Mark Scheme (Results)

Summer 2024

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

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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

- 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.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
  If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
  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 in another.

International GCSE Maths					
Apart from questions 11, 18, 20, 21b and 26 (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)		Saimaa	1	B1 Accept 13 600
	(b)		Six thousand one hundred and twenty four	1	B1
	(c)		6189	1	B1 cao
	(d)		60	1	B1 or 6 tens or sixty
	(e)		3808 & 4361	1	B1 accept Kentucky and Superior
					Total 5 marks
2	(a)		$15p$	1	B1 cao
	(b)		$36q$	1	B1 cao
	(c)		3.75	1	B1 or $\frac{15}{4}$ or $3\frac{3}{4}$ oe
					Total 3 marks

3	(a)		Cross at $\frac{1}{2}$	1	B1 cao
	(b)		Cross at 0	1	B1 cao
	(c)	Acceptable answers eg 1. It is over 1/more than 1 oe 2. It is over 100%/more than 100% oe 3. Probability of 1/100% is the highest oe 4. Probability ranges from 0 – 1 or 0 – 100% oe 5. 1.2/120% is impossible oe 6. It has to be 1 or less oe 7. It has to be below 1 oe Do not accept eg 1. It is (too) high oe 2. Sum has to be 1 oe This is not an exhaustive list	Correct reason	1	B1 for probability cannot be more than 1 oe Do not allow contradictory answers Any reference to **sum** of probabilities is 1 is B0
					Total 3 marks

4	(a)		octagon	1	B1
	(b)		240	1	B1
	(c)		C	1	B1 allow c
	(d)		metres	1	B1 or m
					Total 4 marks

5	(a)(i)		9	1	B1 cao
	(ii)		24	1	B1 cao
	(iii)		8	1	B1 cao
	(iv)		2	1	B1 cao
	(b)		76	1	B1 cao
					Total 5 marks

6	(a)(i)		125	1	B1 cao
	(ii)		correct reason	1	B1 for Angles around a point add up to 360° or Angles around a point add up to 360°
	(b)	*ABD* = 180 – 54 (= 126) or *BDC* = 180 – 2 × 54 (= 72) or *BDC* = 180 – 108 (= 72)		3	M1 NB If angles are on the diagram they must be correctly assigned or if angle notation is used it must be correctly assigned
		360 – (98 + 90 + "126") or 360 – (98 + 90 + 54 + "72") or 360 – 314			M1 for a complete method
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	46		A1
					Total 5 marks

7	35 × 14 (= 490)			4	M1
	679 – "490" (= 189)	M2 for (679 –) 9 × 21 oe or (490 +) 9 × 21 oe			M1
	"189" ÷ 21				M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)		9		A1
					Total 4 marks

8	(a)		$4x - 3y$	2	B2 Accept $-3y + 4x$ (If not B2 then award B1 for $4x$ or $-3y$)
	(b)	4 × 13 **and** ±6 × 7 or 52 **and** ±42		2	M1
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	10		A1 SC B1 for –50
	(c)	$5p = 28 - 11$ or $11 - 28 = -5p$ or $5p = 17$ or $p + \frac{11}{5} = \frac{28}{5}$ or (28 – 11) ÷ 5 oe		2	M1
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$\frac{17}{5}$		A1 oe e.g. 3.4 or $3\frac{2}{5}$
					Total 6 marks

9		Triangle drawn with correct intersecting arcs 9 cm from *A* and 9 cm from *B*	2	B2 for triangle drawn with correct intersecting arcs 9 cm from *A* and 9 cm from *B* within or on the guidelines of the overlay (B1 for two intersecting arcs within or on the guidelines of the overlay **or** accurate triangle drawn with no arcs)
	Working required			**Total 2 marks**

10	(a)		$\frac{10}{29}$	1	B1 oe 0.34(48275…) or 34.(48275…)% truncated or rounded
	(b)	$\frac{29-10-7}{29}$ or $1-\frac{10+7}{29}$ or 29 – 10 – 7 or 12 or 1 – 0.34(482…) – 0.24(137…)		2	M1
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$\frac{12}{29}$		A1 oe 0.41(37931…) – 0.42 or 41.(37931…)% – 42% penalise incorrect notation only once
					Total 3 marks

11	1.4 × 1000 (= 1400)			4	M1
	5 × 250 ÷ 120 (= 10.4…) oe or 120, 240, 360, 480, 600, 720, 840, … **or** 750 ÷ 60 (= 12.5) oe or 60, 120, 180, 240, 300, 360, 420, … **or** "1400" ÷ 200 (= 7) oe or 200, 400, 600, 800, 1000, 1200, 1400, …	120 ÷ 24 (= 5) oe **or** 60 ÷ 24 (= 2.5) oe **or** 200 ÷ 24 (= 8.3…) oe			M1
	5 × 250 ÷ 120 (× 24) oe or 1250 ÷ 120 (× 24) oe or 10.4… oe or 250 or 120, 240, 360, 480, 600, 720, 840, … **and** 750 ÷ 60 (× 24) oe or 12.5 oe or 300 or 60, 120, 180, 240, 300, 360, 420, … **and** "1400" ÷ 200 (× 24) oe or 7 or 168 or 200, 400, 600, 800, 1000, 1200, 1400, …	5 × 250 ÷ "5" (= 250) oe **and** 750 ÷ "2.5" (= 300) oe **and** "1400" ÷ "8.3…" (= 168)			M1
	Working required		168		A1 dep on M3
					Total 4 marks

12 (a)	$(0 \times 2) + (1 \times 5) + (2 \times 11) + (3 \times 7) + (4 \times 4) + (5 \times 1)$ (= 69) or $0 + 5 + 22 + 21 + 16 + 5$ (= 69)		3	M1 for at least 4 products added (need not be evaluated) or for 71
	"69" ÷ 30			M1 dep on M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	2.3		A1
(b)		0.21	1	B1 oe
				Total 4 marks

13				3	B3 for a correct line between $x = -2$ and $x = 4$ (B2 for a correct straight line segment through at least 3 of (−2, −7) (−1, −5) (0, −3) (1, −1) (2, 1) (3, 3) (4, 5) **or** for all of (−2, −7) (−1, −5) (0, −3) (1, −1) (2, 1) (3, 3) (4, 5) plotted but not joined) (B1 for at least 2 correct points stated (may be in a table) **or** plotted **or** for a line drawn with a positive gradient through (0, −3) **or** for a line with a gradient of 2)
					Total 3 marks

x	−2	−1	0	1	2	3	4
y	−7	−5	−3	−1	1	3	5

(−2, −7) (−1, −5) (0, −3) (1, −1) (2, 1) (3, 3) (4, 5)

Correct line between $x = -2$ and $x = 4$

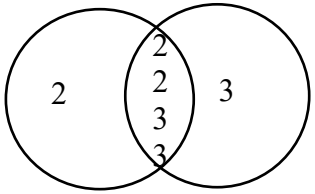
14	(a)	$\frac{86}{490}(\times 100)$ oe or 0.175(510…) (× 100)		2	M1	
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	17.6		A1 awrt 17.6	
	(b)	$\frac{12}{100}\times 375\,(=45)$ oe or 0.12 × 375 (= 45) oe or $\frac{10}{100}\times 375 + \frac{1}{100}\times 375 + \frac{1}{100}\times 375$ oe (= 45) or 37.5 + 3.75 + 3.75 (= 45) oe		3	M1 Must see a calculation. Do not accept,for eg, 12% of 375 unless 45 seen	M2 $\frac{88}{100}\times 375$ oe
		375 − "45" or 375 – "37.5" – "3.75" – "3.75" oe or 375 – "37.5" – "7.5" oe			M1	
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	330		A1	
						Total 5 marks

15	40 – (17 + 15) (= 8) or $\sqrt{17^2-15^2}\left(=\sqrt{289-225}=\sqrt{64}=8\right)$		4	M1 may be seen on diagram	
	"8" × "8" (= 64)			M1 for area of square (can be seen on diagram)	M2 for use of formula for area of trapezium $\frac{1}{2}\times(15+"8"+"8")\times"8"$
	$\frac{15\times"8"}{2}$ (= 60) oe or			M1 for area of triangle (can be seen on diagram)	
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	124		A1	
					Total 4 marks

16 (a)			2	M1 for $3n + k$ ($k \neq -2$) or $3 \times n + k$ ($k \neq -2$) or $n \times 3 + k$ ($k \neq -2$) (k may be zero or absent)
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$3n - 2$		A1 oe eg $1 + (n - 1)3$ oe or $3 \times n - 2$ oe or $n \times 3 - 2$ oe NB: award full marks for eg $x = 3n - 2$ oe or $x = 3 \times n - 2$ oe or $x = n \times 3 - 2$ oe or nth term $= 3n - 2$ oe or nth term $= 3 \times n - 2$ oe or nth term $= n \times 3 - 2$ oe or $3x - 2$ Allow eg T_n or U_n or a_n for nth term **but** only M1 for $n = 3n - 2$ oe or $x = 3x - 2$
(b)		77	1	B1 cao
				Total 3 marks

17	1 – (0.20 + 0.26) (= 0.54) oe or $x + 2x + 0.26 + 0.20 = 1$ oe or $x + 2x = 0.54$ oe or		4	M1 showing clear understanding that the total of probabilities is 1 If probabilities are given as percentages then % sign must be seen
	$\frac{"0.54"}{3} (= 0.18)$ or $\frac{2}{3} \times "0.54" (= 0.36)$ oe or 0.54 × 450 (= 243)			M1 for a correct method to find x or $2x$
	(2 ×) "0.18" × 450 oe or 81 or "0.36" × 450 oe			M1 or for $\frac{81}{450}$ or $\frac{162}{450}$
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	162		A1
				Total 4 marks

17 **ALT**	(0.2 × 450) + (0.26 × 450) (= 207) oe or 90 + 117 (= 207) or 0.46 × 450 (= 207)		4	M1
	450 – "207" (= 243)			M1
	$\frac{1}{3} \times "243"$ or 81 or $\frac{2}{3} \times "243"$			M1 or for $\frac{81}{450}$ or $\frac{162}{450}$
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	162		A1
				Total 4 marks

18	1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72 **and** 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108 **or** 2 2 2 3 3 **and** 2 2 3 3 3 **or**  12 | 72 | 108 3 | 6 | 9 | 2 | 3		2	M1 for any correct valid method and no errors eg for starting to list at least **four** different factors of each number and no errors **or** 2 2 2 3 3 **and** 2 2 3 3 3 seen or 4 2 3 3 **and** 4 3 3 3 seen or 2 2 2 9 **and** 2 2 3 9 seen or 4 2 9 **and** 4 3 9 seen or 2 36 **and** 3 36 etc (may be in a factor tree or a ladder diagram with no errors and ignore 1) **or** a fully correct Venn diagram **or** other clear method, eg table
	Working required	36		A1 dep on M1 Accept $2^2 \times 3^2$ oe
				Total 2 marks

19	1 + 0.15 (= 1.15) **or** $x + 0.15x = 943$ **or** 100(%) + 15(%) (= 115(%)) **or** $\frac{943}{115}$ (= 8.2) oe		3	M1
	943 ÷ "1.15" **or** 943 ÷ "115" × 100 **or** 943 × 100 ÷ "115" oe **or** 8.2 × 100			M1 dep on M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	820		A1
				Total 3 marks

20	(5 – 2) × 180 (= 540) **or** 360 ÷ 5 (= 72)		4	M1 NB If angles are on the diagram they must be from correct working and correctly assigned
	$\frac{"540"}{5}$ (= 108) or 180 – "72" (= 108) **or** 180 – 96 (= 84)			M1
	"72" + "84" **or** 360 – (96 + "108") **or** 180 – ("108" – "84")			M1 for a complete method
	Working required	156		A1 dep on M2
				Total 4 marks

21	(a)	$m^2 - 8m + 5m - 40$		2	M1 for any 3 correct terms from 4 terms **or** for 4 out of 4 correct terms ignoring signs **or** for $m^2 - 3m$ … **or** for … $- 3m - 40$
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$m^2 - 3m - 40$		A1
	(b)	$9n - 12 = 5n + 6$ oe **or** $3n - 4 = \frac{5}{3}n + \frac{6}{3}$ oe		3	M1 for removal of fraction **and** multiplying out LHS **or** separating fraction (RHS) in an equation
		$9n - 5n = 12 + 6$ oe or $4n = 18$ or $-12 - 6 = 5n - 9n$ oe or $-4n = -18$ oe or $n = \frac{-18}{-4}$ **or** $3n - \frac{5}{3}n = \frac{6}{3} + 4$ oe			M1 ft (dep on 4 terms) correctly rearranging their 4 term equation for terms in n on one side of equation and number terms on the other
		Working required	$\frac{9}{2}$		A1 dep on M2 oe eg $\frac{18}{4}$ or 4.5 or $4\frac{1}{2}$
					Total 5 marks

22	(a)(i)		23, 24 ,27, 29, 30, 31, 33	1	B1 in any order with no repeats
	(a)(ii)		27, 33	1	B1 in any order with no repeats
	(b)	eg 1. Yes, no members/numbers/values in common 2. Yes, nothing in common 3. Yes, no common members/numbers/values 4. Yes, they share no common members/numbers/values 5. Yes, there is not the same members/numbers/values in both sets 6. Yes, there is no intersection or there is nothing in B and C 7. Yes, as there are no members/numbers/values the same (in B and C) 8. Yes, no members/numbers/values in B are in C or vice versa 9. Yes, there are no members/numbers in B that are multiples of 3 10. Yes, there are no members/numbers/values in that empty set 11. Yes, 23, 29, 31 not in C 12. Yes, 24, 27, 30, 33 are not in B Allow sector for set This is not an exhaustive list Allow element(s) for members/numbers/values	Yes, there are no multiples of 3 in set *B*	1	B1 for Yes and a statement which indicates correct meanings of intersection and empty set. If no box is ticked, then the 'Yes' must be stated in the answer
	(c)		23, 25, 29, 31	2	B2 for the four correct numbers and no additions (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

23	1575 = (area) × 21 oe **or** (area =) 75 **or** 1575 = $\pi \times r^2 \times 21$ oe **or** $r^2 = \frac{1575}{21\pi}\left(= 23.8(732...)\right)$ oe **or** $r = \sqrt{\frac{1575}{21\pi}}\left(= 4.88(602...)\right)$ oe		3	M1 for finding the area using Vol = cross sectional area × height **or** finding r or r^2 using vol = $\pi r^2 h$ NB r^2 and r can be rounded or truncated
	$\frac{84}{"75"}$ oe or $\frac{84}{\pi"4.88"^2}$ oe or $\frac{84}{\pi"23.8"}$ oe			M1 for $\frac{84}{\text{area of circle}}$
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	1.12		A1 accept 1.06 – 1.121
				Total 3 marks

24	(a)		35 000 000	1	B1
	(b)	$8.2 \times 10^5 + 6\,780\,000$ oe or $820\,000 + 6\,780\,000$ oe or 7 600 000 or 76×10^5 oe or 7.6×10^n where $n \neq 6$		2	M1 Allow correct mixture of ordinary numbers and standard form numbers
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	7.6×10^6		A1
					Total 3 marks

25	(a)		1	1	B1
	(b)		6	1	B1
	(c)		$125a^{12}c^6$	2	B2 for $125a^{12}c^6$ B1 for a product in the form ka^pc^q where 2 from k, p or q are correct eg $5a^{12}c^6$ or $125a^{12}3c^6$ Accept multiplication signs between terms (Allow $125a^{12}$ or $125c^6$ or $a^{12}c^6$ as long as not added to any other terms)
					Total 4 marks

26	$(CM)^2 + (12 \div 2)^2 = 9^2$ oe or $9^2 - (12 \div 2)^2$ $(= 81 - 36 = 45)$		4	M1 $AM = MB$ $CAM = CBM$	M2 for $(\cos^{-1}(CAM) =) \dfrac{12 \div 2}{9} = 48.1(896...)$ **and** $(CM =)(12 \div 2) \times \tan"48.1..."(= 6.7\ldots)$ or $(CM =) 9 \times \sin"48.1..."(= 6.7\ldots)$
	$\sqrt{9^2 - (12 \div 2)^2}$ oe $(= \sqrt{81-36} = \sqrt{45} = 3\sqrt{5} = 6.7(08...))$			M1	
	("7"+ 9 + 9 + 12) × 21.5(0) oe			M1	
	Working required	795.5(0)		A1 dep on M2 SC B3 for awrt 789 for using 6.7…	
					Total 4 marks

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