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Mark Scheme (Results)

Summer 2013

GCSE Mathematics (2MB01) Higher
5MB1H (Calculator) Paper 01

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 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.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

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.

8 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.

9 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: e.g. incorrect canceling 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 e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 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.

11 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.

12 Parts of questions

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

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1			600, 150, 75, 375	3	M2 a complete correct method seen to calculate the required ingredients (M1 for a method to find a scale factor or the weight of one scone or dividing ALL by the same number or multiplying by 30) A1 cao **SC** B2 for three out of four ingredients correct
2		0 5 5 8 2 4 5 7 9 2 5 8 4 6 2 5	Ordered stem and leaf diagram	3	M1 for an unordered stem and leaf diagram with no errors or omissions **OR** an ordered stem and leaf diagram condoning two errors or omissions A1 for a correctly ordered stem and leaf diagram B1 for an appropriate key
3	(a)		Point plotted	1	B1 for point plotted
	(b)		Negative	1	B1 for Negative (correlation)
	(c)		Correct line	1	B1 for a straight line that lies between (1, 40) to (1, 48) and (5.5, 6) to (5.5, 14)
	(d)		30 – 34	1	B1 30-34 or ft lobf (dep on single str line segment with a negative gradient)

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		Two reasons	2	B1 for no time scale e.g. day, week etc B1 for vague times e.g don't know how long a little is, no units
	(b)		Better question	2	B1 for stem which must include a time scale B1 for at least 3 non overlapping response boxes (not necessarily exhaustive) or at least 3 boxes that are exhaustive (but could be overlapping) **NB** Units must be included in either stem or response boxes to score full marks
	(c)		Biased sample	1	B1 for biased or not representative sample eg could all be too similar
5			Points plotted at (5, 6), (15, 9), (25, 8), (35, 7), (45,5) and joined with line segments	2	B2 for correct plotting of 5 points and joining with line segments (B1 for points plotted correctly at midpoints of intervals **OR** joining points with line segments at the correct heights and consistent within the class interval (including end values) **OR** correct frequency polygon with one point incorrect **OR** correct frequency polygon with first and last points joined) NB Ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

PAPER: 5MB1H_01

<table>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>6</td><td>(a)
(b)</td><td></td><td>16.5
17.5</td><td>1
1</td><td>B1 cao
B1 for 17.5 accept 17.499(9…) or $17.4\dot{9}$</td></tr>
<tr><td>7</td><td></td><td></td><td>0.5</td><td>2</td><td>M1 for any suitable right angled triangle drawn against the given line with lengths indicated or used
or for use of $\frac{y_2 - y_1}{x_2 - x_1}$ oe
A1 for 0.5 oe
SC B1 y=0.5x+1</td></tr>
<tr><td>8</td><td></td><td>
<table>
<tr><td></td><td>B</td><td>G</td><td>Tot</td></tr>
<tr><td>F</td><td>10</td><td>35</td><td>45</td></tr>
<tr><td>H</td><td>12</td><td>26</td><td>38</td></tr>
<tr><td>T</td><td>8</td><td>29</td><td>37</td></tr>
<tr><td>Tot</td><td>30</td><td>90</td><td>120</td></tr>
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<table>
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<tr><td>Tot</td><td>45</td><td>38</td><td>37</td><td>120</td></tr>
</table>
</td><td>29</td><td>4</td><td>M1 for a complete correct method to find the total number of girls eg 120 – 30 (=90)
M1 for complete correct method to find the number of girls who play football or hockey eg 26 + 35 (=61)
M1 for ‘90’ – ‘61’
A1 for identifying 29 as the answer
OR
M1 for a complete correct method to find the total number playing tennis
M1 for a complete correct method to find the number of boys playing tennis
M1 for ‘total for tennis’-‘boys playing tennis’
A1 for identifying 29 as the answer</td></tr>
</table>

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*9		**Cost of villa** 2600 + 200 = £2800 **Cost of hotel** 180 × 7×2 = 2520 $\frac{40}{100}\times 180 = 72$ 72 × 7 = 504 2520 + 504 = 3024	Comparison	6	B1 for identifying 2600 or 180 from the table M1 for a complete correct method to find 40% of their adult price for either one day or one week. **OR** the total cost of the adult(s) at the hotel ie 2×'180' or 7×'180' or 2×7×'180' M1 for a complete correct method to find the total price of the hotel for their two adults and their one child (40% of adult) for either a week or a day M1 for finding the total of the villa ie '2600'+200 A1 for 2800 and 3024 **OR** 400 and 432 C1 (Dep on M2) for a clear conclusion from comparing their results.
10		20 000×0.85 = 17 000 17 000×0.9 = 15 300 15 300×0.9 = 13 770	3	4	M1 for a complete correct method to find 15% of 20 000 (=3000) or 100-15 (=85) M1 for a complete correct method to find 85% of 20 000 e.g. 20 000 – '3000' (=17000) or 20 000 × '0.85' (=17000) M1 for a complete method to find 90% of '17 000' A1 cao but MUST be supported: 3 without working scores 0 marks and 3 from incorrect working may gain some method marks.

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)		42	2	M1 for realising that the weight is three quarters of the total number of trees (=¾ × 56 or ¾ × 57 oe) A1 for 42 or 43
	(b)		Correct box plot	2	M1 for with at least 3 elements correctly plotted but must at least have a box. A1 for fully correct box plot
	*(c)	Median Jodie = 40 Median Tom = 29 Range Jodie = 30 Range Tom = 40 IQR Jodie = 10 IQR of Tom = 22	Comparison	2	C2 two relevant comparisons one spread (IQR or range) and one about the median (C1 one comparison made)
12	(a)		Cf graph drawn	2	M1 for 5 or 6 points plotted correctly at the end of intervals or 5 or 6 points plotted not at ends but consistent within each interval and joined. A1 cao
	(b)		8-9	2	M1 ft UQ-LQ seen A1 ft from their cf graph
	(c)	65 – ‘59’	6-9	2	M1 method shown to read off from t=45 from their cf graph or linear interpolation from the table A1 ft from their cf graph

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13		$\frac{15+18}{160}\times 30$	6	3	M1 for finding the proportion of the stratum e.g. $\frac{15}{160}$ or $\frac{18}{160}$ or $\frac{15+18}{160}$ OR for finding the proportion of the population eg $\frac{30}{160}\times 100$ or 18.75% M1 for completing their method to find the sample size e.g $\frac{15+18}{160}\times 30$ oe or 18.75÷100×(15+18) or sight of 6.1(875) A1 cao

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)	0.016 × 500 = 8 0.03 × 500 = 15 0.08 × 250 = 20 0.096 × 250 = 24 0.026 × 1000 = 26	(8), 15, 20, 24, 26	2	M1 for correct calculation to find one frequency e.g. 0.03 × 500 or 0.08 × 250 or 0.096 × 250 or 0.026 × 1000 or for one frequency correct or establishing that 1 cm^2 = 2.5 fish A1 for all frequencies correct
	(b)	0.026 × 500 = 13 8 + 15 + 20 + 24 + 26 = 93	13 : 93	2	M1 ft for a complete correct method to find the number of fish over 2000 g ie 0.026 × 500 (=13) or '26'÷2 A1ft for 13 : 93 or '0.026 × 500' : 'total for all their fish' or '26'÷2 : 'total for all their fish' SCB1 for 93:13 given as the answer
	(c)	47^{th} item needed	1292	2	M1 for a complete correct method to divide the area of the histogram into two equal parts **OR** for a complete correct method to interpolate for the 47^{th} value A1 for answer in range 1290 to 1300

PAPER: 5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15		$\frac{6}{10}\times\frac{5}{9}+\frac{2}{10}\times\frac{1}{9}+\frac{2}{10}+\frac{1}{9}$ $\frac{30}{90}+\frac{2}{90}+\frac{2}{90}$	$\frac{34}{90}$	4	B1 for $\frac{5}{9}$ *or* $\frac{1}{9}$ *or* $\frac{1}{9}$ seen as 2nd probability M1 for $(\frac{6}{10}\times\frac{5}{9})$ or $(\frac{2}{10}\times\frac{1}{9})$ or $(\frac{2}{10}\times\frac{1}{9})$ M1 for $(\frac{6}{10}\times\frac{5}{9})+(\frac{2}{10}\times\frac{1}{9})+(\frac{2}{10}\times\frac{1}{9})$ A1 for $\frac{34}{90}$ oe **With replacement** B0 for $\frac{6}{10}$ or $\frac{2}{10}$ or $\frac{2}{10}$ seen as 2nd probability M1 for $(\frac{6}{10}\times\frac{6}{10})$ or $(\frac{2}{10}\times\frac{2}{10})$ or $(\frac{2}{10}\times\frac{2}{10})$ M1for $(\frac{6}{10}\times\frac{6}{10})+(\frac{2}{10}\times\frac{2}{10})+(\frac{2}{10}\times\frac{2}{10})$ A0 for $\frac{44}{100}$ S.C award B2 for $\frac{44}{100}$ or $\frac{34}{100}$ or $\frac{44}{90}$ oe

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 5MB1H_01			
Question		**Modifications**	**Notes**
2		Stem and leaf diagram horizontal line inserted at the bottom	Standard mark scheme
3		*x*-axis 2cm for $\frac{1}{2}$ *y*-axis 2cm to for 5. Cross changed to filled in circles. In (a) points (1.8,42) is now point (2,40) In (d) reading is now from 3 litres; use a range of 26 – 32	Standard mark scheme
5		*x*-axis 2cm for 5 *y*-axis 2cm for 1	Standard mark scheme
7		2cm grid	Standard mark scheme

PAPER: 5MB1H_01			
Question		**Modifications**	**Notes**
9		Top two rows in the table removed	Standard mark scheme
11		Tom's boxplot : LQ changed to 20 median changed to 30 which could affect slightly the answers (comparisons) in (d).	Standard mark scheme
12		Both axes: 1.5 cm for 5. Cumulative frequencies changed : 0 5 15 50 60 65	*This will affect all parts of this question; follow through accordingly.*
14		In table. weight 0 to 500 changed to 10 In Graph: 0 -500: up to 0.02, 1250 – 1500: up to 0.1, 1500 – 2500: up to 0.03.	The answers are therefore (10), 15, 20, 25, 30; density still $1cm^2 = 2.5$

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