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Mark Scheme (Results)

January 2013

International GCSE Mathematics A (4MA0) Paper 2F

Level 1 / Level 2 Certificate in Mathematics (KMA0) 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
  - 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.

- **Follow through marks**

  Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

  Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

- **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 & Level 1/Level 2 Certificate Maths Jan 2013 – Paper 2F Mark scheme				
Apart from Question 20 (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)		$\frac{7}{10}$ oe	1	B1
(ii)		0.7	1	B1 Accept 0.70 etc ft from (i)
(b)(i)		3 triangles shaded	1	B1
(ii)		75	1	B1 cao
				Total 4 marks

2.	(a)		Germany	1	B1
	(b)		12	1	B1 cao
	(c)		Ghana	1	B1
	(d)			1	B1 accept circles as well as 'footballs'
	(e)	16 : 8 or 8 : 4 or 4 : 2		2	M1
			2 : 1		A1 SC If M0, award B1 for 1 : 2
					Total 6 marks

3.	(i)		diameter	3	B1
	(ii)		arc		B1
	(iii)		tangent		B1
					Total 3 marks

4.	(a)		38 43	2	B2	B1 for 38 B1 for 43
	(b)		eg add 5, +5	1	B1	or sight of $5n + 8$
	(c)		98	1	B1	cao
						Total 4 marks

5.	(i)		11	3	B1	cao
	(ii)		16		B1	cao
	(iii)		12 16		B2	B1 for 12 B1 for 16
						Total 4 marks

6.	(a)		hexagon	1	B1	
	(b)		correct pair	1	B1	arrows on two parallel sides and no others
	(c)		correct pair	1	B1	crosses on two perpendicular sides and no others
	(d)		−2, 7	1	B1	
	(e)		2, 6	2	B2	B1 for x-coord of 2 B1 for y-coord of 6
						Total 6 marks

7.	(a)	eg $\frac{35}{100} \times 80$		2	M1	
			28		A1	cao
	(b)	48 ÷ 8 or 6 or 7 × 48 or 336 or $\frac{42}{48}$ or 0.875×48 or 7÷8×48 oe		2	M1	
			42		A1	cao
						Total 4 marks

8. (a)(i)		8	2	B1	Also accept −8
(ii)		3		B1	Also accept −3
(b)		−6 in table	1	B1	cao
					Total 3 marks

9. (a)		E I	2	B2	B1 for E B1 for I
(b)		B D	2	B2	B1 for B B1 for D
(c)		4	1	B1	cao
					Total 5 marks

10. (a)(i)		$\frac{1}{20}$	2	B1	for $\frac{1}{20}$ oe
(ii)		0		B1	Also accept $\frac{0}{20}, \frac{0}{1}, \frac{0}{19}$ Do not accept any other denominators
(b)		$\frac{3}{10}$	1	B1	for $\frac{3}{10}$ oe eg $\frac{6}{20}$
					Total 3 marks

11.	(a)	eg 0.571… 0.555… 0.58 0.56	$\frac{5}{9}$ 56% $\frac{4}{7}$ 0.58	3	B3 B2 for 3 numbers in correct order or for two of $\frac{4}{7}$, $\frac{5}{9}$, 56% correctly converted to decimals (at least 2 dp rounded or truncated) B1 for one of $\frac{4}{7}$, $\frac{5}{9}$, 56% correctly converted to a decimal (at least 2 dp rounded or truncated) SC B1 for 0.58 $\frac{4}{7}$ 56% $\frac{5}{9}$ if none of previous marks scored
	(b)	$\frac{1}{6} \times \frac{4}{1}$			M1 or $\frac{2a}{12a} \div \frac{3a}{12a}$ (a > 1; denominators the same and a multiple of 12)

	fraction equivalent to $\frac{4}{6}$ (but not $\frac{2}{3}$) coming directly from M1 **or** $\frac{4}{6}$ or $\frac{2}{3}$ from cancelling fractions within multiplication sum	$\frac{4}{6}$	2	A1 dep. on M1 SC : B2 for $\frac{2}{12} \div \frac{3}{12}$
				Total 5 marks

12.	$\frac{50}{10}$ or $\frac{42}{7}$ or $\frac{40}{5}$ or 5 or 6 or 8 or $\frac{40}{10}$ or $\frac{42}{7}$ or $\frac{50}{5}$ or 4 or 6 or 10 or $10 \times 7 \times 5$ or $50 \times 42 \times 40$ or 350 or 84000		3	M1	for multiplier for at least one pair of edges (may be part of expression eg $\frac{50 \times 42}{10 \times 7}$, $10 \times 5 = 50$) or for volume of at least one of two cuboids eg. $10 \times 7 \times 5$, 350
	"5" × "6" × "8" or "84000" ÷ "350" or "4" × "6" × "10"			M1	dep
		240		A1	cao
					Total 3 marks

13.	(a)	$5\times1.6 - -2$ or $5\times1.6 + 2$ or 8 or +2		2	M1	for correct evaluation of one term ie 8 or 2 or complete correct substitution into rhs
			10		A1	cao
	(b)	$1 = 5c - 2$		3	M1	for correct substitution (may be implied by second M1)
		$5c = 3$			M1	for correct rearrangement
			$\frac{3}{5}$ or 0.6		A1	
						Total 5 marks

14.	(a)	$\frac{90}{60}$ or 1.5 or $\frac{80}{60}$ or 1.66…		2	M1	
			120		A1	cao
	(b)		$\frac{144}{360}$ or $\frac{216}{540}$ oe	2	M1	for fraction with denominator 360 or 540
					A1	for $\frac{144}{360}$ or $\frac{216}{540}$ oe inc $\frac{2}{5}$, 0.4, 40%
						Total 4 marks

15.	360 − (79 + 35) or 246		3	M1	or (180 − 79) ÷ 2 or 50.5 **and** (180 − 35) ÷ 2 or 72.5 or 79÷2 or 38.5 **and** 35÷2 or 17.5
	"246" ÷ 2			M1	(dep) or "50.5" + "72.5" or 180 − ("38.5" + "17.5")
		123		A1	cao
					Total 3 marks

16.	(a)	11.5 or 1.96 seen		2	M1	Also award for $5\frac{85}{98}$ or $\frac{575}{98}$ or answer of 5.9 or 5.87
			5.8673(46939...)		A1	for at least first 5 figures (ignore figures after the first five)
	(b)		5.9	1	B1	ft from (a) if non-trivial
						Total 3 marks

17.		π × 7.6		2	M1	or $2\times\pi\times\frac{7.6}{2}$
			23.9		A1	for answer which rounds to 23.9
						Total 2 marks

18.	6×2+7×4+8×5+9×8+10×1 or 12+28+40+72+10 or 162		3	M1	for at least 3 correct products and summing them
	"162" ÷ 20			M1	(dep) for division by 20
		8.1		A1	Accept 8 if 162 ÷ 20 seen NB: Award A0 if 8.1 clearly comes from incorrect figures
					Total 3 marks

19.	(a)	4, 8 & one even number other than 2, 6 or 10	3	B2	B1 for 4, 8 or for 4, 8 and one odd number or for 4, 8 and more than one other even number (any extra even numbers must not be 2 or 6 or 10) Accept 0 as an even number
	(b)	3 even numbers other than 2, 4, 6, 8 or 10 eg 12, 14, 16		B1	
					Total 3 marks

20.	$5x = -15$ or $5x = 1 - 16$ or $3x + 2x = -15$ or $5x + 15 = 0$		3	M2	for correct rearrangement with x terms on one side and numbers on the other AND correct collection of terms on at least one side M2 also for $-5x = 15$, $-5x = 16 - 1$ or $-2x - 3x = 15$ M1 for correct rearrangement with x terms on one side and numbers on the other eg. $3x + 2x = 1 - 16$ or $16 - 1 = -2x - 3x$ **or** correct rearrangement and simplification of numbers or x terms eg .$5x + 16 = 1$ or $5x = a$ or $5x - a = 0$ $nx = -15$ ($n \neq 5$)
		-3		A1	Award 3 marks if M1 scored and answer correct.
					Total 3 marks

21.	0.2 + 0.7		2	M1
		0.9 oe		A1 oe inc $\frac{9}{10}$, 90%
				Total 2 marks

22.	Splits shape appropriately eg rectangle + triangle or rectangle + trapezium or 'completing the rectangle'		4	B1	If lines not present on diagram then can be implied by correct method for at least two areas (areas must not overlap and must not be contradictory)
	eg. 9×10 or 90 or 9×4 or 36 or 9×6 or 54 or $\frac{1}{2} \times 7 \times 6$ or 21 or $\frac{1}{2} \times (16+9) \times 6$ or 75 16×10 or 160 or $\frac{1}{2} \times (4+10) \times 7$ or 49			M1	for area of one appropriate rectangle, triangle or trapezium
	eg. $\frac{1}{2} \times 7 \times 6 + 9 \times 10$ $\frac{1}{2} \times 7 \times 6 + 9 \times 4 + 9 \times 6$ $9 \times 4 + \frac{1}{2} \times (16+9) \times 6$ $16 \times 10 - \frac{1}{2} \times (4+10) \times 7$			M1	for complete method
		111		A1	cao
					Total 4 marks

23.	(a)	$6x - 15 - 4x - 12$		2	M1	for 3 correct terms
			$2x - 27$		A1	cao
	(b)	$y^2 + 2y + 7y + 14$		2	M1	for 3 correct terms out of 4 or for 4 correct terms ignoring signs or for $y^2 + 9y + c$ for any non-zero value of c or for … $+ 9y + 14$
			$y^2 + 9y + 14$		A1	cao
						Total 4 marks

24.	$8.6^2 - 6.9^2$ or $73.96 - 47.61$ or 26.35		3	M1	for squaring and subtracting
	$\sqrt{8.6^2 - 6.9^2}$ or $\sqrt{26.35}$			M1	(dep) for square root
		5.13		A1	for answer which rounds to 5.13
					Total 3 marks

25.	$1 - \frac{5}{9}$ or $\frac{4}{9}$ seen		3	M1	
	"$\frac{4}{9}$"$\times\frac{5}{6}$ oe or $\frac{5}{9} \times \frac{5}{6}$ oe			M1	
		$\frac{20}{54}$ or $\frac{10}{27}$		A1	ft from "$\frac{4}{9}$"
					Total 3 marks

26.	5 + 9 or 14 or $\frac{n}{14}$ (provided no evidence of 14 from incorrect method)		3	M1	$\frac{5+9}{5+9+6}\times x = 56$
	56 ÷ "14" or 4 or $\frac{6}{14}\times 56$			M1 dep	$56 \div \frac{14}{20}$ or 80
		24		A1	Also accept 20 : 36 : 24 as final answer
					Total 3 marks

27.	arc centre *B* cutting *BA* and *BC* at (say) *P* and *Q*	2	M1	
	arcs centres *P* and *Q* of equal radii which intersect at *R* (say) and *BR* joined (overlay)		A1	dep
				Total 2 marks

28.	$-2 \le x \le 4 \quad 1 \le y \le 3$ or $x \ge -2 \quad x \le 4 \quad y \ge 1 \quad y \le 3$	3	B3	B2 for 3 correct B1 for 2 correct inequalities (Treat double-ended inequalities as two separate inequalities) Accept < and > throughout
				Total 3 marks

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