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Mark Scheme (Results)

Summer 2013

International GCSE Mathematics (4MA0) Paper 1F

Level 1/Level 2 Certificate in Mathematics (KMA0) 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**
  - awrt – answers which round to.....
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working

- SC - special case
- oe – or equivalent (and appropriate)
- dep – dependent
- indep – independent
- 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.

  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.

Apart from Question 15(c) (where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

1	(a)	four thousand, six hundred and one		1	B1	
	(b)		thousand(s)	1	B1	accept 5000, 1000
	(c)		4770	1	B1	cao
	(d)		4874	1	B1	accept Emily
	(e)		4667	1	B1	accept Jessica
						Total 5 marks

2	(a)		Egypt	1	B1	
	(b)		250	1	B1	cao
	(c)		Kenya	1	B1	
	(d)		500 < bar < 750	1	B1	
						Total 4 marks

3	(a)		42, 50	2	B2	B1 for 42 B1 for 50
	(b)		146	1	B1	cao
						Total 3 marks

4	(i)		27	5	B1 cao
	(ii)		30		B1 cao
	(iii)		25		B1 cao
	(iv)		24		B1 cao
	(v)		29		B1 cao
					Total 5 marks

5	(a)		equilateral	1	B1
	(b)		octagon	1	B1
	(c)		0	1	B1 accept 'none' oe
	(d)		3	1	B1 cao
	(e)		380	1	B1 cao
	(f)		0.3 oe	1	B1
	(g)		10	1	B1 cao
	(h)		18 00	1	B1
	(i)		0.16	1	B1 cao
	(j)	$\frac{16}{100}$ or $\frac{8}{50}$		2	M1
			$\frac{4}{25}$		A1 cao
	(k)		12	1	B1 cao
					Total 12 marks

6	(a)		4 35 pm	1	B1	
	(b)		one hand → 11 **and** 7 < one hand ≤ 8	1	B1	Ignore lengths of hands
	(c)	360 × 7 or 2520		3	M1	
		$\frac{4500-"2520"}{9}$ or $\frac{1980}{9}$			M1	(dep) for subtraction from 4500 and division by 9
			220		A1	cao
						Total 5 marks

7	(a)		115	1	B1	cao
	(b)		23	1	B1	cao
	(c)	6.8 × 5		3	M1	
		34			A1	May be implied by ans of 95
			95		A1	
						Total 5 marks

8	(a)		0.375	1	B1
	(b)	$\frac{54}{6}$ or 9 **or** 5 × 54 **or** 270 **or** 5 × 54 ÷ 6 oe		2	M1
			45		A1 cao
	(c)	$\frac{3}{5}, \frac{16}{25}, \frac{13}{20}, \frac{2}{3}$ in correct order **or** correct decimal equivalents in correct order eg 0.6, 0.64, 0.65, 0.66 **or** correct fraction equivalents in correct order	$\frac{3}{5}, \frac{16}{25}, \frac{13}{20}, \frac{2}{3}$	2	B2 B1 for 3 fractions in correct order **or** for 2 fractions correctly converted to decimals or percentages (at least 2 sf rounded or truncated for $\frac{2}{3}$) **or** for 2 fractions expressed as equivalent fractions with a denominator of 300 or a multiple of 300) **SC** B1 for $\frac{2}{3}$ $\frac{13}{20}$ $\frac{16}{25}$ $\frac{3}{5}$ i.e. fractions reversed
					Total 5 marks

9	(a)		$7c^2$	1	B1 Accept $7\times c^2$, $c^2 7$ etc
	(b)		$9x - 5y$	2	B2 B1 for $9x$ B1 for $-5y$
					Total 3 marks

10 (a)		$\frac{1}{5}$ oe	1	B1	
(b)		1	1	B1	Accept $\frac{5}{5}$ **or** $\frac{1}{1}$ **or** 100%
(c)		$\frac{2}{5}$ oe	2	M1 A1	for a fraction with a denominator of 5 for **or** for correct probability with incorrect notation $\frac{2}{5}$ oe
					Total 4 marks

11	$\angle ABD = 60°$ **or** $\angle BAD = 60°$ **or** $\angle ADB = 60°$ **or** 180 ÷ 3			M1	Angles may be unambiguously stated eg *C* or *A* but *ABD* etc or marked on diagram.
	$\angle BCD = 65°$ **or** $(\angle CBD =) 180 - 2 \times 65$			M1	
	$(\angle CBD =) 50°$			A1	
	$\angle ABC = 60° + 50°$	110		A1	Award 4 marks for an answer of 110
					Total 4 marks

12 (a)	$12 \times 3 + 2 \times 7 = 36 + 14$		2	M1	for $12 \times 3 + 2 \times 7$ **or** for either 36 **or** 14	
		50		A1	cao	
(b)	$43 = 12x + 2 \times 6.5$ **or** $43 = 12x + 13$ **or** $P - 2y = 12x$ (oe with $\pm 12x$ or $\pm x$ as the subject)		3	M1	for correct rearrangement of original equation or substitution	M2 for $43 - 2 \times 6.5$ (= $12x$) **or** 30 (=$12x$)
	$12x = 43 - 13$ **or** $12x = 30$ **or** $-12x = 13 - 43$ **or** $-12x = -30$			M1	for correct rearrangement and substitution	
		2.5 oe		A1	Correct answer scores full marks	
(c)	$4xy + \frac{1}{2} \times 3x \times 4x$ or $\frac{3x + y + y}{2} \times 4x$		2	M1	for any one correct area eg. $4xy$ oe or $\frac{1}{2} \times 3x \times 4x$ oe or $4x(3x + y)$	
		$4xy + 6x^2$ etc		A1	for $4xy + 6x^2$ or $4yx + 6x^2$ or $2x(3x + 2y)$ or $2(3x^2 + 2xy)$ (No fractions or uncollected terms but could be multiplication signs and/or brackets present)	
						Total 7 marks

13 (a)		4	1	B1	cao
(b)	$\frac{40}{2}$ or 20 or $\frac{40+1}{2}$ or $20\frac{1}{2}$ or for clear attempt to list all marks		2	M1	
		3		A1	cao
(c)	(0×13) + 1×2 + 2×3 + 3×8 + 4×14 or (0) + 2 + 6 + 24 + 56 or 88		3	M1	for sum of at least 3 products (products may or may not be evaluated)
	"88" ÷ 40			M1	(dep) for division by 40 (or by their 40)
		2.2		A1	accept 2.2 or $\frac{11}{5}$ or $2\frac{1}{5}$ Also accept 2 if both method marks are scored.
					Total 6 marks

14 (a)	$\frac{2.720294102}{7.7}$		2	M1	for 2.7202(9...) if first 5 figures correct (rounded or truncated) **or** for 7.7 **or** for $\frac{2\sqrt{185}}{77}$
		0.35328(4948)		A1	Accept if first 5 figures correct
(b)		0.35	1	B1	ft from (a) only if more than 2 sig figs given in (a)
					Total 3 marks

15	(a)		$6n - 12$	1	B1	
	(b)		$p(p - 5)$	2	B2	Also accept $(p+0)(p-5)$ for B2 B1 for factors which, when expanded and simplified, give two terms, one of which is correct. **SC**: B1 for $p(p - 5p)$
	(c)	$7x - 3 = 2x$		3	M1	for $7x - 3 = 2x$ **or** $7x - 3 = 2 \times x$ **or** $\frac{7x}{2} - \frac{3}{2} = x$ oe
		$7x - 2x = 3$ or $5x = 3$			M1	for $7x - 2x = 3$ or $5x = 3$ **or** $5x - 3 = 0$ **or** $\frac{7x}{2} - x = \frac{3}{2}$ or $\frac{5x}{2} = \frac{3}{2}$ NB. All these examples could be written with all terms 'on the other side' eg. $-5x = -3$ etc
			$\frac{3}{5}$ oe		A1	**Award full marks if at least one method mark awarded and answer correct.**
						Total 6 marks

16. (a)	corresponding (angle(s))		1	B1	oe eg x corresponds to angle *A;* corresponding to angle A	
(b)	(6 − 2) × 180 **or** 4 × 180 **or** (2 × 6 − 4) × 90 **or** 8 × 90 **or** 120 × 6 **or** (180 − 60)×6 **or** 360 + 360		4	M1		360−(73+46+38+ 88+57) Condone one incorrect ext angle
	720			A1	M1 A1 for 720 seen	58 M1 A1 for 58 seen
	"720" − (107 + 134 + 142 + 92 + 123) or "720" − 598			M1	dep on first M1	180 − "58"
		122		A1		
						Total 5 marks

17. (a)	$\frac{8}{100}\times 475$ oe **or** 38 **or** 437		3	M1	M2 for 475 × 1.08 oe
	475 + "38"			M1(dep)	
		513		A1	cao
(b)	1% = $\frac{48}{8}$ **or** 6 8% (of amount) = 48		3	M1	M2 for $\frac{48}{8}\times 100$ **or** 600 **or** $\frac{48}{0.08}$ **or** $\frac{48}{8}\times 108$ **or** $\frac{48}{0.08}\times 1.08$
	"6" × 100 or 600			M1	
		648		A1	cao (NB: An answer of 600 scores M2A0)
					Total 6 marks

18. (i)		u, a, e	2	B1		Any order. Brackets and commas not necessary
(ii)		s, q, r, a, e, i, o, u		B1	B0 if 'a' or 'e' or 'u' repeated	
						Total 2 marks

19.	$2\times\pi\times5.1^2+2\times\pi\times5.1\times3.7$ oe **or** 163.42... + 118.56... (using π) **or** 163.3428 + 118.5036 (using 3.14) (rounded or truncated to at least 3 sig figs) **or** $2\times\pi\times5.1\times(5.1+3.7)$ **or** $\frac{2601}{50}\pi+\frac{1887}{50}\pi$ **or** $\frac{2244}{25}\pi$		3	M2	M1 for one of $2\times\pi\times5.1^2$ **or** value in range 163-163.43 inc **or** $\frac{2601}{50}\pi$ $2\times\pi\times5.1\times3.7$ oe **or** value in range 118-119 inc **or** $\frac{1887}{50}\pi$ NB. Accept 3.14(...) or 22/7 in place of π
		282		A1	for answer in range 281.8-282 inc
					Total 3 marks

20.	**No approximation** $\frac{37527}{365}$ or $\frac{37527}{366}$ or $\frac{37527}{365.25}$ or $\frac{37527}{364}$			M2	M1 for $\frac{37527}{x}$ where $356 \leq x \leq 370$
		103		A2	Accept 102 if M2 awarded A1 for $102.5 \leq$ answer ≤ 103.1

20.	**Alternative - with approximation** $\frac{x}{y}$ or $x \times \frac{1}{y}$ where x is $35\,000 \leq x \leq 40\,000$ **AND** $336 \leq y \leq 400$		4	M2	M1 for $\frac{x}{y}$ or $x \times \frac{1}{y}$ where either the value of x **or** the value of y is acceptable **or** $\frac{y}{x}$ where the values of x and y are acceptable
		integer in the range $93 - 111$ inclusive		A2	**The award of any accuracy marks is dependent on the award of M2** A1 for non-integer in the range $93 - 111$
					Total 4 marks

21	use of cos		3	M1	cos must be selected for use in trig ratio **NOT** Cosine Rule	**or** M2 for sin and $\frac{\sqrt{"21.36"}}{9.5}$ following correct Pythagoras **or** M2 for tan and $\frac{\sqrt{"21.36"}}{8.3}$ following correct Pythagoras **or** correct Pythag and then correct use of sine or cosine rule with "21.36"
	cos ("x") = $\frac{8.3}{9.5}$ (=0.87…) **or** ("x" =) $\cos^{-1}(\frac{8.3}{9.5})$			M1		
		29.1		A1	for ans rounding to 29.1 (29.1103…)	
						Total 3 marks

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