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Mark Scheme (Results)

June 2022

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

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Summer 2022

Log number 68788

Publications Code 4MA1\_1FR\_2206\_MS

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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
- eeo – 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 question 22, 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)		7534	1	B1
(b)	eg 3600 – 3574 <b>or</b> 3745 – 3600		2	M1 for 3600 – “number” or “number” – 3600 where “number” contains the digits 3,4,5,7. Must have attempted to evaluate this calculation
		26		A1 cao
				<b>Total 3 marks</b>

2 (a)		Pentagon	1	B1
(b)		acute angle clearly indicated with ‘A’	1	B1 allow either angle or both acute angles indicated
(c)		reflex angle clearly indicated with ‘R’	1	B1 accept either the interior reflex angle, or any of the exterior reflex angles, if labelled outside of the shape with an arc
				<b>Total 3 marks</b>

3 (a)		18	1	B1
(b)(i)	eg 66 – 15 – 9 – 3 – “18” <b>or</b> 66 – (7.5 × ”6”) <b>or</b> 66 – 45		2	M1ft ft their 18 from part (a)
		21		A1ft ft their 18 from part (a) eg 66 – 15 – 9 – 3 – their answer to part (a)
(ii)		$3\frac{1}{2}$ diagrams drawn	1	B1ft follow through their 21 from (b)(i)
				<b>Total 4 marks</b>

<b>4</b>	(a)		$\frac{7}{10}$	1	B1 oe eg $\frac{70}{100}$
	(b)		15	1	B1
	(c)	eg $35 \times 3 \div 5$ or $7 \times 3$ or $\frac{3}{5} \times 35$		2	M1 for a complete method
			21		A1
<b>Total 4 marks</b>					

<b>5</b>	(a)		1	1	B1 or one line (only) on the diagram clearly indicated
	(b)		2	1	B1
	(c)		126	1	B1 allow $\pm 2$
<b>Total 3 marks</b>					

<b>6</b>	(a) (i)		27	1	B1
	(ii)		5, 16	1	B1 either or both indicated
	(b)	5 or 23 identified as a prime or $5 + 23$		2	M1 at least one prime identified
			28		A1
<b>Total 4 marks</b>					

<b>7</b>	(a)		$(-1, 3)$	1	B1
	(b)		$(5, 1)$	2	B1 for $x = 5$ B1 for $y = 1$
	(c)	$\frac{1}{2} \times 6 \times 4$ oe		2	M1 for a correct method
			12		A1
	(d)		$D$ indicated at $(-1, -1)$	1	B1 label not required if coordinate clearly indicated
<b>Total 5 marks</b>					

<b>8</b>		add 489 to 13 203	2	B2 oe eg accept 489 + 13 203 (B1 for sight of $489 \times 27 = 13\ 203$ )
<b>Total 2 marks</b>				

<b>9</b>	(a)		$7p - t$	2	B2 Fully correct answer (allow $-1t$ ) (B1 for $7p$ or $-t$ )
	(b)	eg $8 \times 5 - 3 \times 4$ <b>or</b> $40 - 12$		2	M1 for a complete method
			28		A1
<b>Total 4 marks</b>					

<b>10</b>	(a) (i)			35	1	B1 if answer line is blank, check the diagram
	(ii)	<u>vertically opposite</u> angles are equal <b>or</b> vertically <u>opposite angles</u> are equal			1	B1
	(b) (i)	$(BEC =) 180 - 90 - 35 (= 55)$ <b>or</b> $(BEH =) 35 + 90$			2	M1 for a method to find angle <i>BEC</i> <b>or</b> <i>BEH</i>
				125		A1 if answer line is blank, check the diagram
	(ii)	eg <u>Angles in a triangle</u> add to $180^\circ$ (allow angles in a <u>triangle</u> add to $180^\circ$ ) <u>Angles in a triangle</u> sum to $180^\circ$ (allow angles in a <u>triangle</u> sum to $180^\circ$ ) <u>Angles on a straight line</u> add to $180^\circ$ (allow angles on a <u>straight line</u> add to $180^\circ$ ) The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u>			1	B1 (dep on M1) for one correct reason
<b>Total 5 marks</b>						

<b>11</b>	$9.2 \times \frac{500}{1000}$ <b>or</b> $9.2 \div 2 (= 4.6)$ oe		4	M1	for a method to find the cost of 500g of Cheddar
	$6.3 - "4.6" (= 1.7)$			M1	for a method to find the cost of 200g of Stilton
	$"1.7" \times \frac{1000}{200}$ <b>or</b> $"1.7" \times 5$ oe			M1	for a complete method to find the cost of 1kg of Stilton
		8.5(0)		A1	
					<b>Total 4 marks</b>

<b>12</b>	$eg\ 3x - 24 + 102 - x = 180$ oe <b>or</b> $90 + 90 + 3x - 24 + 102 - x = 360$ oe		3	M1	for setting up a correct equation
	$eg\ 2x = 180 - 78$ oe <b>or</b> $2x = 360 - 258$ oe <b>or</b> $eg\ (180 + 24 - 102) \div 2$ <b>or</b> $360 - (90 + 90 - 24 + 102) \div 2$			M1	for simplifying and isolating the $x$ term <b>or</b> for a complete calculation to find the value of $x$
		51		A1	
					<b>Total 3 marks</b>

<b>13</b>	(a)	$150 \div (90 \div 18)$ oe $eg\ 150 \div 5$		2	M1	for a complete method to find the number of people for running
			30		A1	if answer line is blank, check the table for answer
	(b)	$eg\ 360 - (90 + 150 + 15 \times "5") (= 45)$ oe	$eg\ 360 \div "5" (= 72)$	3	M1	for working out the angle for swimming <b>or</b> the total number of people check the table for answers ft their "5" from $90 \div 18$
		$"45" \div "5"$	$"72" - (18 + 15 + "30")$		M1	for a complete method to work out the number of people for swimming ft their "5" from $90 \div 18$ ft their "30" from (a)
			9		A1	if answer line is blank, check the table for answer
					<b>Total 5 marks</b>	



<b>14</b>	(a)	$2.6 \times 40 + 30$ oe		2	M1	
			134		A1	allow 2 h 14 mins
	(b)	$2 \times 60 + 40 (= 160)$ oe		3	M1	convert 2 hours 40 minutes to minutes
		$(“160” - 30) \div 40$ <b>or</b> $“130” \div 40$			M1	for a complete method
			3.25		A1	oe eg $3\frac{1}{4}$ or $\frac{13}{4}$ (Note: may see use of their part (a))
					<b>Total 5 marks</b>	

<b>15</b>	eg $10.5 \div (5 - 2) (= 3.5(0))$ <b>or</b> $\frac{5}{7} - \frac{2}{7} \left( = \frac{3}{7} \right)$		3	M1	for finding the value of one share <b>or</b> the difference as a fraction <b>or</b> Bella’s share <b>or</b> Millie’s share
	<b>or</b> $10.5 \times \frac{5}{5-2} (= 17.5)$ <b>or</b> $10.5 \times \frac{2}{5-2} (= 7)$			M1	for a complete method
	eg $“3.5” \times 7$ <b>or</b> $10.5 \div “\frac{3}{7}”$ <b>or</b> $“17.5” + “7”$			A1	oe eg $\frac{49}{2}$
		24.5(0)		SCB1 for an answer of 3 and/or 7.5 oe	
				<b>Total 3 marks</b>	

<b>16</b>	$\frac{62.3...}{6.07...}$		2	M1	for 62.3(2) <b>or</b> 6.07(646...) <b>or</b> 10.2 <b>or</b> 10.3 <b>or</b> 10.25 <b>or</b> 10.26 <b>or</b> 10.255 <b>or</b> 10.256
		10.2559(6871)		A1	
				<b>Total 2 marks</b>	

<b>17</b>	(a)		0.45	1	B1 oe eg $\frac{9}{20}, \frac{45}{100}, 45\%$
	(b)	eg $1 - (0.25 + 0.2 + 0.2) (= 0.35)$ <b>or</b> $1 - ("0.45" + 0.2) (= 0.35)$ <b>or</b> $300 \times (0.25 + 0.2 + 0.2) (= 195)$		3	M1 allow use of their "0.45" from part (a), check the table
		eg $300 \times "0.35"$ <b>or</b> $300 - "195"$			M1 for a complete method
			105		A1 cao (award $\frac{105}{300}$ M2 only)
					<b>Total 4 marks</b>

<b>18</b>	(a)	eg $6 \times 2.4 + 5 \times 3.5$		2	M1
			31.9		A1 oe
	(b)	$(W = ) 5.9n$ <b>or</b> $(W = ) 5.9(n - 1) + 2.4$ <b>or</b> $(W = ) 2.4n + 3.5(n - 1)$		2	M1 for $2.4n + 3.5n$ or $5.9n$ seen
			$5.9n - 3.5$		A1 oe but must be in simplest form eg $-3.5 + 5.9n$
					<b>Total 4 marks</b>

<b>19</b>		$5 \times 12 (= 60)$ <b>or</b> $\frac{15 + 7 - 2 + 23 + x}{5} = 12$ oe <b>or</b> $\frac{x + "43"}{5} = 12$		3	M1 for a method to find the total of the 5 numbers <b>or</b> setting up an equation in $x$ "43" comes from $15 + 7 - 2 + 23$
		$x + 15 + 7 - 2 + 23 = "60"$ <b>or</b> $x + "43" = "60"$ <b>or</b> $"60" - (15 + 7 - 2 + 23)$			M1 for forming an equation with their 60 <b>or</b> for a complete calculation to find the value of $x$ "43" comes from $15 + 7 - 2 + 23$
			17		A1
					<b>Total 3 marks</b>

<p><b>20</b></p> <p>eg <math>0.45 \times 180 (= 81)</math> oe</p> <p><b>OR</b> <math>\frac{15}{180} \left( = \frac{1}{12} \text{ or } 0.0833\dots \right)</math></p> <p><b>OR</b> <math>\frac{15}{180} \times 100 (= 8.3(33\dots)\%)</math></p>		4	<p><b>M1</b> for a method to find the number of students studying German</p> <p><b>OR</b> the number of students studying French as a fraction or decimal of the total students</p> <p><b>OR</b> a method to find the percentage of students studying French</p> <p>81 may be seen as part of an equation</p>
<p>eg <math>180 - 15 - "81" (= 84)</math> <b>or</b> <math>"81" + 15 (= 96)</math></p> <p><b>OR</b> <math>1 - \left( \frac{1}{12} + \frac{45}{100} \right) = \left( \frac{7}{15} \text{ or } 0.466\dots \right)</math></p> <p><b>or</b> <math>\frac{1}{12} + \frac{45}{100} = \left( \frac{8}{15} \text{ or } 0.533\dots \right)</math></p> <p><b>OR</b> <math>100 - ("8.3" + 45) (= 46.6(66\dots) \text{ or } 46.7\%)</math>  <b>or</b> <math>"8.3" + 45 (= 53.3(33\dots) \text{ or } 53.3\%)</math></p>			<p><b>M1</b> for a method to find the number of students studying Italian/Spanish <b>or</b> French/German</p> <p><b>OR</b> a method to find the fraction or decimal of students studying Italian/Spanish <b>or</b> French/German</p> <p><b>OR</b> a method to find the percentage of students studying Italian/Spanish <b>or</b> French/German</p> <p>84 or 96 may be seen as part of an equation</p>
<p>eg <math>\frac{"84"}{180 - "84"} (\times 100) \left( = \frac{7}{8} \text{ or } 0.875 \right)</math> <b>or</b> <math>\frac{"84"}{"96"} (\times 100) \left( = \frac{7}{8} \text{ or } 0.875 \right)</math></p> <p><b>or</b> <math>\frac{7}{15} \div \frac{8}{15} \left( = \frac{7}{8} \text{ or } 0.875 \right)</math> <b>or</b> <math>\frac{"46.6"}{"53.3"} (\times 100) (= 0.872\dots)</math></p>			<p><b>M1</b> for a complete method to find the fraction or decimal or percentage of Italian/Spanish to French/German</p>
		87.5	<p><b>A1</b> accept 87.2 – 87.7</p>
			<b>Total 4 marks</b>

<b>21</b>	(a)		$3c^4 + 12c^3$	2	B2 for $3c^4 + 12c^3$ (B1 for $3c^4$ or $12c^3$ )
	(b)(i)			2	M1 for $(x \pm 9)(x \pm 1)$ <b>or</b> for $(x + a)(x + b)$ with $ab = -9$ or $a + b = 8$
			$(x + 9)(x - 1)$		A1 for correct factors
	(ii)		$-9, 1$	1	B1 ft dep on factorising in the form $(x + p)(x + q)$
					<b>Total 5 marks</b>

<b>22</b>	$\frac{8}{3}(+)\frac{15}{4}$ <b>or</b> $(2)\frac{8}{12}(+)(3)\frac{9}{12}$ <b>or</b> $(2)\frac{8a}{12a}(+)(3)\frac{9a}{12a}$		3	M1 for correct improper fractions <b>or</b> fractional part of numbers written correctly over a common denominator
	eg $\frac{8 \times 4 + 15 \times 3}{3 \times 4}$ <b>or</b> $\frac{32}{12} + \frac{45}{12}$ <b>or</b> $\frac{32a}{12a} + \frac{45a}{12a}$ <b>or</b> $2\frac{8}{12} + 3\frac{9}{12} = 5\frac{17}{12}$ oe			M1 for correct fractions with a common denominator of 12 or a multiple of 12
	$\frac{32}{12} + \frac{45}{12} = \frac{77}{12} = 6\frac{5}{12}$ <b>or</b> $5\frac{17}{12} = 6\frac{5}{12}$ <b>or</b> if shows $6\frac{5}{12} = \frac{77}{12}$ at the beginning then show that the addition comes to $\frac{77}{12}$	Shown	A1 dep on M2 for a correct answer from fully correct working <b>or</b> shows that RHS = $\frac{77}{12}$ <b>and</b> fully correct working shows LHS = $\frac{77}{12}$	
<b>Total 3 marks</b>				

23	eg $(V=) \pi \times \left(\frac{18}{2}\right)^2 \times 3.5 (= 890.(64\dots) \text{ or } \frac{567}{2} \pi)$		3	M1	correct method to calculate volume
	eg $(7.04 \times 1000) \div "890.64"$			M1	correct method to calculate density (if volume is incorrect, their value can be used if clearly labelled)  accept use of 7.04 or an incorrect conversion from kg to g for mass
		7.9		A1	accept 7.9 – 7.92
					<b>Total 3 marks</b>

24	18000×0.15 (= 2700) oe or 18000×0.85 (= 15 300) oe		3	M1	for finding 15% or 85% of 18 000	M2 for 18000×0.85 <sup>4</sup> oe or 18000×0.85 <sup>5</sup> (= 7986.(69\dots)) oe
	eg 18000×0.85 <sup>4</sup> oe or "15300"×0.85×0.85×0.85 oe or "15300"×0.85(=13005) oe and "13005"×0.85(=11054.25) oe and "11054.25"×0.85 oe			M1	(dep) for a complete method	
		9396		A1	awrt 9396	
				If no marks awarded, award SCB1 for or 18000 × 0.85 <sup>2</sup> (= 13 005) oe or 18000×0.85 <sup>3</sup> (= 11 054.(25)) oe or 18 000 × 0.4 (= 7200) oe or 18 000 × 1.15 (= 20700) oe or 18 000 × 1.15 <sup>4</sup> (= 31482.(1125)) oe		
					<b>Total 3 marks</b>	

25	$-4x \leq 11 - 3$ <b>or</b> $-4x \leq 8$ <b>or</b> $-x \leq 2$ <b>or</b> $3 - 11 \leq 4x$ <b>or</b> $-8 \leq 4x$		2	M1 allow equals sign or condone incorrect inequality sign for M1 only
		$x \geq -2$		A1 allow $-2 \leq x$  SCB1 for $x$ and $-2$ with an incorrect sign between them or $-2$ as an answer
				<b>Total 2 marks</b>

26	$3 \div 2 (=1.5 \text{ or } \frac{3}{2})$ <b>or</b> eg $\frac{5 - -1}{4(-0)}$ <b>or</b> $c = -1$		3	M1 for correct method to find gradient or the correct value of $c$  for gradient, may see a correct calculation <b>or</b> $\frac{3}{2}$ oe <b>or</b> $1.5x (+ c)$ oe  for value of $c$ , allow $c = -1, y = -1, (L =) mx - 1$ oe
	$y = "1.5"x (+ c)$ <b>or</b> $y = mx - 1$ <b>or</b> eg $y - 5 = m(x - 4)$			M1 for use of $y = mx + c$ with either $m$ or $c$ correct (NB: $m \neq 0$ ) <b>or</b> for $(L =) 1.5x - 1$ oe
		$y = \frac{3}{2}x - 1$		A1 oe eg $y = 1.5x - 1$
				<b>Total 3 marks</b>

27	$(AB^2 \Rightarrow) 7.5^2 - 6^2 (= 20.25)$ <b>or</b> eg $(BAC \Rightarrow) \sin^{-1}\left(\frac{6}{7.5}\right) (= 53.1\dots)$		6	M1	for a correct first step to find $AB$ <b>or</b> a complete method to find angle $BAC$ <b>or</b> a correct first step to find angle $BCA$
	<b>or</b> $\cos(BCA) = \frac{6}{7.5} (= 0.8)$			M1	for a complete method to find $AB$ <b>or</b> angle $BCA$
	$(AB \Rightarrow) \sqrt{7.5^2 - 6^2} (= 4.5)$ <b>or</b> $(AB \Rightarrow) \frac{6}{\tan "53.1"} (= 4.5\dots)$			M1	ft [their labelled $AB$ ] <b>or</b> [their labelled $BCA$ ] eg for $\frac{1}{2} \times 6 \times$ [their labelled $AB$ ] <b>or</b> $\frac{1}{2} \times 6 \times 7.5 \times \sin$ [their labelled $BCA$ ]
	<b>or</b> $(AB \Rightarrow) 7.5 \cos "53.1" (= 4.5\dots)$ <b>or</b> $(BCA \Rightarrow) \cos^{-1}\left(\frac{6}{7.5}\right) (= 36.8\dots)$			M1	ft (dep on previous M1) allow $31.5 -$ [their area]
	$(\text{Area } ABC \Rightarrow) \frac{1}{2} \times 6 \times "4.5" (= 13.5)$			M1	for a complete method to find $AD$ , dependent on correct working
	<b>or</b> $(\text{Area } ABC \Rightarrow) \frac{1}{2} \times 6 \times 7.5 \times \sin("36.8") (= 13.47\dots \text{ or } 13.5)$			A1	accept 4.78 – 4.81
$(\text{Area } DAC \Rightarrow) 31.5 - "13.5" (= 18)$					
<b>or</b> $"13.5" + 0.5 \times 7.5 \times AD = 31.5$ oe					
$(AD \Rightarrow) ("18" \div 7.5) \div 0.5$ oe		4.8			
					<b>Total 6 marks</b>

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