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Mark Scheme (Results)

March 2012

GCSE Mathematics (2MB01)
Paper 5MB1H_01 (Calculator)

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1		(6 × 0) + (9 × 1) + (7 × 2) + (3 × 3) + (2 × 4) + (1 × 5)	45	2	M1 for attempt to multiply the number of cans by the frequency and add the results (condone one arithmetic error) A1 cao
2*		120 ÷ 15 120 + 8 3 × 42	No + correct statement	4	M1 for 120 ÷ 15 (=8) or 1×8 (teachers) to 15× 8 (students) oe M1 for 42 × 3 (=126) M1 for 120 + '120 ÷ 15 ' (=128) or difference of 2 oe C1 (dep on all three Ms) for 126 and 128 or 'difference of 2' oe AND for a correct statement that uses correct values **OR** M1 for 120 ÷ 15 (=8) or 1×8 (teachers) to 15× 8 (students) oe M1 for 120 + '120 ÷ 15' (=128) M1 for (120 + '8') ÷ 3 (=42.66…) C1 (dep on all three Ms) for answer in range 42.6−42.7 AND for a correct statement that uses correct values **OR** M1 for 120 ÷ 15 (=8) or 1×8 (teachers) to 15× 8 (students) oe M1 for 120 + '120 ÷ 15 ' (=128) M1 for (120 + '8') ÷ 42 (=3.047…) or successive subtraction of 42 from '128' C1 (dep on all three Ms) for answer in range 3.04−3.05 or remainder 2 oe AND for correct statement that uses correct values

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)	0.10 + 0.25 + 0.30 OR 1 − (0.15 + 0.20)	0.65	2	M1 for 0.10 + 0.25 + 0.30 or 1−(0.15 + 0.20) A1 for 0.65 oe (SC B1 for 0.85oe)
	(b)	200 × 0.30	60	2	M1 for 200 × 0.30 A1 cao
4*		2329×0.9 =2096.1 2147×0.95 =2039.65 OR 4658×0.9 =4192.2 294×0.95 =4079.3	Royal European	5	M1 for use of 2329 or 2147 (or sight of 4658 or 4294), ie selection of correct column M1 for attempting to calculate the discount for both their figures, eg 2329×0.1 (=232.90) oe AND 2147×0.05 (=107.35) oe or 4658×0.1 (=465.8) oe AND 4294×0.05 (=214.7) oe) OR for attempting to find the discounted price for one, eg 2329×0.9 (=2096.1) oe or 2147×0.95 (=2039.65) oe or 4658×0.9 (=4192.2) oe or 4294×0.95 (=4079.3) oe M1 for attempting to find the discounted price for both, eg 2329×0.9 (=2096.1) oe AND 2147×0.95 (=2039.65) oe or 4658×0.9 (=4192.2) oe AND 4294×0.95 (=4079.3) oe A1 for 2096(.1) and 2039(.65) OR 4192(.2) and 4079(.3) figures rounded or truncated C1 (dep on at least M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a)		7 | 1 3 8 8 | 1 4 4 7 8 9 | 1 2 3 5 6 6 6 8 10 | 0 1 3 4 Key: 7 | 1 means 71cm	3	B2 for fully correct diagram accept a stem of 70, 80, 90, 100 (the order of the numbers in the stem may be reversed) (B1 for ordered leaves or unordered leaves (with one error or omission)) B1 for a correct key (units may be omitted)
	(b)		92.5	1	B1 for 92.5 or ft from ordered diagram
6	(a)	−14 ÷ 40	−0.35	2	M1 for method shown to work out the gradient, eg right-angled triangle drawn or 14÷40 or 0.35 or $\frac{14}{40}$ oe A1 for −0.35 or $-\frac{14}{40}$oe
	b(i)		*P* + reason	2	B1 for *P* with reason eg takes only 40 seconds or crosses time axis first, takes 10 second less oe
	(ii)		2		B1 cao
7		900 ÷ 360 2.5 × 100 900 − 250 − 225 − 125 − 162.50	£250, £137.50	3	M1 for (900÷360) × 100 or (100÷360)×900oe or (55÷360) × 900oe or implied by one correct value A1 for (£)250 or (£)137.5(0) seen A1 for (£)250 and (£)137.5(0) in correct positions

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)		83	1	B1 for answer in range 82 – 83
	(b)		9	2	M1 for lines drawn to graph at 22 and 66 (tolerance one 2mm square) A1 for answer in range 8 – 10
	(c)	88 − 78	10	2	M1 for 88 – '78' or 5 × 2 or 5 seen A1 for 10 or 11
9	(a)		0.6, 0.4, 0.3, 0.7, 0.3, 0.7	2	B2 for 6 correct probabilities in the correct positions (B1 for 2, 3, 4 or 5 correct)
	(b)	0.6 × 0.7 + 0.4 × 0.3	0.54	3	M1 for '0.6' ×' 0.7' or '0.4' × '0.3' (may be awarded in tree diagram if selected) M1 for '0.6' × '0.7' + '0.4' × '0.3' A1 cao OR M1 for '0.6' × '0.3' + '0.4' × '0.7'(may be awarded in tree diagram if selected) M1 for 1 –('0.6' × '0.3' + '0.4' × '0.7') A1 cao

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)	125 × 50.2 50 × 48.7 6275 – 2435 3840 ÷ 75	51.2	3	M1 for 125 × 50.2(=6275) or 50×48.7(=2435) M1 for (125 × 50.2 − 50 × 48.7) ÷ 75 A1 cao
	(b)		completed box plot	3	B3 for box plot with all three aspects (overlay) aspect 1: ends of whiskers at 18 and 96 aspect 2: ends of box at 32 and 72 aspect 3: median marked at 56 (B2 for box plot with two aspects, B1 for box plot with one aspect or correct quartiles and median identified)
11	(a)		eg How many times do you go out to eat each month? 0, 1, 2, 3 or more	2	B1 for a suitable question including a time period (may appear with response boxes) B1 for at least 3 non-overlapping boxes which are exhaustive for their question
	(b)	$\frac{10}{127} \times 50$	4	2	M1 for $\frac{10}{127} \times 50$ (=3.937…) oe A1 for 3 or 4
	(c)		2 valid reasons	2	B2 for 2 reasons, eg not able to get a zero response oe, ages/genders not representive oe, only does it on one day/evening oe (B1 for 1 reason)

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)		Histogram	3	B3 for fully correct histogram (overlay) (B2 for 4 correct blocks B1 for 3 correct blocks) SC B1 for correct key, eg $1cm^2$=5(men) or correct freq÷ class interval for at least three frequencies
	(b)	$2x + 1.4x + x + 0.4x + 0.2x$	$5x$	2	M1 for finding total area of histogram, eg $20(cm^2)$, or fd for 10 to 20 ($0.1x$ oe) or area of one block in terms of x A1 for $5x$ oe
13	(a)	$1 - 0.1$ $0.9 \div 3$	0.3	2	M1 for $(1 - 0.1) \div 3$ or $0.1+0.3+0.6(=1)$ or $0.6 \div 2$ A1 for 0.3 oe
	(b)	$0.1 \times 0.1 \times 0.1$	0.001	2	M1 for $0.1 \times 0.1 \times 0.1$ oe A1 for 0.001 oe

5MB1H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
	(c)	1 − (0.7 × 0.7 × 0.7) OR 3 × 0.3 × 0.3 × 0.7 + 3 × 0.3 × 0.7 × 0.7 + 0.3 × 0.3 × 0.3 OR 3 × 0.3 × 0.3 × (0.1 + 0,6) + 3 × 0.3 × (0.1 + 0.6) × (0.1 + 0.6) + 0.3 × 0.3 × 0.3 OR 0.3 × 0.3 × 0.3 + 3 × 0.3 × 0.3 × 0.6 + 3 × 0.3 × 0.3 × 0.1 + 3 × 0.3 × 0.6 × 0.6 + 3 × 0.3 × 0.1 × 0.1 + 6 × 0.3 × 0.6 × 0.1	0.657	3	M1 for 0.7×0.7×0.7 or ft (1 – 'a')×(1 – 'a')×(1 – 'a') M1 for 1 – 0.7×0.7×0.7 or ft 1 – (1 – 'a')×(1 – 'a')×(1 – 'a') oe A1 for 0.657 oe (SC B1 for 0.784 oe) OR M1 for 0.3 × 0.3 × 0.7(=0.063) or 0.3 × 0.7 × 0.7(=0.147) or 0.3 × 0.3 × 0.3(=0.027) oe M1 for 3 × 0.3 × 0.3 × 0.7+ 3 × 0.3 × 0.7 × 0.7+ 0.3 × 0.3 × 0.3 oe A1 for 0.657 oe (SC B1 for 0.784 oe) OR M1 for 0.6 × 0.6 × 0.6(=0.216) or 0.1 × 0.6 × 0.6(=0.036) or 0.1 × 0.1 × 0.6(=0.006) or 0.1 × 0.1 × 0.1(=0.001)oe M1 for 1− (0.6 × 0.6 × 0.6 + 3 × 0.1 × 0.6 × 0.6 + 3 × 0.1 × 0.1 × 0.6 + 0.1 × 0.1 × 0.1) oe A1 for 0.657 oe (SC B1 for 0.784 oe) OR M1 for 0.3 × 0.3 × 0.3 or 0.3 × 0.3 × 0.6 or 0.3 × 0.3 × 0.1 or 0.3 × 0.6 × 0.6 or 0.3 × 0.1 × 0.1 or 0.3 × 0.6 × 0.1 oe M1 for 0.3 × 0.3 × 0.3 + 3 × 0.3 × 0.3 × 0.6 + 3 × 0.3 × 0.3 × 0.1 + 3 × 0.3 × 0.6 × 0.6 + 3 × 0.3 × 0.1 × 0.1 + 6 × 0.3 × 0.6 × 0.1 oe A1 for 0.657 oe (SC B1 for 0.784 oe)

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