

Mark Scheme (Results)

Summer 2024

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

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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

- o M marks: method marks
- o A marks: accuracy marks
- B marks: unconditional accuracy marks (independent of M marks)

#### Abbreviations

- o cao correct answer only
- o ft follow through
- o isw ignore subsequent working
- SC special case
- o oe or equivalent (and appropriate)
- o dep dependent
- o indep independent
- awrt answer which rounds to
- o 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

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

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

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

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

<b>6</b> (a)	11.56	1	B1 oe eg $\frac{289}{25}$ or $11\frac{14}{25}$
(b)	72	1	B1
(c)	74	1	B1
(d)(i)	$(5+3)\times 2=16$	1	B1
(ii)	$10 - 8 - (10 - 6) \div 2 = 0$	1	B1
			Total 5 marks

					I	
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	Correct explanation	1	B1	
		1. (the) sequence is odd				
		2. (326) is even or not odd				
		3. 'nth 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				
						Total 3 marks

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

<b>9</b> (a)		$c^3$	1	B1	
(b)		36 <i>de</i>	1	B1	oe
(c)		28	1	B1	
(d)	$2g = 6 + 3 \text{ or } 2g = 9 \text{ or } g - \frac{3}{2} = \frac{6}{2} \text{ oe or}$ $(6+3) \div 2 \text{ or } 9 \div 2$		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. $4 \times (-3)^2 + 2 \text{ or } 4(-3)^2 + 2 \text{ or } 4 \times 9 + 2 \text{ or } 4(9) + 2 \text{ or } 4 \times -3 \times -3 + 2 \text{ or } 4(-3 \times -3) + 2$ Weaking not required, so convert greaters	38	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 sq	uare 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 <b>or</b> correct arcs
				not joined – all within or on the
				guidelines of the overlay
				Total 2 marks

11	(a)						CF, CL, CM, FL, FM, LM	2	B2 (B1	for all 6 combinations with no extras of repeats  for at least 3 correct combinations (ignoring repeats))
	(b)		Chocolate	Mint	Vanilla	Total	Correct two-way	2	B2	for all 4 correct values
		Saturday	32	11	28	71	table		(B1	for 2 or 3 correct values)
		Sunday	16	20	13	49				
		Total	48	31	41	120				
	(c)						$\frac{67}{100}$	1	B1	oe
							100			Total 5 marks

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

13	(-2, 9) (-1, 7)	For a correct line between $x = -2$ and	3	В3	For a correct line between $x = -2$ and $x = 3$
	(0, 5) (1, 3) (2, 1) (3, -1)	x = 3		(B2	For a correct straight line segment through at least 3 of $(-2, 9) (-1, 7) (0, 5) (1, 3) (2, 1) (3, -1)$ <b>OR</b> for all of $(-2, 9) (-1, 7) (0, 5) (1, 3) (2, 1) (3, -1)$ plotted but not joined <b>OR</b> 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	$\frac{1}{5} \times 1200 (= 240) \text{ oe or}$ $1200 \div 5 (= 240) \text{ oe}$	$20(\%)$ or 0.2 or 0.42 or $\frac{42}{100}$ oe		4	M1	M2 for 744
	$0.42 \times 1200 (= 504)$ or $\frac{42}{100} \times 1200 (= 504)$ oe	$\frac{1}{5} + \frac{42}{100} \left( = \frac{62}{100} \right) \text{ oe or}$ $0.2 + 0.42 \ (= 0.62) \text{ or}$ $20 + 42 \ (= 62)$			M1	_
	1200 – ("240" + "504") (= 456) oe or 1200 – "744" (= 456)	$1 - \frac{62}{100} = \frac{38}{100} = \frac{19}{50}$ oe or $1 - 0.62 = (0.38)$ or $100 - 62 = 38$			M1	
	Working not required, so correct answer scor obvious incorrect working)	es full marks (unless from	1.9		A1	oe
						Total 4 marks

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

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

$2 \times 2 \times 350$				with 0 incorrect stages
or 2 × 7 × 100 or 2 × 5 × 140				or at least 3 stages in prime factorisation
$\begin{array}{c} \mathbf{or} \ 2 \times 3 \times 140 \\ \mathbf{or} \ 5 \times 7 \times 40 \end{array}$				with no more than 1 incorrect stage.
or $5 \times 5 \times 56$				water the three times a major of the gen
or $(14 \times 100 =) 2 \times 7 \times 100$				Each stage gives 2 factors – may be in a
or $(28 \times 50 = 4 \times 7 \times 50 =) 2 \times 2 \times 7 \times 50 =$				factor tree or a table or listed eg 2, 2,
or 2 1400				350 (see LHS for examples of the amount of work needed for the award of
2 700				this mark).
350				······
				Example of 3 stages with 1 incorrect
				stage:
eg			M1	$1400 = 10 \times 14 = 2 \times 5 \times 2 \times 7$ dep on M1 for $2 \times 2 \times 2 \times 5 \times 5 \times 7$ or
2, 2, 2, 5, 5, 7			1411	$2^3$ , $5^2$ , 7 or $2^3 + 5^2 + 7$
eg eg				
2 1400				(Ignore 1's)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$				(may be seen in a fully correct factor tree
$\begin{array}{ c c c c c c }\hline 5 & 350 \\ \hline 2 & 70 \\ \hline \end{array}$				or ladder)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$				,
7 2 72 5				
	$2^3 \times 5^2 \times 7$		A1	dep on M2 (do not allow 1 in the final
				answer)
				Can be in any order (allow $2^3  cdot 5^2  cdot 7$ ) but
W. 1.				must be in index form as asked for.
Working required	I	1	1	Total 3 marks

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	2	B2	condone missing label
		(-6,-1)(-4,-1)(-4,-2)(-5,-2)			If not B2 then
					B1 for a correct trapezium drawn with correct orientation in wrong position <b>or</b> 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	2 ( <b>or</b> 3 <b>or</b> 2 and 3) is a member of <i>A</i> and <i>B</i>	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
		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				If students mention a number that is common, it must be correct
		$A \cap B = \{3\}$ 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				
	(c)		1, 5, 6, 7	2	B2	for 1, 5, 6, 7
					(B1	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) <b>or</b> 9 <b>or</b> 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 $\pi \times \text{"9"} (= 28.2 (743) \text{ or } 9\pi)$			M1	for a correct expression for the circumference for using $2\pi r$ or $\pi D$ (the first M mark can be implied by $28.2(743)$ rounded or truncated to 1 dp or by $9\pi$ )
	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 (1-)	1	1	D1	
<b>22</b> (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 $4x^3y(5x^2 +)$ or $4x^3y( + 3y^3)$
				Total 8 marks

23	eg $3^{3} \text{ or } (3^{-2}) \times 3^{-5} \text{ or } \frac{3^{3}}{(3^{10})} \text{ or } \frac{(3^{5})}{3^{12}} \text{ or } \frac{(3^{-2})}{3^{5}} \text{ or } 3^{-12} (\times 3^{5}) \text{ oe}$ or $-2 + 5 - 10 \text{ oe or}$ $-12 + 5 \text{ oe or}$ $3 - 10 \text{ oe}$		2	M1 for a correct application of an index rule as a first step or a correct calculation for <i>n</i>
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	<del>-7</del>		Al Allow 3 <sup>-7</sup>
				Total 2 marks

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

		604.000		D.1	
<b>25</b> (a)		604 000	1	B1	
(b)		$7 \times 10^{-5}$	1	B1	
(c)	380 000 or		2	M1	
	$3.8 \times 10^{5}$ or				
	$38 \times 10^4$ oe				
	Working not required, so correct answer	$2 \times 10^{5}$		A1	Accept $2.0 \times 10^5$ or $2.00 \times 10^5$ etc
	scores full marks (unless from obvious	2 ~ 10		AI	Accept 2.0 \(^{10}\) of 2.00 \(^{10}\) cic
					A count o dat on a commo for a
	incorrect working)				Accept a dot or a comma for a
					multiplication sign
					eg 2, 10 <sup>5</sup>
					$2, 10^3$
					$2.10^5$
					SC B1 for
					$200\ 000\ \text{or}\ 20 \times 10^4\ \text{or}\ 0.2 \times 10^6\ \text{oe}$
					or
					$2 \times 10^n$ where $n \neq 5$
					when given as a final answer (not for
					incorrect simplification of the
					denominator)
					Total 4 marks

26	23 × 4.7 (= 108.1) oe		5	B1	(indep) May be embedded in 23 × (4.7 + 2.5) (= 165.6)
	$ sin 30 = \frac{(x)}{5} $ or $ \frac{(x)}{\sin 30} = \frac{5}{\sin 90} \text{ oe} $ where $x = \text{height of trapezium}$ $ 5\cos 30 \left( = \frac{5\sqrt{3}}{2} = 4.33 \right) $ and $(x^2 = )5^2 - "5\cos 30"^2 (= 6.25)$			M1	
	$(x =) 5 \sin 30 (= 2.5) \text{ oe} $ $(x =) \frac{5}{\sin 90} \times \sin 30 (= 2.5) \text{ oe} $ $(x =) \frac{5}{\sin 90} \times \sin 30 (= 2.5) \text{ oe} $			M1	
	$\frac{1}{2} \times (11+23) \times "2.5" (= 42.5) \text{ oe or } \left(\frac{1}{2} \times "2.5" \times (23-11)\right) + (11 \times "2.5") (= 42.5) \text{ oe or }$ $\left(\frac{1}{2} \times "2.5" \times (23-11-"4.3")\right) + (11 \times "2.5") + \left(\frac{1}{2} \times "2.5" \times "4.3"\right) (= 42.5) \text{ oe or }$ $(11 \times "2.5") + \left(\frac{1}{2} \times 5 \times (23-11) \times \sin 30\right) (= 42.5) \text{ oe or }$ $(23 \times "2.5") - \left(\frac{1}{2} \times "2.5" \times (23-11-"4.3")\right) - \left(\frac{1}{2} \times "2.5" \times "4.3"\right) (= 42.5) \text{ oe or }$ $(23 \times ("2.5"+4.7)) - \left(\frac{1}{2} \times "2.5" \times (23-11-"4.3")\right) - \left(\frac{1}{2} \times "2.5" \times "4.3"\right) \text{ oe }$			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