



Pearson
Edexcel

Mark Scheme (Results)

Summer 2023

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**
 - 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,

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Where the mark scheme states otherwise, 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)(i)		20	1	B1 cao
(ii)		25	1	B1 cao
(b)(i)		cube	1	B1 ignore misspelling
(ii)		factor	1	B1 ignore misspelling
				Total 4 marks

2 (a)		8	1	B1 cao
(b)		Correct shape drawn	1	B1
(c)		2	1	B1 cao
(d)		240	1	B1 cao
				Total 4 marks

3 (a)		Neptune	1	B1 cao allow -210
(b)		630	1	B1 allow -630
				Total 2 marks

4 (a)(i)		(2, 6)	1	B1 cao
(ii)		(-4, 3)	1	B1 cao
(b)		Cross at (4, 2)	1	B1 cao
				Total 3 marks

5	(a)		$\frac{2}{3}$	1	B1 allow 0.67 or better
	(b)		$\frac{4}{5}$ and $\frac{12}{15}$	1	B1
	(c)		0.7	1	B1 allow 0.7(000...)
					Total 3 marks

6	(a)		8	1	B1 cao
	(b)	40 – (“8” + 14 + 11) oe or 40 – 33 or or 18 – 11 or 21 – 14 or 15 – “8”		3	M1 for 40 minus their 3 readings (allow one incorrect reading from 8 or 14 or 11)
		7			A1(ft for 15 – “8” or 40 – (“8” + 14 + 11))
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	Correct height of bar		A1 ft dep on M1 ± half square tolerance for height of bar Award 3 marks for a fully correct bar of height of 7
					Total 4 marks

7	$1620 \times 0.9(0)$ (= 1458)		4	M1
	$1620 \div 1.08$ (= 1500)			M1
	“1500” – “1458”			M1
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	42		A1
				SC B1 for $1620 \div 0.9$ (= 1800) and 1620×1.08 (= 1749.6(0)) or for “1800” – “1749.6(0)” (= 50.4(0))
				Total 4 marks

8	(a)	$3 \times 25 + 30 + 42$ or $75 + 30 + 42$		2	M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	147		A1
	(b)	$220 - 65 - 30$ (= 125) or $220 - 95$ (= 125)		3	M1
		“125” \div 25 or 5×25 (= 125)			M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	5		A1
					Total 5 marks

9	(a)		60	1	B1 cao
	(b)(i)		58	1	B1
	(ii)		correct reason	1	B1 for <u>angles</u> in a <u>triangle</u> add up to 180° or for angles in a <u>triangle</u> add up to <u>180°</u>
					Total 3 marks

10	$\frac{4}{5} \times 120 (= 96)$ oe		4	M1
	“96” \times 46 (= 4416) oe			M1
	“4416” – 120 \times 28 or “4416” – “3360”			M1
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	1056		A1
				Total 4 marks

11		Seoul	Tokyo	Total	correct table	3	B3 for all correct entries (B2 for 6 or 7 or 8 correct entries) (B1 for 3 or 4 or 5 correct entries)
	Business	51	35	86			
	Economy	25	69	94			
	Total	76	104	180			
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>						Total 3 marks

12	(a)	$[7.3 - 7.7] \times 3$		2	M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	22.5		A1 accept an answer in the range 21.9 – 23.1
	(b)	for stating 8 cm or within or on guidelines on overlay		1	B1
		for \times from B with a bearing of 110° or \times plotted within or on guidelines on overlay or line drawn within or on guidelines		1	B1
			Correct position	1	B1 within or on guidelines
					Total 5 marks

13	$\frac{49}{175} \times 100$ oe or 0.28×100 oe		2	M1
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	28		A1
				Total 2 marks

14	$135 \div (2 + 7) (= 15)$ oe or $135 \div 9 (= 15)$ oe or $9 \times 15 (= 135)$ oe		4	M1	M2 for $\frac{2}{9} \times 135 (= 30)$ or
	$2 \times "15" (= 30)$ oe or $7 \times "15" (= 105)$ oe			M1	$\frac{7}{9} \times 135 (= 105)$
	$"30" \times 8 + "105" \times 5 (= 765)$ oe or $240 + 525 (= 765)$ oe			M1	
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	65		A1	
					Total 4 marks

15	(a)	$138 \div \frac{72}{12}$ oe or $138 \div "6"$		2	M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	23		A1
	(b)	$18 + x + 2x = 90$ oe or $90 - 18 (= 72)$		3	M1
		$x = \frac{90 - 18}{3} = 24$ or $"72" \div 3 (= 24)$			M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	$\frac{24}{90}$		A1 oe or 0.26(666...) or 26(.666...) % truncated or rounded
					Total 5 marks

16	(a)		$3(2y-9)$	1	B1 accept $3(-9+2y)$
	(b)		$p^2 - 2p$	1	B1 accept $-2p + p^2$
	(c)	$46 = 5 \times 17 + 4r$ oe or $46 = 85 + 4r$ oe oe or $46 - 5 \times 17 (= 4r)$ oe or $46 - 85 (= 4r)$ oe or $r = \frac{T - 5g}{4}$		3	M1
		$(r =) \frac{46 - 85}{4}$ oe or $(r =) \frac{46 - 5 \times 17}{4}$ oe			M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	-9.75		A1 oe eg $\frac{-39}{4}$
	(d)	$25 \pm \dots\dots$ or $\dots\dots - 12$ or $(-5)^2 - 4 \times 3$ or $(-5)^2 - 4(3)$ or $-5 \times -5 - 4 \times 3$ or $-5 \times -5 - 4(3)$		2	M1 for either 25 or -12 in the correct place or the correct substitution shown with brackets around -5
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	13		A1 (M0A0 for -37 without any working)
	(e)	$x^2 + 5x - 7x - 35$		2	M1 for any 3 correct terms or for 4 out of 4 correct terms ignoring signs or for $x^2 - 2x \dots$ or for $\dots - 2x - 35$
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	$x^2 - 2x - 35$		A1 oe Ignore solutions/roots if correct expansion seen
					Total 9 marks

17	<p>9, 18, 27, 36 and 12, 24, 36</p> <p>or</p> <p>36</p> <p>or</p> <p>a multiple of 36</p> <p>or</p> <p>$(9 \times 12 =) 108$</p> <p>or</p> <p>$3^2 \times 4 (= 36)$ (from Venn diagram or table)</p>		4	<p>M1 for at least two multiples of 9 and 12</p> <p>or</p> <p>36</p> <p>or</p> <p>a multiple of 36</p>																					
	<p>$"4" \times 7.6(0)$ or $"3" \times 4.8(0)$ or</p> <p>$"30.4"$ or $"14.4"$ or</p> <p>$"4n" \times 7.6(0)$ or $"3n" \times 4.8(0)$</p>			<p>M1 for a correct method to find the cost of 4 or 8 or 12 etc of packets of pens</p> <p>or 3 or 6 or 9 etc packets of pencils</p>																					
	<p>$"4" \times 7.6(0) + "3" \times 4.8(0)$</p> <p>or</p> <p>$"30.4" + "14.4"$</p> <p>or</p> <p>$"4n" \times 7.6(0) + "3n" \times 4.8(0)$</p>			<p>M1 for a correct combination of number of packets of pens $\times 7.6(0)$ + number of packets of pencils $\times 4.8(0)$ with an intention to add, eg</p> <table border="1" data-bbox="1489 842 2033 1114"> <thead> <tr> <th>pens</th> <th>pencils</th> <th></th> </tr> </thead> <tbody> <tr> <td>$4 \times 7.60 +$</td> <td>$3 \times 4.8 =$</td> <td>44.8(0)</td> </tr> <tr> <td>$8 \times 7.60 +$</td> <td>$6 \times 4.8 =$</td> <td>89.6(0)</td> </tr> <tr> <td>$12 \times 7.60 +$</td> <td>$9 \times 4.8 =$</td> <td>134.4(0)</td> </tr> <tr> <td>$16 \times 7.60 +$</td> <td>$12 \times 4.8 =$</td> <td>179.2(0)</td> </tr> <tr> <td>$36 \times 7.60 +$</td> <td>$27 \times 4.8 =$</td> <td>403.2(0)</td> </tr> <tr> <td>$48 \times 7.60 +$</td> <td>$36 \times 4.8 =$</td> <td>537.6(0)</td> </tr> </tbody> </table>	pens	pencils		$4 \times 7.60 +$	$3 \times 4.8 =$	44.8(0)	$8 \times 7.60 +$	$6 \times 4.8 =$	89.6(0)	$12 \times 7.60 +$	$9 \times 4.8 =$	134.4(0)	$16 \times 7.60 +$	$12 \times 4.8 =$	179.2(0)	$36 \times 7.60 +$	$27 \times 4.8 =$	403.2(0)	$48 \times 7.60 +$	$36 \times 4.8 =$	537.6(0)
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	<p><i>Correct answer scores full marks (unless from obvious incorrect working)</i></p>	<p>44.8(0)</p>		<p>A1 allow 45 if 44.8(0) seen</p> <p>allow 4480 p or pence if £ sign crossed out</p> <p>M3A0 for $44.8n$ where n is an integer (eg 134.4(0))</p>																					
				<p>Total 4 marks</p>																					

18	3.3 or $\frac{33}{10}$ or $3\frac{3}{10}$ or $3\frac{18}{60}$ oe or $180 + 18$ or 198 oe		3	B1 for working out the time in hours or minutes
	$515 \div 3.3$ or $515 \div \frac{33}{10}$ or $515 \div 3\frac{3}{10}$ or $\frac{515}{\text{"198"}} \times 60$ oe			M1 Units must be consistent
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	156		A1 allow 156 – 156.1 SCM1 for $515 \div 3.18$ (= 161.9... or 162)
				Total 3 marks

19			2	M1 for $-7n + k$ ($k \neq 45$) or $-7 \times n + k$ ($k \neq 45$) or $n \times -7 + k$ ($k \neq 45$) (k may be zero or absent or negative)
		$45 - 7n$		A1 oe eg $45 - 7 \times n$ oe or $-7 \times n + 45$ oe or $U_n = 45 - 7n$ oe or $38 - 7(n - 1)$ oe NB: award full marks for eg $x = 45 - 7n$ oe or n th term = $-7 \times n + 45$ oe or but only M1 for $n = 45 - 7n$ oe
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>			Total 2 marks

20	$\frac{1}{2}(330+170) \times 240 (= 60\,000)$ oe or $\left(\frac{80 \times 240}{2}\right) + (170 \times 240) + \left(\frac{80 \times 240}{2}\right) (= 60\,000)$ oe or $(2 \times 9600) + 40\,800 (= 60\,000)$ oe		4	M1 for working out the area of the trapezium
	$[60\,000] \div 10\,000 (= 6)$ or $10\,000 \times 6 (= 60\,000)$			M1 ft their area (must come from a two dimensional area) Allow $\frac{\text{their area}}{10\,000}$
	$49\,650 \div [6]$			M1 dep on either previous M1 ft their number of hectares Allow $\frac{49\,650}{\text{their number of hectares}}$
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	8275		A1
				Total 4 marks

21	(a)	$7 \times 5 \times 14 (= 490)$ oe or $7 \times 14 (= 98)$ and $400 \div 5 (= 80)$		4	M1 for working out the pay per week or pay per day
		"490" – 400 (= 90) or "98" – "80" (= 18) or "98" \div "80" oe or "490" \div 400 oe or 1.225 oe			M1
		$\frac{"90"}{400}(\times 100)(= 0.225)$ oe or $\frac{"18"}{80}(\times 100)(= 0.225)$ oe or $\frac{"98"}{80} \times 100 (= 122.5)$ oe or $\frac{"490"}{400} \times 100 (= 122.5)$ oe or "1.225" – 1 (= 0.225)			M1 dep on M2
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	22.5		A1 oe allow 23% with M3 awarded
	(b)	E.g. $1 - 0.06 (= 0.94)$ or $100(\%) - 6(\%) (= 94(\%))$ or $\frac{23\ 030}{94} (= 245)$ oe		3	M1
		E.g. $23\ 030 \div "0.94"$ or $23\ 030 \div "94" \times 100$ or $23\ 030 \times 100 \div "94"$ or "245" $\times 100$			M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	24 500		A1
					Total 7 marks

22	(a)		1	1	B1 cao
	(b)		-6	1	B1 Allow 3^{-6}
					Total 2 marks

23	(a)	$-4x > 17 - 9$ or $-4x > 8$ or $9 - 17 > 4x$ or $-8 > 4x$ or $\frac{9}{4} - x > \frac{17}{4}$ oe or $-\frac{9}{4} + x < -\frac{17}{4}$ oe		2	M1 for a correct first step Condone = rather than $>$ or any other sign for this mark.
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	$x < -2$		A1 oe eg $-2 > x$ (sight of correct answer in working space and just $(x =) -2$ on answer line gains M1 only)
	(b)		$y \geq 2$ $x \leq 6$ $y \leq x$	3	B3 for all 3 correct Allow $2 \leq y, 6 \geq x$ and $x \geq y$ B2 for 2 correct B1 for 1 correct Allow $<$ and $>$ signs SCB2: $y \leq 2, y \geq x$ and $x \geq 6$ (for all 3) Allow $<$ and $>$ signs
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>			Total 5 marks

24	$\sin 32 = \frac{(BC)}{50}$ or $\cos 32 = \frac{(CD)}{50}$ or $\frac{(BC)}{\sin 32} = \frac{50}{\sin 90}$ oe or $\frac{(CD)}{\sin(90-32)} = \frac{50}{\sin 90}$ oe		6	M1
	$(BC =) 50 \sin 32 (= 26.4(959\dots))$ or $(BC =) \sqrt{50^2 - (50 \cos 32)^2} (= 26.4(959\dots))$ or $(BC =) \sqrt{50^2 - "42.4\dots" ^2} (= 26.4(998\dots))$ or $(BC =) \frac{50}{\sin 90} \times \sin 32$ oe			M1 for finding <i>BC</i> or <i>AD</i> Can be written on the diagram
	$(CD =) 50 \cos 32 (= 42.4(024)\dots)$ or $(CD =) \sqrt{50^2 - (50 \sin 32)^2} (= 42.4(024\dots))$ or $(CD =) \sqrt{50^2 - "26.4\dots" ^2} (= 42.4(622\dots))$ or $(CD =) \frac{50}{\sin 90} \times \sin(90-32)$			M1 for finding <i>CD</i> or <i>BA</i> Can be written on the diagram
	$(r =) "42.4(024\dots)" \div 2\pi (= 6.74(855\dots))$			M1 for finding the radius of the cylinder
	$(V =) \pi \times "6.74(855\dots)"^2 \times "26.4(959\dots)"$			M1 dep on previous M mark for the use of $\pi r^2 h$
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	3790		A1 allow answers in the range 3737 – 3794 Accept answers in standard form
				Total 6 marks

25	$104 \times 5 (= 520)$ or $127 \times 7 (= 889)$ or $\frac{m+tu+w+th+f}{5} = 104$ oe		3	M1
	“889” – “520” – 132 or “369” – 132 or $\frac{520+132+x}{7} = 127$ oe or $\frac{132+x}{2} = \frac{369}{2}$ oe $652 + x = 127 \times 7$			M1 ($x = \text{Sunday}$)
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	237		A1
				Total 3 marks

