= 40.75) not an integer/whole number 4. 326 cannot be divided by 8	Correct explanation	1	B1	
						Total 3 marks

8	eg 5 × 2.60 or 13 or 50 – 5 × 2.60 or 37 **or** 4 × 3.94 or 15.76 oe or 50 – 4 × 3.94 or 34.24 oe **or** 5 × 2.60 + 4 × 3.94 (= 28.76) oe		3	M1 for method to find the cost of the nails **or** the bolts **or** the nails and bolts
	eg 50 – (5 × 2.60) – (4 × 3.94) oe or 50 – "13" – "15.76" oe or 50 – "28.76" oe			M1 ft for a complete method
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	21.24		A1
				Total 3 marks

9	(a)		c^3	1	B1	
	(b)		$36de$	1	B1	oe
	(c)		28	1	B1	
	(d)	$2g = 6 + 3$ or $2g = 9$ or $g - \frac{3}{2} = \frac{6}{2}$ oe or $(6 + 3) \div 2$ or $9 \div 2$		2	M1	
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	4.5		A1	oe eg $\frac{9}{2}$ or $4\frac{1}{2}$ or 4,5
	(e)		$x^2 - 4x$	1	B1	or $-4x + x^2$
	(f)	e.g. $4\times(-3)^2 + 2$ or $4(-3)^2 + 2$ or $4 \times 9 + 2$ or $4(9) + 2$ or $4 \times -3 \times -3 + 2$ or $4(-3 \times -3) + 2$		2	M1	for substituting values for y and w
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	38		A1	
						Total 8 marks

10		Correct square	2	B2	For a fully correct square with arcs shown (B1 for a correctly sized square with no arcs shown **or** for an incorrect quadrilateral with arcs of equal radius shown **or** correct arcs not joined – all within or on the guidelines of the overlay
					Total 2 marks

<table>
<tr><td>11 (a)</td><td></td><td>CF, CL, CM, FL, FM, LM</td><td>2</td><td>B2 for all 6 combinations with no extras of repeats

(B1 for at least 3 correct combinations (ignoring repeats))</td></tr>
<tr><td>(b)</td><td><table>
<tr><th></th><th>Chocolate</th><th>Mint</th><th>Vanilla</th><th>Total</th></tr>
<tr><td>Saturday</td><td>32</td><td>11</td><td>28</td><td>71</td></tr>
<tr><td>Sunday</td><td>16</td><td>20</td><td>13</td><td>49</td></tr>
<tr><td>Total</td><td>48</td><td>31</td><td>41</td><td>120</td></tr>
</table></td><td>Correct two-way table</td><td>2</td><td>B2 for all 4 correct values

(B1 for 2 or 3 correct values)</td></tr>
<tr><td>(c)</td><td></td><td>$\frac{67}{100}$</td><td>1</td><td>B1 oe</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Total 5 marks</td></tr>
</table>

<table>
<tr><td>12</td><td>eg 360 ÷ 15 or
$\frac{(n-2)\times 180}{n} = 180 - 15$</td><td></td><td>2</td><td>M1</td></tr>
<tr><td></td><td>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</td><td>24</td><td></td><td>A1</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Total 2 marks</td></tr>
</table>

13	(−2, 9) (−1, 7) (0, 5) (1, 3) (2, 1) (3, −1)	For a correct line between $x = -2$ and $x = 3$	3	B3 For a correct line between $x = -2$ and $x = 3$ (B2 For a correct straight line segment through at least 3 of (−2, 9) (−1, 7) (0, 5) (1, 3) (2, 1) (3, −1) **OR** for all of (−2, 9) (−1, 7) (0, 5) (1, 3) (2, 1) (3, −1) plotted but not joined **OR** for a line drawn with a negative gradient of −2 through (0, 5)) (B1 For at least 2 correct points stated (may be in a table) **OR** for a line drawn with a negative gradient through (0, 5) **OR** for a line with a gradient of −2)
				Total 3 marks

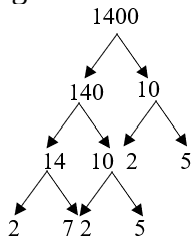
14	$\frac{1}{5}\times 1200\left(=240\right)$ oe or 1200 ÷ 5 (= 240) oe	20(%) or 0.2 or 0.42 or $\frac{42}{100}$ oe		4	M1 M2 for 744
	$0.42\times 1200\left(=504\right)$ or $\frac{42}{100}\times 1200\left(=504\right)$ oe	$\frac{1}{5}+\frac{42}{100}\left(=\frac{62}{100}\right)$ oe or 0.2 + 0.42 (= 0.62) or 20 + 42 (= 62)			M1
	1200 – (“240” + “504”) (= 456) oe or 1200 – “744” (= 456)	$1-"\frac{62}{100}"\left(=\frac{38}{100}=\frac{19}{50}\right)$ oe or 1 – “0.62” (= 0.38) or 100 –“62” (= 38)			M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)		1.9		A1 oe
					Total 4 marks

15	(a)		12	1	B1	
	(b)	eg 11 × 7 + 12 × 8 + 13 × 7 + 14 × 5 + 15 × 1 + 16 × 2 (= 381) **or** 77 + 96 + 91 + 70 + 15 + 32 (= 381)		3	M1	for at least 4 correct products
		"381" ÷ 30 oe			M1	
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	12.7		A1	oe, allow 13 if M2 scored
						Total 4 marks

16	eg 375 × 8 oe or 3000		4	M1
	eg 375 × 8 × 1.2 (= 3600) or "3000" × $\left(1+\frac{20}{100}\right)$ (= 3600) oe or 1.2 × "3000" (= 3600) or (0.2 × "3000") + 3000 (= 3600) or 600 + "3000" (= 3600)			M1
	eg "3600" ÷ 300			M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	12		A1
				Total 4 marks

<table>
<tr><td>17</td><td>eg
2 × 2 × 350
or 2 × 7 × 100
or 2 × 5 × 140
or 5 × 7 × 40
or 5 × 5 × 56
or (14 × 100 =) 2 × 7 × 100
or (28 × 50 = 4 × 7 × 50 =) 2 × 2 × 7 × 50 =
or
<table><tr><td>2</td><td>1400</td></tr><tr><td>2</td><td>700</td></tr><tr><td></td><td>350</td></tr></table></td><td></td><td>3</td><td>M1</td><td>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, 350 (see LHS for examples of the amount of work needed for the award of this mark).

Example of 3 stages with 1 incorrect stage:
1400 = 10 × 14 = 2 × 5 × 2 × 7</td></tr>
<tr><td></td><td>eg
2, 2, 2, 5, 5, 7
eg
<table><tr><td>2</td><td>1400</td></tr><tr><td>2</td><td>700</td></tr><tr><td>5</td><td>350</td></tr><tr><td>2</td><td>70</td></tr><tr><td>5</td><td>35</td></tr><tr><td></td><td>7</td></tr></table>eg
 
</td><td></td><td></td><td>M1</td><td>dep on M1 for 2 × 2 × 2 × 5 × 5 × 7 or 2^3, 5^2, 7 or $2^3 + 5^2 + 7$

(Ignore 1’s)

(may be seen in a fully correct factor tree or ladder)</td></tr>
<tr><td></td><td></td><td>$2^3 \times 5^2 \times 7$</td><td></td><td>A1</td><td>dep on M2 (do not allow 1 in the final answer)
Can be in any order (allow $2^3 . 5^2 . 7$) but must be in index form as asked for.</td></tr>
<tr><td></td><td>Working required</td><td></td><td></td><td></td><td>Total 3 marks</td></tr>
</table>

18 (a)	Allow translated translating translate Allow misspelling of the word eg translat	Translation	2	B1	for translation (with none of reflection, rotation, enlargement, mirrored, turned, move or flipped stated) NB Move with translation is acceptable
		$\begin{pmatrix} 3 \\ -5 \end{pmatrix}$		B1	for (vector =) $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$
(b)		Shape drawn at (−6, −1) (−4, −1) (−4, −2) (−5, −2)	2	B2	condone missing label If not B2 then B1 for a correct trapezium drawn with correct orientation in wrong position **or** 3 points plotted correctly)
					Total 4 marks

19		(x =) 11 (and) (y =) 14	2	B2 for $x = 11$ and $y = 14$ (B1 for $x = 11$ or $y = 14$) SC B1 for $x = 14$ and $y = 11$
				Total 2 marks

20	(a)(i)		1, 2, 3, 5, 6, 7	1	B1	in any order with no repeats
	(a)(ii)		4, 5, 7, 8, 9, 10	1	B1	in any order with no repeats
	(b)	eg 1. 2 (**or** 3 **or** 2 and 3) is in both sets oe 2. *A* and *B* have 2 (**or** 3 **or** 2 and 3) oe 3. 2 (**or** 3 **or** 2 and 3) is common oe 4. 2 (**or** 3 **or** 2 and 3) is in the intersection oe 5. $A \cap B = \{2,3\}$ oe or $A \cap B = \{2\}$ oe or $A \cap B = \{3\}$ oe 6. They share 2 (**or** 3 **or** 2 and 3)oe 7. As 2 and/or 3 are factors of 6 and also prime numbers oe Allow sector for set This is not an exhaustive list	2 (**or** 3 **or** 2 and 3) is a member of *A* and *B*	1	B1	for identifying the element 2 **or** 3 **or** 2 and 3 with a correct explanation to show they know the meaning of intersection and empty set If students mention a number that is common, it must be correct
	(c)		1, 5, 6, 7	2	B2 (B1	for 1, 5, 6, 7 for three correct values with no more than one incorrect or for four correct values with no more than one incorrect)
						Total 5 marks

21	$\sqrt{81}$ (= 9) **or** 9 **or** 9 × 9 (= 81)		4	M1	for method to find the length of the side of the square (may be seen on the diagram)
	4 × "9" (= 36) oe			M1	for the perimeter of the square (the first M mark can be implied by 36)
	eg $\pi \times$ "9" $(= 28.2(743...)$ or $9\pi)$			M1	for a correct expression for the circumference for using $2\pi r$ or πD (the first M mark can be implied by 28.2(743…) rounded or truncated to 1 dp or by 9π)
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	64.3		A1	accept 64.26 – 64.3
					Total 4 marks

22 (a)	eg $2f = 12f - 51$ **or** $\frac{f}{3} = \frac{4}{2}f - \frac{17}{2}$ **or** $\frac{f}{3} = 2f - \frac{17}{2}$ **or** $0.3f = 2f - 8.5$ **or** $f = 6f - \frac{51}{2}$ **or** $f = 6f - 25.5$ **or** $17 = 4f - \frac{2}{3}f$ **or** $17 = 4f - 0.6f$ **or** $17 = 4f - 0.7f$ **or** $\frac{2}{3}f - 4f = -17$ **or** $0.6f - 4f = -17$ **or** $0.7f - 4f = -17$		3	M1	for a correct first step – multiplying both sides by 3 correctly and expanding to find $2f = 12f - 51$ or $2f = -51 + 12f$ or writing the RHS as 2 terms each over 2 (Allow decimals to 1dp or better – rounded or truncated)
	eg $-10f = -51$ **or** $10f = 51$ **or** $\frac{5f}{3} = \frac{17}{2}$ **or** $5f = \frac{51}{2}$ or $17 = \frac{10f}{3}$ **or** $3.3f = 17$ **or** $-\frac{10f}{3} = -17$ **or** $-3.3f = -17$			M1	for a correct 2 term equation in the form $af = b$ ft the following equations only $2f = 12f - 17$ oe $2f = 4f - 51$ oe $6f = 12f - 51$ oe (Allow decimals to 1dp or better – rounded or truncated)
	Working required	$\frac{51}{10}$		A1	(dep on at least M1) oe

22	(b)		1	1	B1	
	(c)		$3a^3h^4$	2	B2	for $3a^3h^4$ oe B1 for a product in the form ka^ph^q where 2 from k, p or q are correct (allow multiplication signs) eg $5a^3h^4$ or $\frac{12a^3h^4}{4}$ (Allow $3a^3$ or a^3h^4 or $3h^4$ as long as not added to any other term)
	(d)		$4x^3y(5x^2+3y^3)$	2	B2	for $4x^3y(5x^2+3y^3)$ B1 for any correct factorisation with at least a 2 term factor outside the bracket eg $2x^3y(10x^2 + 6y^3)$ **or** $x^3y(20x^2+12y^3)$ **or** $2x(10x^4y + 6x^2y^4)$ **or** $4y(5x^5+3x^3y^3)$ **or** $4x^3(5x^2y+3y^4)$ etc **or** the correct highest common factor **and** a 2 term expression with at most one incorrect term eg $4x^3y(5x^2 + \ldots)$ or $4x^3y(\ldots + 3y^3)$
						Total 8 marks

23	eg 3^3 or $\left(3^{-2}\right)\times 3^{-5}$ or $\frac{3^3}{\left(3^{10}\right)}$ or $\frac{\left(3^5\right)}{3^{12}}$ or $\frac{\left(3^{-2}\right)}{3^5}$ or $3^{-12}\left(\times 3^5\right)$oe or – 2 + 5 – 10 oe or – 12 + 5 oe or 3 – 10 oe		2	M1 for a correct application of an index rule as a first step or a correct calculation for *n*
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	–7		A1 Allow 3^{-7}
				Total 2 marks

24	1 – 0.17 or 0.83 or $\frac{83}{100}$ **or** 100(%) – 17(%) or 83(%) **or** $\frac{6225}{83}$ (= 75) oe		3	M1
	6225 ÷ "0.83" **or** 6225 ÷ "83" × 100 **or** 6225 × 100 ÷ "83" oe **or** 75 × 100			M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	7500		A1
				Total 3 marks

25	(a)		604 000	1	B1	
	(b)		7×10^{-5}	1	B1	
	(c)	380 000 or 3.8×10^5 or 38×10^4 oe		2	M1	
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	2×10^5		A1	Accept 2.0×10^5 or 2.00×10^5 etc Accept a dot or a comma for a multiplication sign eg $2 , 10^5$ $2 . 10^5$ SC B1 for 200 000 or 20×10^4 or 0.2×10^6 oe or 2×10^n where $n \neq 5$ when given as a final answer (not for incorrect simplification of the denominator)
						Total 4 marks

26	$23 \times 4.7\ (= 108.1)$ oe			5	B1 (indep) May be embedded in $23 \times (4.7 + 2.5)$ $(= 165.6)$
	$\sin 30 = \frac{(x)}{5}$ or $\frac{(x)}{\sin 30} = \frac{5}{\sin 90}$ oe where x = height of trapezium	$5\cos 30 \left(= \frac{5\sqrt{3}}{2} = 4.33... \right)$ **and** $\left(x^2 =\right) 5^2 - "5\cos 30"^2 \ (= 6.25)$			M1
	$(x =) 5\sin 30\ (= 2.5)$ oe or $(x =) \frac{5}{\sin 90} \times \sin 30 (= 2.5)$ oe	$(x =) \sqrt{5^2 - "5\cos 30"^2}\ (= 2.5)$			M1
	$\frac{1}{2} \times (11 + 23) \times "2.5" (= 42.5)$ oe or $\left(\frac{1}{2} \times "2.5" \times (23 - 11)\right) + (11 \times "2.5") (= 42.5)$ oe or $\left(\frac{1}{2} \times "2.5" \times (23 - 11 - "4.3")\right) + (11 \times "2.5") + \left(\frac{1}{2} \times "2.5" \times "4.3"\right) (= 42.5)$ oe or $(11 \times "2.5") + \left(\frac{1}{2} \times 5 \times (23 - 11) \times \sin 30\right) (= 42.5)$ oe or $(23 \times "2.5") - \left(\frac{1}{2} \times "2.5" \times (23 - 11 - "4.3")\right) - \left(\frac{1}{2} \times "2.5" \times "4.3"\right) (= 42.5)$ oe or $(23 \times ("2.5" + 4.7)) - \left(\frac{1}{2} \times "2.5" \times (23 - 11 - "4.3")\right) - \left(\frac{1}{2} \times "2.5" \times "4.3"\right)$ oe				M1 for a correct method to find the area of the trapezium or the whole shape
	Working required	150.6		A1 dep on M1 awrt 150.6 Allow 151 Accept $\frac{753}{5}$	
					Total 5 marks

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