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Mark Scheme (Results)

Summer 2012

International GCSE Mathematics (4MB0) Paper 01

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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.

- **Probability**

  Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

  Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

  If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

  If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

- **Linear equations**

  Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

- **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	Notes		Mark
1	5 x £ 12.50 + 4 x 7.20	M1		
	£ 91.30	A1	2	2

Question Number	Working	Notes		Mark
2	$2x - 40 + 3x + 10 = 180$	M1		
	$x = 42$	A1	2	2

Question Number	Working	Notes		Mark
3	$5 + 7 = 2\sqrt{x}$ OR $14\sqrt{x} - 10\sqrt{x} = 49 - 25$ (o.e.)	M1		
	$x = 36, 6^2$	A1	2	2

Question Number	Working	Notes		Mark
4	145 + 180 **OR** 360 -35	M1		
	325° (o.e.)	A1	2	2

Question Number	Working	Notes		Mark
5	(3 x 60)/24	M1		
	7.5 secs	A1	2	2

Question Number	Working	Notes		Mark
6	$6x^2 - 4x - 9x + 6$ (allow one sign error)	M1		
	$6x^2 - 13x + 6$	A1	2	2

Question Number	Working	Notes		Mark
7	Any multiple of 18 seen (but nothing for 72, 162 or 270) **OR** Correct prime factors of **2** of 72, 162,and 270 18 (or 2×3^2)	 B1 B1	 2	 2

Question Number	Working	Notes		Mark
8	$\begin{pmatrix} 3 \\ -10 \end{pmatrix}$	B1 B1	 2	 2

Question Number	Working	Notes		Mark
9	$1.25 \times 10^{-5} \times 6000$ OR 0.075 7.5×10^{-2}	M1 A1	 2	 2

Question Number	Working	Notes		Mark
10	$\sqrt{(a - b)}$ where $a = 25$ or $b = 9$ 4, -4, ± 4	M1 A1	 2	 2

Question Number	Working	Notes		Mark
11	Factor of 3 $(3x - 2y)(3x + 2y)$ **OR** $(9x - 6y)(3x + 2y)$ **OR** $(3x - 2y)(9x + 6y)$ $3(3x - 2y)(3x + 2y)$	B1 M1 A1	 3	 3

Question Number	Working	Notes		Mark
12	(a) 21	B1	1	
	(b) 5 + 9 + 13 + 17 + "21" (attempt at summing 5 terms, at least 3 correct)	M1		
	65	A1		
	OR Using the formula for the sum of an Arithmetic Progession: $S_n = \sum_{i=1}^{n} a_i = \frac{n}{2}\{2a_1 + (n-1)d\},\ d = a_i - a_{i-1}$			
	Correct subst. 65	M1 A1	2	3

Question Number	Working	Notes		Mark
13	68 x ¾ (= 51*l*)	M1		
	612/("68 x ¾")	M1 dep		
	12 km/litre	A1	3	3

Question Number	Working	Notes		Mark
14	(a) 5	B1	1	
	(b) 46	B1	1	
	(c) 12	B1	1	3

Question Number	Working	Notes		Mark
15	(a) $A = \frac{24000}{x}$	B1	1	
	(b) $1500 = "\frac{24000}{x}"$ (o.e)	M1		
	x = 16	A1	2	3

Question Number	Working	Notes		Mark
16	(a) 6	B1	1	
	(b) 360/30	M1		
	OR $(n - 2)*180 = (180 - 30)*n$ (oe)			
	12 (final answer only, do NOT isw)	A1	2	3

Question Number	Working	Notes		Mark
17	$5x + 3x < 15 + 2$ (allow one error)	M1		
	$x < 17/8$ (= 2.125)	A1		
	2	A1	3	3
	(allow equality sign for first two marks)			

Question Number	Working	Notes		Mark
18	$\sqrt{(17^2 - 8^2)}$	M1		
	15	A1		
	OR			
	$(\sin \angle BAC = \frac{8}{17} \Rightarrow \angle BAC = 28.072^o)$			
	tan"28.072" = 8/*AB*	M1		
	15	A1		
	8/"15"	A1 ft	3	3

Question Number	Working	Notes		Mark
19	$a = 1$ $b = -2$ $\lambda = 3$	B1 B1 B1	3	3

Question Number	Working	Notes		Mark
20	(a) 306° $\frac{7}{17} \times "306"$ 126° (accept answer on diagram)	B1 M1 A1	3	

Question Number	Working	Notes		Mark
20	(b) cyclic (quadrilateral)	B1	1	4

Question Number	Working	Notes		Mark
21	(a) 14/100 x 15 000 2100 (b) $\frac{16}{100} \times x = "2100"$ (o.e.) 13125 (integer value only)	M1 A1 M1 A1	2 2	4

Question Number	Working	Notes		Mark
22	$\frac{1}{24}=\frac{k}{60^2}$ k = 150 $y=\frac{"150"}{10^2}$ y = 1.5, $\frac{3}{2}$	M1 A1 M1 dep A1	4	4

Question Number	Working	Notes		Mark
23	16/0.25 **OR** 64 **OR** 0.25/16 **OR** 1/64 (o.e eg 16000/250) $\sqrt[3]{0.25/16}$ **OR** $\sqrt[3]{16/0.25}$ (o.e) used in expression involving r_S **OR** 0.25/16 or 16/0.25 (o.e) used in expression involving r_S^3 $r_S = 24\times\sqrt[3]{\frac{0.25}{16}}$ (o.e) 6 cm	B1 B1 M1 A1	4	4

Question Number	Working	Notes		Mark
24	(a) 93	B1	1	

Question Number	Working	Notes		Mark
24	(b) $t^n \rightarrow t^{n-1}$	M1		
	$12t^2$	A1		
	$-2t - 2$ **NB:** Answer is $12t^2-2t - 2$	A1	3	4

Question Number	Working	Notes		Mark
25	(a) construction; accuracy (line must intersect *AB* and *DC* for A1)	M1, A1	2	
	(b) construction; accuracy (line from *D* and must intersect *AB* for A1)	M1, A1	2	
	(c) shaded and labelled	B1	1	5

Question Number	Working	Notes		Mark
26	(a) $\frac{5}{8}, \frac{3}{7}, \frac{4}{7}$ (or decimal equivalent to 2 dp)	B1, B1, B1	3	
	(b) $\frac{3}{8}\times\frac{2}{7}+"\frac{5}{8}"\times"\frac{4}{7}"$	M1		
	$\frac{13}{28}$ (o.e.)	A1	2	5

Question Number	Working	Notes		Mark
27	16 seen	B1		
	$\sqrt{34^2 - "16"^2}$	M1		
	30	A1		
	π "30"^{2}	M1 dep		
	2830 cm^2	A1	5	5

Question Number	Working	Notes		Mark
28	$2x + 3(2x - 1) = 3x.(2x - 1)$	M1		
	(removing denominators)			
	$6x^2 - 11x + 3 (= 0)$	A1		
	Attempt to factorise c's trinomial quadratic	M1		
	$x = 1/3$	A1		
	$x = 3/2$	A1	5	5

Question Number	Working	Notes		Mark
29	(a) $0 < x \leq 2$	B1	1	
	(b) using a consistent value:	M1		
	mid class, lower class boundary, upper class boundary			
	complete and correct method for finding mean			
	i.e. $\frac{1\times35+3\times20+5\times13+7\times8+9\times4}{80}$	M1 dep		
	3.15	A1	3	
	(c) $2+\frac{5}{20}\times2$ (o.e.)	M1		
	(accept 5.5/20)			
	2.5 (accept 2.55)	A1	2	6

Question Number	Working	Notes		Mark
30	(a) one term correctly differentiated	M1		
	$3x^2$ - $2x$	A1	2	
	(b) "$3x^2$ - $2x$" = 5	M1		
	$3x^2$ - $2x$ - 5 (= 0)	A1		
	Attempt to factorise c's quadratic	M1		
	x = -1	A1		
	x = 5/3	A1	5	7

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