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Mark Scheme (Results)

Summer 2012

International GCSE Mathematics (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
  - awrt – anything which rounds to
  - eeoo – each error or omission

- **No working**
  If no working is shown then correct answers normally score full marks – the mark scheme will make it clear when this does not apply.
  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 the lower mark should be awarded, unless it is clear which method the candidate has chosen.
  If there is no answer on the answer line then check the working for an 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.

Question Number	Working	Answer	Mark	Notes
Apart from Questions 20 and 22 (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) (i)		1/4	2	B2 cao B1 for 3/12 or any fraction equivalent to 1/4
(ii)		(0).25	1	B1ft ft ai) if denominator = 12,6,4,3,or 2 (answer must be at least 2dp rounded or truncated.)
(b) (i)		any 2 triangles or 1 kite shaded	1	B1
(ii)		80	1	B1
				Total 5 marks
2.(a) (i)		Impossible	1	B1
(ii)		Unlikely	1	B1
(iii)		Likely	1	B1
(b) (i)		Mark B at 0.5	1	B1
(ii)		Mark Y at 1cm < Y < 3 cm from 0 on original diagram	1	B1 i.e. less than ¼ of line in from 0
				Total 5 marks
3. (a)		9 and 17	2	B2 B1 for 9 only : B1 for 17 only B1 for 9 and 17 + 1 extra
(b)		9 and 16	2	B2 B1 for 9 only : B1 for 16 only B1 for 9 and 16 + 1 extra
(c)		2 and 17	2	B2 B1 for 2 only : B1 for 17 only B1 for 2 and 17 + 1 extra
				Total 6 marks
4. (i)		cm^2 or square cms	1	B1 (any recognisable spelling)
(ii)		kg or kilograms	1	B1 (any recognisable spelling)
(iii)		metres or m	1	B1 (any recognisable spelling)
				Total 3 marks

Question Number	Working	Answer	Mark	Notes
5. (a)		(2 , 4)	1	B1 cao
(b)		(–1 , 3)	1	B1 cao
(c)		S plotted at 5, 3	1	B1 Accept X in place of S or rhombus in correct position
(d)	2 x 3 oe	6	M1 A1	SC B1 for 5 to 7 inclusive (but not 6) or 8
(e)		$x = 2$ oe	1	B1
				Total 6 marks
6. (a) (i)		(Pentagonal) prism	1	B1 Accept any prism. Do not accept pentagon
(ii)		7	1	B1
(iii)		15	1	B1
(b)		2	1	B1
				Total 4 marks
7.		1, 2, 4, 5, 10, 20	2	B2 cao B1 for any two or more correct – 1 mark for incorrect addition(s) ignore repetitions
				Total 2 marks
8. (a)		1 7 (X 2 =) 3 4	1	B1 cao
(b)		Multiplying by 2 always ends with an even number	1	B1 Accept any idea that the list contains no even digits (or only odd digits)
				Total 2 marks
9.	(3 x 7.50) + (2 x 1.35) +1.80 (=26.4) 30 – "26.4"	3.6(0)	M1 M1 A1	3 correct "products" listed dep on 1st M1 Accept 3.6
				Total 3 marks

Question Number	Working	Answer	Mark	Notes
10. (a) (i)		62	1	B1
(ii)		(Vertically) opposite angles (are equal)	1	B1 ind Accept abbreviations if meaning is clear.
(b)		44	1	B1
(c)	360 – "74"	286	2	M1 "74" from 180 – (62 + 44) A1
				Total 5 marks

11. (a) (i)		8.4681	1	B1
(ii)		8.47	1	B1 ft from a i) if a i) > 2dp
(b) (i)		3.107(232506..)	1	B1 4 sf at least needed
(ii)		3.1	1	B1 ft from b i) if b i) >2sf
				Total 4 marks

12.		Triangle drawn with correct intersecting arcs from A (4cm) and B (10cm)	2	B2 Arcs intersect within overlay B1 for correct 4cm arc from A or 10 cm arc from B Accurate triangle with no arcs scores zero.
				Total 2 marks

13. (a)		8	1	B1
(b) (i)		6rt oe	1	B1 Do not accept x signs
(ii)		8m oe	1	B1
(iii)		2a^3 oe	1	B1
(c)	– 8 + 15	7	2	M1 M1 for 4 x –2 and 5 x 3 or – 8 and 15 A1
				Total 6 marks

Question Number	Working	Answer	Mark	Notes
14. (a) (i)		60 : 90 2 : 3	2	M1 any correct un-simplified ratio (e.g. 6:9 or 20:30 etc.) A1 SC B1 for 3 : 2 or 1 : 1.5 NB. must be colon notation to gain marks (i.e not decimal points or fractions)
(ii)	160 ÷ 50 x 0.7 oe or 160 ÷ 50 x 700000	2.24	3	M2 M1 for 160 ÷ 50 (=3.2) or 50 ÷ 160 (=0.3125) or 0.7 ÷ 50 (=0.014) or 50 ÷ 0.7 (=71.42..) A1 Accept 2240000 Alt method M1 (150° =) 0.7 x 3 (=2.1) M1 (10° =) 0.7 ÷ 5 (=0.14) + ("0.7 x 3") A1 2.24 Accept 2240000
(b)	1.2 ÷ 4 x 360 oe	108°	2	M1 A1
				Total 7 marks

15. (a)		reflection in line $x = 1$ (rotation (90° {anticlockwise}) about (1 , 1)	2	B1 B1 must be a single transformation oe for $x = 1$ B1 B1 must be a single transformation
(b)		flag at (4, – 1) (5, –1) (6, – 1) (5, – 2) or triangle at (5, –1) (6, –1) (5, – 2)	2	B2 B1 for correct orientation of flag, or triangle, but in wrong position
				Total 4 marks

Question Number	Working	Answer	Mark	Notes
16.	(12 x 18) + (8 x 16.5) (=348) "348" ÷ 20	17.4	4	M2 M1 for 12 x 18 (=216) or 8 x 16.5 (=132) M1 dep on at least 1 previous M1 A1
				Alt Ratio method M1: 12:8 = 3:2 or 6:4 M1: 18x3 and 16.5x 2 or 18 x 6 and 16.5 x 4 M1: (18x3 + 16.5x 2) ÷ 5 or (18 x 6 + 16.5 x 4) ÷ 10 A1: 17.4
				Alt Proportion method M1 60 % boys and 40% girls stated or implied M2 (0.6 x 18) + (0.4 x 16.5) (= 10.8 + 6.6) M1 for 0.6 x 18 or 0.4 x 16.5 A1 17.4
				SC B1 for 17.1 (from {(8 x 18) + (12 x 16.5)}÷20)
				Total 4 marks

17. (a) (i)		30	1	B1
(ii)		21	1	B1
(b)		Horizontal line from (1400,39) to (1600,39) Line from ("1600", 39) to (1715, 0)	2	B1 B1ft ft if line finishes at (17 15, 0) (± 5 mins) and starts at height 39km
(c)		13 25to 1330 1625 to 1630	2	B1 Accept 1 25 pm to 1 30 pm B1 Accept 4 25 pm to 4 30 pm or ft if line finishes at (17 15, 0) (± 5 mins) and starts at height 39 km
(d)	39 ÷ 1.25 oe (39 ÷ 75 x 60)	31.2	3	M2 M1 for 39 ÷ 1.15 (= 33.9...) or 39 ÷ 75 (=0.52) A1
				Total 9 marks

Question Number	Working	Answer	Mark	Notes
18.	7.92 ÷ 1.65	4.8	2	M1 for 7.92 or 1.65 A1 Accept $\frac{24}{5}$
				Total 2 marks
19. (i)	$10x + 5 – 9x + 3$	$x + 8$	2	B2 B1 for 3 correct terms with correct signs or 4 correct terms ignoring signs
(ii)	$y^2 + 5y – 7y – 35$	$y^2 – 2y – 35$	2	B2 B1 for 3 correct terms with correct signs or 4 correct terms ignoring signs N.B. $– 2y$ (with no more y terms) implies $+ 5y – 7y$
				Total 4 marks
20. (a)	4/5 x 15/7	12/7 oe	2	M1 or 12a/15a ÷ 7a/15a (denominators the same and a multiple of 15) A1 dep on M1. Improper fraction equivalent to 1 5/7 required produced directly from M1
(b)	21/4 – 5/3 63a/12a – 20a/12a	43/12 oe	3	M1 Correct improper fractions M1 Correct fractions with a common denominator a multiple of 12 A1 dep on M2 Improper fraction required. Alt method M1 (5) 3/12 – (1) 8/12 (i.e. can ignore integer parts) M1 – 5/12 A1 Improper fraction required or 4 – 5/12. Ans dep on M2. Alt method M1 (4) 5/4 – (1) 2/3 (i.e. can ignore integer parts) M1 (4) 15/12 – (1) 8/12 (i.e. can ignore integer parts) A1 (3 +) 7/12 or improper fraction Ans dep on M2
				NB: Follow one strand that gives most marks.
				Total 5 marks

Question Number	Working	Answer	Mark	Notes
21.	tan 72 or tan 18 selected (*MN*=) 34 x tan 72	105	3	M1 M1 or (*MN*=) 34 ÷ tan 18 A1 104.64.... awrt 105
				Total 3 marks
22.	$2a = -4$ or $4b = 14$	$a = -2$ $b = 3.5$	3	M1 Correctly eliminate 1 variable: Accept $3(5 - 2b) + 2b = 1$ oe A1 A1 Ans dep on M1 Ans only or T&E = M0A0A0
				Total 3 marks
23.	A product of 3 or more factors of 300 of which at least 2 are different primes (i.e. from 2, 3 or 5) All 5 correct prime factors & no extras (ignore 1's)	2, 2, 3, 5, 5 (with/without 1's) or 2^2 x 3 x 5^2 x 1 or $2^2 + 3 + 5^2$ 2 x 2 x 3 x 5 x 5	3	M1 e.g 2 x 3 x 50 (must multiply to 300) could be implied from a factor tree or division ladder M1 could be implied from a factor tree or division ladder A1 any order, do not accept inclusion of 1's accept . in place of x
				Total 3 marks
24.	(19 x1)(=19) + (8x3)(=24) + (3x5)(=15) + (1x 9) (=9)	67	3	M2 for freq x all correct midpoint values correctly evaluated (condone omission of 4th interval) {do not have to see intention to add} if not M2 then M1 for freq x consistent point in each interval or M1 for 1 error in list of 19, 24, 15, (0), 9 A1 isw if 67 calculated correctly. (2.16.. = M2A1)
				Total 3 marks
				TOTAL FOR PAPER: 100 MARKS

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