Mark Scheme (Results)

November 2021

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

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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. 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 12c, 18, 21 and 23, 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)		25	1	B1	cao
(b)		1 and ½ squares	1	B1	Oe the half symbol can be drawn in any direction.
(c)		Monday	1	B1	M or Mon (allow incorrect spelling if meaning is clear)
(d)	20 + 55 + 40 + '25' + 30		2	M1	check by side of pictogram for working – allow values without '+' signs if clear attempt to add (allow one error or omission)
		170		A1	cao
					Total 5 marks

2 (a)		2.001, 2.07, 2.1, 2.12, 2.19	1	B1	cao
(b)		6 tenths	1	B1	oe eg tenths, six tenths, $\frac{6}{10}$ (do not allow 0.6 or .6)
(c)		3.49	1	B1	cao
(d)		60	1	B1	cao
					Total 4 marks

3			7x	1	B1	cao
			28p	1	B1	cao
						Total 2 marks

4	(a)		548	1	B1	cao
	(b)		4.6	1	B1	allow 4.6000….
	(c)	(32 – 5) ÷ 2		2	M1	
		Correct answer scores full marks (unless from obvious incorrect working)	13.5		A1	oe
						Total 4 marks

5	(a)		15	1	B1	cao
	(b)	19 – 13		2	M1	19 and 13 selected or a – b where a = 19 or b = 13
		Correct answer scores full marks (unless from obvious incorrect working)	6		A1	cao
						Total 3 marks

6	(a)		20	1	B1	cao
	(b)		add 4	1	B1	oe 4 times table or 4n or goes up in 4's, allow 'the gap is +4' but not 'the gap is 4'
	(c)		4n	1	B1	4n + 0 not n = 4×n
						Total 3 marks

7	(465 – 400) × 0.10 (= 6.5) or 65 × 0.10 (= 6.5)		4	M1
	(1740 – 1500) × 0.05 (= 12) or 240 × 0.05 (= 12)			M1
	20.75 + '6.5' + '12'			M1
	Correct answer scores full marks (unless from obvious incorrect working)	39.25		A1 cao
				Total 4 marks

8	(360 – 122 – 122) ÷ 2 or 180 – 122		3	M1
		58		A1 for 58°
		58 and correct reason		B1 dep on M1for a reason for their method used **allied** or **co-interior** angles add up to **180°** or **corresponding** angles are **equal** (angles on a **straight line** add up to **180°)** or **opposite angles** in a **rhombus** are **equal** or angles of a **rhombus/quadrilateral** add up to **360°**
				Total 3 marks

9	$12 \times 9 \times 6$		2	M1	
		648		A1	cao
					Total 2 marks

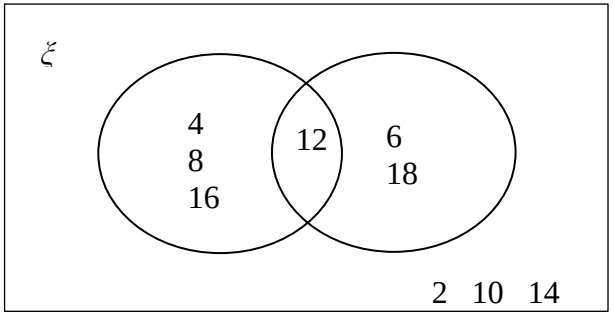
10 (a)		$\frac{5}{29}$	2	B2	for a correct simplified fraction (B1 for $\frac{25}{145}$ oe or for $\frac{29}{5}$)
(b)	$\frac{9}{25} \times 100$ or $\frac{9}{25} = \frac{36}{100}$		2	M1	
		36		A1	
(c)	$28 \div 16 \times 27$ oe eg 1.75×27 or 1.75×11		2	M1	Fully correct method
		47.25		A1	cao
					Total 6 marks

11		Triangle drawn with correct intersecting arcs from A (5 cm) and B (8 cm)	2	B2 (B1	for arcs intersecting within overlay and triangle drawn for correct 5 cm arc from A or 8 cm arc from B) An accurate triangle drawn without arcs scores B1
					Total 2 marks

12	(a)	$6 \times 8 - 4 \times 3$		2	M1	
		Correct answer scores full marks (unless from obvious incorrect working)	36		A1	
	(b)	$-41 = 6 \times p - 4 \times 5$ or $6p = T + 4d$ or $6p = -41 + 4 \times 5$		3	M1	for correct substitution into the correct formula or a correct rearrangement for 6p
		$6p = -41 + 20$ or $6p = -21$ $-6p = 41 - 20$ or $-6p = 21$ $p = \frac{-41+20}{6}$ or $p = \frac{41-20}{-6}$			M1	
		Correct answer scores full marks (unless from obvious incorrect working)	$-\frac{7}{2}$		A1	Oe If no marks awarded SCB1 for –266
	(c)	$4x - 12$ or $x - 3 = \frac{7x}{4} + \frac{15}{4}$ oe		3	M1	for a correct expansion of bracket **or** division of all terms in a correct equation by 4
		$4x - 7x = 15 + 12$ or $-12 - 15 = 7x - 4x$ or $-3x = 27$ or $-27 = 3x$			M1	for a correct rearrangement within a correct equation with x terms on one side and the numbers on the other side
		Working required	-9		A1	dep on M1 (SCB1 for an answer of $x = -6$ with working shown from $4x - 3 = 7x + 15$)
						Total 8 marks

13	40, 80, 120, 160, 200, 240 48, 96, 144, 192, 240 **or** 40, 1h 20, 2h, 2h 40, 3h 20, 4h 48, 1h 36, 2h 24, 3h 12, 4h **or** 6 40, 7 20, 8 00, 8 40, 9 20, 10 00 6 48, 7 36, 8 24, 9 12, 10 00 **or** [(40 =) 8 × 5 and (48 =) 8 × 6 oe eg 40 = 2×2×2×5 and 48 =2×2×2×2×3 (could be numbers on ends of factor trees]		3	M1	for listing multiples of 40 and 48 with at least 3 numbers in each list. (Multiples could be given in minutes or in hours and minutes) Or for listing times after 6 am for both trains, with at least 2 times in each list (allow one ft error)[mark until you have seen 2 correct times with only one ft error]
	(LCM =) 8 × 30 (= 240) or 4 or 10 (am) shown in lists but not given as answer			A1	for 240 (minutes) or 4 (hours)
	Correct answer scores full marks (unless from obvious incorrect working)	10 00 (am)		A1	oe
					Total 3 marks

14	<table><tr><td>**x**</td><td>−2</td><td>−1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>**y**</td><td>7</td><td>4</td><td>1</td><td>−2</td><td>−5</td><td>−8</td></tr></table> (−2, 7) (−1, 4) (0 ,1) (1, −2) (2, −5) (3, −8)	Correct line between x = −2 and x = 3	3	B3	B3 for a correct line between x = −2 and x = 3 (B2 for a correct straight line segment through at least 3 of (−2, 7) (−1, 4) (0, 1) (1, −2) (2, −5) (3, −8) **or** for all of (−2, 7) (−1, 4) (0, 1) (1, −2) (2, −5) (3, −8) 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 negative gradient through (0,1) **or** for a line with a gradient of −3)
					Total 3 marks

15 (a)			3	B3	fully correct (B2 for three correct regions) (B1 for one or two correct regions) [a repeat in a region is an error]
(b)	$\frac{'6'}{9}$		2	M1	Numerator correct (or value intended as numerator) or correct for their Venn diagram (so long as fraction not improper) or 6 out of 9 or 6 : 9 oe (ie correct values in incorrect form)
		$\frac{6}{9}$		A1	Oe allow (0.66)666….rounded or truncated Allow 0.6 only if preceded by $\frac{6}{9}$
					Total 5 marks

16	$80 = \frac{60}{\text{time}}$		3	M1	for substituting correctly into the speed formula
	$(\text{time} =)\frac{60}{80}$ or $\frac{3}{4}$ or 0.75 or 45			M1	for correctly rearranging the speed formula for time
	Correct answer scores full marks (unless from obvious incorrect working)	2 20 (pm)		A1	Accept 14 20
					Total 3 marks

17	(a)		9	1	B1	allow 3^9
	(b)		21	1	B1	allow 5^{21}
	(c)	$8 + 2 - p = 6$ oe eg $8 + 2 = 6 + p$ or $7^{8+2-p} = 7^6$ oe		2	M1	(or embedded eg $8 + 2 = 10$, $10 - 4 = 6$)
		Correct answer scores full marks (unless from obvious incorrect working)	4		A1	allow 7^4
						Total 4 marks

18	$4 \times (5 - x)$ **or** $5 \times (2x - 1)$ **or** $20 - 4x$ **or** $10x - 5$ oe			4	M1	for setting up a correct expression for area A or area B (could be seen as part of an equation) (condone lack of brackets for multiplying if meaning is clear for this mark)
	one from: $4(5 - x) = 20 - 4x$ or $2 \times 4(5 - x) = 40 - 8x$ or $0.5 \times 4(5 - x) = 10 - 2x$ oe	**and** one from: $5(2x - 1) = 10x - 5$ or $2 \times 5(2x - 1) = 20x - 10$ or $0.5 \times 5(2x - 1) = 5x - 2.5$ oe			M1	for expanding 2 sets of brackets correctly (one for each shape) [We will allow for ×2 or ÷2 for the wrong shape for this expansion mark]
	eg $10x + 8x = 40 + 5$ **or** $-5 - 40 = -10x - 8x$ **or** $18x = 45$ **or** $-45 = -18x$ **or** $4x + 5x = 20 + 2.5$ oe				M1	for a <u>correct</u> equation with terms in x on one side and number terms the other side
	Working required		2.5		A1	oe dep on M1
						Total 4 marks

19 (a)			$\frac{31}{70}$	1	B1 31/70 Accept 0.44(28571…..) or 44.(2…)%
	(b)	$4 \times 6 + 12 \times 14 + 20 \times 19 + 28 \times 25 + 36 \times 6$ (= 1488) **or** 24 + 168 + 380 + 700 + 216 (= 1488)		4	M2 for at least **4** correct products added (need not be evaluated) If not M2 then award: M1 for consistent use of value within interval (including end points) for at least **4** products which must be added or correct midpoints used for at least **4** products and not added
		$\frac{4 \times 6 + 12 \times 14 + 20 \times 19 + 28 \times 25 + 36 \times 6}{70}$ oe eg '1488' ÷ '70'			M1 dep on at least M1 Allow division by their Σf provided addition or total under column seen
		Correct answer scores full marks (unless from obvious incorrect working)	21.26		A1 awrt 21.26 accept 21.3
					Total 5 marks

20	(a)	$\frac{45}{20}$ **or** $\frac{20}{45}$ **or** $\frac{36}{20}$ **or** $\frac{20}{36}$ oe 2.25 **or** 0.44(44…) **or** 1.8 **or** 0.55(55…)		2	M1 for a correct scale factor, accept ratio notation eg 45 : 20
		Correct answer scores full marks (unless from obvious incorrect working)	81		A1
	(b)	54 ÷ 2.25 **or** 54 × 0.44(44…) oe **or** $36\times\frac{54}{'81'}$		2	M1 can ft if M1 scored in (a)
		Correct answer scores full marks (unless from obvious incorrect working)	24		A1
					Total 4 marks

21	$(5-2)\times 180-112-102-96\ (=230)$ oe eg $540-112-102-96\ (=230)$ **or** $360-(180-112)-(180-102)-(180-96)$ $(=360-68-78-104=360-230=130)$ oe		5	M1
	$\frac{'540'-112-102-96}{2}\ (=115)$ **or** '130' ÷ 2 (= 65)			M1 dep on previous mark
	$\frac{180\times(8-2)}{8}\ (=135)$ **or** $180-(360\div 8)\ (=135)$ **or** $\frac{360}{8}\ (=45)$ as exterior angle of octagon			M1 indep Withhold the mark for $\frac{360}{8}\ (=45)$ if shown as an interior angle
	360 – '115' – '135' **or** '65' + '45'			M1
	Working required	110		A1 dep on M1
				Total 5 marks

22	12 × 2.45 (= 29.4) **or** 21 ÷ 12 (= 1.75)		3	M1
	$\frac{'29.4'-21}{21}\times 100$ oe **or** $\frac{2.45-'1.75'}{'1.75'}\times 100$ oe **or** $(\frac{'29.4'-21}{12}) \div '1.75' \times 100$ oe **or** $(\frac{2.45}{'1.75'}\times 100)-100$ oe			M1 or an answer of 140(%)
	Correct answer scores full marks (unless from obvious incorrect working)	40		A1
				Total 3 marks

23	$\frac{4.5}{100}$ × 25 000 (=1125) **or** $\frac{104.5}{100}\times 25000(=26\,125)$ **or** 1150 × 3 (= 3450) **or** 25 000 + 1150 × 3 (= 28 450) (allow $\frac{3\times 4.5}{100}\times 25000(=3375)$ for this mark)		4	M1 finding 4.5% or 104.5% of 25 000 (allow for 3 × 0.045 × 25 000 oe) **or** the total interest for T bank **or** the total amount gained for T bank	M2 for $1.045^3\times 25000$ (=28 529.(15313))
	$\frac{4.5}{100}$ × (25 000 + '1125') (= 1175.625 or 1175 or 1176) **and** $\frac{4.5}{100}$ × (25 000 + '1125' + '1175.625') (= 1228.529) **or** $\frac{104.5}{100}\times 26125(=27\,300.625)$ **and** $\frac{104.5}{100}\times 27\,300.625(=28529.15....)$			M1 completing the interest for C bank **or** completing the total amount for C bank	
	'1125' + '1176' + '1229' (= 3530) **or** '28 529' – 25 000 (=3529) **and** 3 × 1150 (= 3450) **or** '28 529' **and** 25 000 + '3450' (= 28 450)			M1 for total interest for C bank and total interest for T bank **or** total amount for C bank and total amount for T bank	
	Working required	79 or 80		A1 dep on M2 Allow 79 - 80	
					Total 4 marks

24	(a)		1	1	B1
	(b)(i)	$(x \pm 4)(x \pm 9)(= 0)$		2	M1 or $(x + a)(x + b)$ where $ab = -36$ **or** $a + b = -5$
		Correct answer scores full marks (unless from obvious incorrect working)	$(x+4)(x-9)$		A1 (isw if they also solve the equation in this part)
	(ii)	Answers must ft from (b)(i)	-4 and 9	1	B1 ft Answer **must** ft from their $(x + p)(x + q)$ in (b)(i) Award B0 for -4 and 9 if no marks scored in (i)
					Total 4 marks

25	$1.75 \times 10^6 \div 2.4 \times 10^7$ or 1 750 000 ÷ 24 000 000 oe eg $\frac{1.75}{24}$		3	M1
	0.0729(16…) or 0.072 or 0.073 or for $\frac{7}{96}$ or 7.29(16…)% or 7.2% or 7.3%			A1
	Correct answer scores full marks (unless from obvious incorrect working)	7.3×10^{-2}		A1 accept 7.3×10^{-2} or better $(7.29(16\ldots.) \times 10^{-2})$
				Total 3 marks

26	eg $\cos 38 = \frac{9.3}{(AB)}$ oe **or** $\sin'52' = \frac{9.3}{(AB)}$ oe **or** $\frac{(BC)}{\sin 38} = \frac{2\times 9.3}{\sin'104'}$ oe or $\frac{\sin'52'}{9.3} = \frac{\sin 90}{(BC)}$ oe		4	M1 or $BN = \frac{9.3\sin 38}{\sin'52'}$ or $9.3\tan 38 (= 7.2659...)$ **and** $(AB^2) = 9.3^2 + '7.2659...'^2$
	eg $(AB =) \frac{9.3}{\cos 38}$ (= 11.80….) **or** $(AB =) \frac{9.3}{\sin'52'}$ (= 11.80….) **or** $(BC =) \frac{2\times 9.3\times \sin 38}{\sin'104'}$ (= 11.80…) oe			M1 or $(AB =) \sqrt{9.3^2 + '7.2659...'^2}$ $(= 11.80...)$
	‘11.8’ + ’11.8’ + 9.3 + 9.3 or ’11.8’ × 2 + 9.3 × 2 oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	42.2		A1 awrt 42.2
				Total 4 marks

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