Mark Scheme (Results)

January 2020

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

- o indep – independent
- o 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.
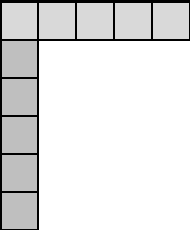
- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

Question		Working	Answer	Mark	Notes
1	(a)		Tanzania	1	B1
	(b)		823 000	1	B1
	(c)		2410	1	B1 accept −2410
	(d)		ten thousand one hundred and twenty	1	B1
					Total 4 marks

Question		Working	Answer	Mark	Notes
2	(a)		correct bar	1	B1 for bar drawn at correct height of 13 Allow a line instead of a bar
	(b)		Brazil	1	B1
	(c)	29		2	M1 for $\dfrac{29}{k}$ with $k > 29$ **or** $\dfrac{n}{113}$ with $n < 113$ oe May work in millions Allow incorrect notation e.g. 29 out of 113 or 29:113 oe
			$\dfrac{29}{113}$		A1 oe Allow 0.26 or 0.256(6371…….)
					Total 4 marks

3	(a)(i)			kilometres	1	B1 accept m
	(ii)			grams	1	B1 accept g or grammes
	(iii)			square metres	1	B1 accept m^2
	(b)	× 1000 (= 1000)	÷ 1000 (= 0.03)		3	M1
		÷ 30 (= 33.3…)	÷ '0.03' (= 33.3…)			M1
				33		A1 SC B2 for 33.3……. or 34
						Total 6 marks

4	(a)		pattern 4 drawn	1	B1
	(b)		10, 12	1	B1
	(c)	14, 16, 18, 20, 22, 24, 26, 28, 30, 32 **or** 2 × 30 + 2 **or** 12 + (25 × 2) **or** 4 + (29 × 2) **or** 31 × 2 **or** uses or states 2*n* + 2		2	M1 for adding 2 and continuing to at least pattern 15 (allow one error) **or** for a correct diagram **or** any correct method which would lead to 62
			62		A1
	(d)	E.g. *n*th term is 2*n* + 2 oe **or** gives a counter example e.g. when *n* = 1, 2*n* gives 2 (not 4)	No with reason	1	B1 oe
					Total 5 marks

5			CO, CM, CW, EO, EM, EW, TO, TM, TW	2	B2 for all combinations with no repeats or incorrect combinations If not B2 then award B1 for at least 4 correct combinations (ignore repeats or incorrect combinations)
					Total 2 marks

6	(a)		0.25	1	B1
	(b)	$3\dfrac{4}{10}$ **or** $\dfrac{17}{5}$		2	M1 for converting to a simplified improper fraction **or** an unsimplified mixed fraction
			$3\dfrac{2}{5}$		A1
	(c)	$\dfrac{3}{4}\times\dfrac{16}{15}$ **or** E.g. $\dfrac{12}{16}\div\dfrac{15}{16}$		2	M1
		E.g. $\dfrac{3}{4}\times\dfrac{16}{15}=\dfrac{48}{60}=\dfrac{4}{5}$ **or** $\dfrac{12}{16}\div\dfrac{15}{16}=\dfrac{12}{15}=\dfrac{4}{5}$ **or**	Shown		A1 for fully correct method leading to $\dfrac{4}{5}$ - this must be preceded by a correct equivalent fraction e.g. $\dfrac{48}{60}$, $\dfrac{12}{15}$, $\dfrac{16}{20}$ **or** fully correct cancelling must be seen within a multiplication
					Total 5 marks

7	(a)(i)			38	1	B1
	(ii)			Angles in a <u>triangle</u> sum to 180º	1	B1 Allow Angles in a <u>triangle</u> sum to <u>180º</u>
	(b)	Quad *ABDE* $360 - 78 - 90 - 17 - (a)(i)$ $(360 - 223)$	Line and quad *ACDE* $360 - 90 - 78 - (180 - 125)$ $360 - 90 - 78 - '55'$		3	M1 ft from (ai)
				137		A1
				Reason(s)		B1 for full reasons E.g. <u>Angles</u> in a <u>quadrilateral</u> sum to 360º (accept Angles in a <u>quadrilateral</u> sum to <u>360º</u>) **OR** <u>Angles</u> on a straight <u>line</u> sum to 180º (accept Angles on a straight <u>line</u> sum to <u>180º</u>) **and** <u>Angles</u> in a <u>quadrilateral</u> sum to 360º (accept Angles in a <u>quadrilateral</u> sum to <u>360º</u>) Accept 4 sided shape for quadrilateral
						Total 5 marks

8	(a)			$11m - 3k$	2	B2 If not B2 then award B1 for either $11m$ or $-3k$
	(b)	$2 \times 5 + 3 \times 8$ **or** $10 + 24$			2	M1 for substituting the values of a and b into P
				34		A1
	(c)	$16 = 2a + 3 \times 20$ **or** $16 = 2a + 60$	$P - 3b = 2a$		3	M1 for substituting the values of P and b into the equation **or** rearranging the equation $P = 2a + 3b$ for $2a$ correctly
		$16 - 60 = 2a$ $-44 = 2a$ oe **or**	$16 - 2 \times 30 = 2a$ **or** $16 - 60 = 2a$			M1 for rearranging the equation for $2a$ correctly **or** substituting the values of P and b into the correctly rearranged equation
				-22		A1
						Total 7 marks

9		$240 \div 3 (= 80)$ **or** $240 \div 3 \times 2 (= 160)$		4	M1 for finding the number of large ice creams or small ice creams
		'80' $\times 3.8 (= 304)$			M1 for finding the cost of large ice creams
		$(640 - '304') \div '160'$			M1 for a complete method to find the cost of a small ice cream
			2.1(0)		A1
					Total 4 marks
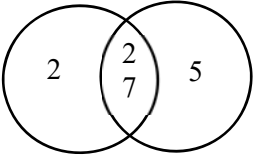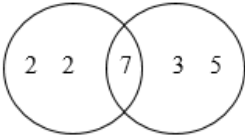
10	(a)	16 : 40 or 8 : 20 or 4 : 10		2	M1 for any correct cancelling or 5 : 2
			2 : 5		A1 cao
	(b)		$\dfrac{5}{12}$	1	B1
					Total 3 marks

11	(a)	$\frac{16}{40} \times 360$ oe **or** $\left(\frac{16}{40} \times 100\right) \frac{40}{100} \times 360$ oe **or** $360 \div (40 \div 16)$		2	M1 Allow two stages e.g. $\left(\frac{16}{40} \times 100 \text{ and }\right) \frac{'40'}{100} \times 360$ oe
			144		A1 cao
	(b)	E.g. $48 \div 192 \times 56$ oe **or** $\left(\frac{48}{192} \times 100 = 25\right) \frac{'25'}{100} \times 56$ oe **or** $(192 \div 48 (= 4)$ **and)** $56 \div '4'$ **or** $192 \div 56 (= 3.4\ldots)$ **and** $48 \div '3.4\ldots'$		2	M1
			14		A1 cao
					Total 4 marks

12		A: $0.6 \times (2 \times 80) (= 96)$ B: $0.6 \times 80 (= 48)$ C: $0.55 \times 80 (= 44)$ D: $(0.6 - 0.55) \times 80 (= 4)$		4	M2 for **two** compatible values: AC or BC or BD **or** $2 \times 60 - 55 (= 65\%)$ If not M2 then award M1 for any **one** of A or B or C or D
		E.g. '96' – '44' **or** $48 + (48 - 44)$ **or** $48 + '4'$ **or** '0.65' $\times 80$			M1 for a complete method
			52		A1
					Total 4 marks

13	(a)			310	1	B1 for 308 – 312
	(b)	[8.3, 8.7]			4	B1 for 8.3 – 8.7
		'[8.3, 8.7]' × 20 (= '[166,174]')	24 ÷ 20 (=1.2)			M1
		'[166, 174]' ÷ 24 ([6.9….., 7.3])	'[8.3, 8.7]' ÷ '1.2' ([6.9….., 7.3])			M1
				7		A1
						Total 5 marks

14	(a)	$\dfrac{5+13}{2}$ or $\dfrac{-4+1}{2}$			2	M1 for a correct method to find one coordinate **or** for one coordinate correct **or** for (−1.5, 9)
			(9, −1.5)			A1 Accept $(9, -\dfrac{3}{2})$
	(b)			−3	1	B1
	(c)			No with reason	1	B1 No (oe) and e.g. line goes through (100, −298) or (101.3..), −302) or $\left(\dfrac{304}{3}, -302\right)$ or (3 × 100) − 302 = −2 not (+)2
						Total 4 marks

15	(a)	1, 2, 4, 7, 14, 28 **and** 1, 2, 5, 7, 10, 14, 35, 70 **or** $2 \times 2 \times 7$ **and** $2 \times 5 \times 7$ **or**		2	M1 for starting to list at least **four** factors of each number **or** 2, 2, 7 **and** 2, 5, 7 seen (may be in a factor tree and ignore 1) **or** a fully correct Venn diagram
			14		A1 cao
	(b)	28, 56, 84, 112… **and** 105, 210, 315, 420… **or** 2, 2, 7 **and** 3, 5, 7 **or** **or** $\dfrac{28 \times 105}{7}$ **or** 2, 2, 3, 5, 7 oe		2	M1 for any correct valid method e.g. for starting to list at least **four** multiples of each number **or** 2, 2, 7 and 3, 5, 7 seen (may be in a factor tree and ignore 1) **or** a fully correct Venn diagram
			420		A1 cao
					Total 4 marks

16		E.g. $12 \times 9 \ (=108)$ **or** $(9-6) \times x \ (=3x)$		4	M1 for one correct relevant area
		E.g. $129 - '108' \ (=21)$ **or** $'108' + '3x' = 129$ **or**			M1 dep on M1 for 129 used correctly with another area **or** for a correct equation (ft) with bracket(s) expanded
		E.g. $'21' \div (9-6)$ **or** $x = \dfrac{129 - '108'}{3}$			M1 for a complete method
			7		A1
					Total 4 marks

17	(a)		$3 < w \leq 4$	1	B1
	(b)	$(12 \times 2.5) + (16 \times 3.5) + (9 \times 4.5) +$ $(2 \times 5.5) + (1 \times 6.5)$ **or** $30 + 56 + 40.5 + 11 + 6.5 \ (= 144)$		4	M2 for at least **4** correct products added (need not be evaluated) **or** 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
		$[(12 \times 2.5) + (16 \times 3.5) + (9 \times 4.5) +$ $(2 \times 5.5) + (1 \times 6.5)] \div 40$ **or** '144' $\div$ 40			M1 dep on at least M1 Allow division by their Σf provided addition or total under column seen
			3.6		A1 oe
	(c)	$\dfrac{2}{40} + \dfrac{1}{40}$		2	M1 for $\dfrac{a}{40}$ where $0 < a < 40$ or $\dfrac{3}{b}$ where $b > 3$ where a and b are integers
			$\dfrac{3}{40}$		A1 0.075 oe
					Total 7 marks

18		$120 \div (3 + 5)\ (= 15)$		6	M1	M2 for
		'15' × 3 (= 45) **or** '15' × 5 (= 75)			M1	$\dfrac{3}{8} \times 120\,(= 45)$ **or** $\dfrac{5}{8} \times 120\,(= 75)$ oe
		'45' ÷ 3 (= 15) **or** '45' ÷ 3 × 2 (= 30)			M1	
		'75' × $\dfrac{16}{25}$ (= 48) **or** '75' × $\dfrac{9}{25}$ (= 27)			M1	
		E.g. ('45' ÷ 3 × 2) + ('75' × $\dfrac{9}{25}$) oe **or** '27' + '30' **or** ('75' − '48') + ('45' − '15')			M1 for a complete method	
			57		A1	
						Total 6 marks

19			Trapezium with vertices at (6, 3) (8, 3) (8, 6) (4, 6)	2	B2 If not B2 then award B1 for shape of correct size and orientation **or** 3 or 4 points plotted correctly
					Total 2 marks

20	(a)		0.000 78	1	B1
	(b)	22 500 000 oe e.g. 22.5×10^6 **or** 2.25×10^n $n \neq 7$		2	M1
			2.25×10^7		A1
					Total 3 marks

21	(a)	$m^2 - 8m + 5m - 40$		2	M1 for any 3 correct terms **or** for 4 out of 4 correct terms ignoring signs **or** for $m^2 - 3m$ … **or** for …$- 3m - 40$
			$m^2 - 3m - 40$		A1
	(b)		$5y(1 + 4y)$	2	B2 If not B2 then award B1 for $5(y + 4y^2)$ **or** $y(5 + 20y)$ **or** $5y(a + 4y)$ where a is an integer and $a \neq 0$ **or** $5y(1 + by)$ where b is an integer and $b \neq 0$
	(c)		1	1	B1
	(d)	E.g. $6x - 15$ or $12x - 30$ oe		4	M1 for expansion of a correct bracket
		$2 \times 3(2x - 5) = 9 - x$ oe **or** $2('6x - 15') = 9 - x$ oe **or** $3(2x - 5) = \dfrac{9}{2} - \dfrac{x}{2}$ oe			M1 for removal of fraction **or** separating fraction (RHS) in an equation
		$12x + x = 9 + 30$ oe **or** $6x + \dfrac{x}{2} = \dfrac{9}{2} + 15$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation; number terms on the other
			3		A1 dep on at least M2 awarded
					Total 9 marks

22		$\cos 63 = \dfrac{24.3}{(PQ)}$ or $\sin 27 = \dfrac{24.3}{(PQ)}$ or $\dfrac{(PQ)}{\sin 90} = \dfrac{24.3}{\sin 27}$ or $\dfrac{\sin 90}{(PQ)} = \dfrac{\sin 27}{24.3}$ oe		3	M1 for a correct trigonometric ratio	M2 for $(RQ =) 24.3 \times \tan 63 \, (= 47.6914..)$ oe **and** $(PQ =) \sqrt{'47.6914'^2 + 24.3^2}$ oe
		$(PQ =) \dfrac{24.3}{\cos 63}$ or $(PQ =) \dfrac{24.3}{\sin 27}$ or $(PQ) = \dfrac{24.3}{\sin 27} \times \sin 90$			M1 for a correct rearrangement for PQ	
			53.5		A1 Accept 53.5 - 53.53	
						Total 3 marks