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Mark Scheme (Results)

November 2012

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 labelling 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 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 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

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1			18 | 9 9 19 | 0 3 5 8 20 | 0 5 6 7 7 21 | 1 2 8 22 | 3 Key	3	B2 for a correct ordered diagram (B1 for an unordered diagram with at most1 error or omission OR for an ordered diagram with 1 or 2 errors or omissions Note: 1 error can look like 2 in the diagram when 1 value is misplaced B1 (indep) for a correct key eg Key: 18| 7 represents 187 (g) NB for an ordered diagram of the form 1 | 89 89 90 93 95 98 2 | 00 05 06 07 07 11 12 18 23 award a maximum of B1 for an ordered diagram with 1 or 2 errors or omissions The B1 for a key can still be earned.
2	(a)	1 – (0.12 + 0.39 + 0.18) 1 □ 0.69	0.31	2	M1 for 1 – (0.12 + 0.39 + 0.18) or 1 □ "0.69" A1 cao
	(b)	50 × 0.12	6	2	M1 for 50 × 0.12 seen or for $\frac{6}{50}$ A1cao

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
3		(2 × 11) + (6 × 23) + (10 × 14) + (14 × 2) = 22 + 138 + 140 + 28 = 328 328 ÷ 50	6.56	4	M2 for use of midpoints accept one error or three of 22, 138, 140, 28 seen or three of 2×11, 6×23, 10×14, 14×2 seen (M1 for use of *fw* with *w* consistent within intervals (including end points) accept one error) M1 (**dep** on M1) for use of "Σ*fw*" ÷ 50 or "328" ÷ 50 A1 cao
4		Top Cat = 35 × 4 = 140° Katkins = 30 × 4 = 120° Coolkat = 15 × 4 = 60°	Pie chart	3	M1 for 360 ÷ 90 or 4 seen or one angle (TC or Ka or Co) correct in pie chart ± 2◦ ignore labels, or one correct angle calculated A1 for any two angles (TC or Ka or Co) correct in pie chart. ± 2◦ ignore labels A1 for fully correct and labelled pie chart. All angles ±2º
5	(a)		positive	1	B1 Accept with 'positive' valid extra words eg strong positive
	(b)		46 – 54	2	B2 46 – 54 Or M1 for a single line segment with positive gradient that could be used as a line of best fit or a vertical line from 44 A1 for given answer in the range 46 – 54

<table>
<tr><th colspan="6">5MB1H_01</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>6</td><td></td><td>
<table>
<tr><td></td><td>A</td><td>G</td><td>T</td><td>total</td></tr>
<tr><td>F</td><td>77</td><td>(26)</td><td>13</td><td>(116)</td></tr>
<tr><td>M</td><td>53</td><td>9</td><td>(22)</td><td>84</td></tr>
<tr><td>total</td><td>(130)</td><td>35</td><td>35</td><td>(200)</td></tr>
</table>
( ) value given
</td><td>53</td><td>4</td><td>M1 for calculation of total male students 200 – 116 or 84 seen
M1 for Graphics total or Textiles total = (200 – 130) ÷ 2
or 70 ÷ 2 or 35 seen
M1 for calculation of male students choosing Graphics,
"35" – 26 or male Graphics 9
or female students choosing Art,
116 – 26 – ("35" – 22) or " 90" – "13" or 77
A1 cao
or
Answers may appear in a two-way table with no methods seen
B1 for male total, 84
B1 for Graphics total or Textiles total, 35
M1 for male Graphics, 9
or (dep on B1) for a table that balances (condone 77 and/or 13 missing or 9 missing)
A1 in table or on answer line</td></tr>
<tr><td>7</td><td></td><td>P(F) = $\frac{3}{5}$ $\frac{3}{5}$ students = 96
Total = 96 ÷ 3 × 5 = 32 × 5
or
F : M = 3 : 2 = 96 : x
M = 96 ÷ 3 × 2 = 32 × 2 = 64
Total = 96 + 64</td><td>160</td><td>3</td><td>M1 for P(F) = $\frac{3}{5}$ or 96 ÷ 3 or $\frac{3}{5}$(students) = 96 oe or 32 seen
M1 for 96 ÷ 3 × 5 or "32" × 5 or "480" ÷ 3
A1 cao
or
M1 for F : M = 3 : 2 oe or 3 : 2 = 96 : ? oe or 96:64 or 64 seen
M1 for 96 ÷ 3 × 2 + 96 or "32" × 2 + 96 or "192" ÷ 3 + 96
or "64" + 96
A1 cao</td></tr>
</table>

<table>
<tr><th colspan="6">5MB1H_01</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>8*</td><td></td><td>A = (78 + 52 + 165) × 2 + 236
= 295 × 2 + 236 = 590 + 236
= 826

826 × 0.95 = 784.70

B = (68 + 48 + 160) × 2 + 242
= 276 × 2 + 242 = 552 + 242
=794
794 × 0.97 = 770.18

<table><tr><th>Shop</th><th>A</th><th>B</th></tr><tr><td>Skis</td><td>156</td><td>136</td></tr><tr><td>Boots</td><td>104</td><td>96</td></tr><tr><td>S & B</td><td>260</td><td>232</td></tr><tr><td>Lift(Ch)</td><td>330</td><td>320</td></tr><tr><td>Lift (Ad)</td><td>236</td><td>242</td></tr><tr><td>Lift total</td><td>566</td><td>562</td></tr><tr><td>Total</td><td>826</td><td>794</td></tr><tr><td>%age off</td><td>41.3</td><td>23.82</td></tr></table></td><td>Shop B</td><td>5</td><td>M1 for finding the total cost for 1adult and 2 children for lift passes for 6 days in either shop A or shop B
e.g 236 + 2 × 165 or 242 + 2 or 2× 160 or 236 + “330” or 242 + “320” or 566 seen or 562 seen
or the total cost of 2 children only for ski hire and boot hire for 6 days in either shop A or shop B
e.g. 2× 78 + 2 × 52 or 2× 68 + 2 × 48 or “156” + “104” or “136” + “96” or 260 seen or 232 seen

M1 for a complete calculation of cost for shop A or shop B
Eg (78 + 52 + 165) × 2 + 236 or (68 + 48 + 160) × 2 + 242 or “295” × 2 + 236 or “276” × 2 + 242 or 826 or 794 seen
M1 for a correct method to find the reduced cost for shop A or for shop B
e.g. “826” × 0.95 or “794” × 0.97
A1 for (€)784(.70) or (€)785 and (€)770(.18)
C1 (dep on M1 scored) ft for ‘cheaper shop’ identified</td></tr>
<tr><td>9</td><td>(a)</td><td></td><td>2 reasons

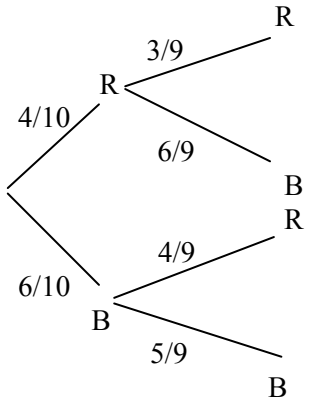
2 statements</td><td>2

2</td><td>B1 only asked females oe
B1 recognition of why only asking people in one store is biased or for the need to ask people in a different location
B1 for overlapping numbers oe
B1 for not exhaustive oe</td></tr>
<tr><td>10</td><td></td><td>(5 × x + 7 × y) ÷ 12</td><td>$\frac{5x+7y}{12}$</td><td>2</td><td>M1 for 5 × x or 7 × y oe seen
A1 for $\frac{5x+7y}{12}$ oe (ignore kg units)</td></tr>
</table>

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11		1700 + 1700 × 4 ÷ 100 = 1700 + 68 = 1768 1768 + 1768 × 4 ÷ 100 = 1768 + 70.72	1838.72	3	M1 for 1700 × 1.04 or 1700 + 0.04 × 1700 or for 1768 or 68 or 136 or 1836 seen M1 (**dep**) for "1768" × 1.04 or for "1768" + 0.04 × "1768" or "1768" + "70.72" A1 for 1838.72 cao (If correct answer seen then ignore any extra years) **Alternative method** M2 for 1700×1.04^2 or 1700×1.04^n $n > 2$ or digits 183872 seen A1 for 1838.72 cao [**SC**: Award B2 for 138.72 seen]
12			BFACED	3	B3 for all 6 correct (B2 for 4 or 5 correct) (B1 for 2 or 3 correct)

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)	244 ÷ 740 × 60 = 19.78378… 315 ÷ 740 × 60 = 25.54054… 181 ÷ 740 × 60 = 14.6756	20, 25, 15	3	M1 for 244 ÷ 740 × 60 or 315 ÷ 740 × 60 or 181 ÷ 740 × 60 A1 (**dep** on method shown for their answer) 19.7… or 19.8 or 20 or 25.5… or 25 or 26 or 14.6… or 14.7 or 15 seen B1 (**indep**) for 20, 25, 15 or 20, 26, 14
	(b)(i)		random	2	B1 for all have an equal chance oe
	(ii)		method		C1 for valid method eg put all names in a hat and pull out 20, 25, 15 **ft** from (a) or 60 eg number each person and use random numbers on calculator or table to select 20, 25, 15 **ft** from (a) or 60
14	(a)(i)	Line drawn at 10, Median = 46	45 - 46	3	B1 answer in range 45 to 46 inclusive
	(ii)	Line drawn at 5(or 4.75) LQ = 30 ± 1 Line drawn at 15 (or 14.25) UQ = 56 ± 1 IQR = 56 □ 30	26		M1 for lines drawn to the graph at 5 and 15 or at 4.75 and 14.25, (tolerance $\pm\frac{1}{2}$ square) or LQ = 30± 1 seen or UQ = 56± 1 seen A1 for answer in range 26 ± 2
	(b) *	IQR Wilson = 64 – 28 = 36	comment	2	B1 for Wilson IQR = 64 – 28 or 36 seen C1 (dep on B1) (**ft** from 14aii) for a valid statement that compares the two classes e.g. Mr W's class has greater IQR than Mrs A's class

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)	f.d. = 2, 12, 10, 3 e.g. each square = 4 people 1:15:10:1.5 e.g. each square = 2 people 2:30:20:3	histogram	3	B2 for all 4 bars fully correct with areas in the ratio 1:15:10:1.5 or 2:30:20:3 oe (B1 for 2 or 3 bars drawn in the correct ratio to each other) B1 for labelling the vertical axis f.d and consistent scaling or for a key
	(b)	Monday 40 + 6 = 46 more than 7 hours Tuesday One square = 12 ÷ 6 = 2 2 × 3.5 × 7 = 49 more than 7 hours	No with reason	2	M1 for a valid method to work out the frequency for more than 7 hours on Tuesday, (12 ÷ 6) × 3.5 × 7 or 2 × 3.5 × 7 or 7 × 7 or 2 × 24.5 or 49 A1 No with 46 and 49 seen

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
16		 $\frac{4}{10}\times\frac{6}{9}+\frac{6}{10}\times\frac{4}{9}$ $=\frac{24}{90}+\frac{24}{90}$ OR $1-(\frac{4}{10}\times\frac{3}{9}+\frac{6}{10}\times\frac{5}{9})$ $=1-(\frac{12}{90}+\frac{30}{90})$ $=1-\frac{42}{90}$	$\frac{8}{15}$	4	M2 for $\frac{4}{10}\times\frac{6}{9}$ or $\frac{6}{10}\times\frac{4}{9}$ or $\frac{24}{90}$ oe (M1 for $\frac{6}{9}$ or $\frac{3}{9}$ or $\frac{5}{9}$ or $\frac{4}{9}$ seen on diagram or in a calculation) M1for $\frac{4}{10}\times\frac{6}{9}+\frac{6}{10}\times\frac{4}{9}$ or "$\frac{24}{90}$" + "$\frac{24}{90}$"oe A1 for $\frac{8}{15}$ oe **OR** M2 for $\frac{4}{10}\times\frac{3}{9}$ or $\frac{6}{10}\times\frac{5}{9}$ or $\frac{12}{90}$ or $\frac{30}{90}$ or $\frac{42}{90}$ oe (M1 for $\frac{6}{9}$ or $\frac{3}{9}$ or $\frac{5}{9}$ or $\frac{4}{9}$ seen on diagram or in a calculation) M1 for $1-(\frac{4}{10}\times\frac{3}{9}+\frac{6}{10}\times\frac{5}{9})$ or $1-$("$\frac{12}{90}$" + "$\frac{30}{90}$") or $1-$"$\frac{42}{90}$" oe A1 for $\frac{8}{15}$ oe **SC** (if no marks scored) B1for $\frac{4}{10}\times\frac{6}{10}+\frac{6}{10}\times\frac{4}{10}$ or $\frac{24}{100}+\frac{24}{100}$ or $\frac{48}{100}$

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