Mark Scheme (Results)

Summer 2016

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Higher (Calculator) Unit 1

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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.

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. Note that in some cases a correct answer alone will not score marks unless supported by working; these situations are made clear in the mark scheme. Examiners should 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 award marks for the quality of written communication (QWC).
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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks; transcription errors may also gain some credit. Send any such responses to review for the Team Leader to consider.
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.

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 (embedded answers).

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	(a)		Reason	1	B1 for an acceptable reason eg bias relating to age, to gender, or to playing in school band (NB bias alone not enough); eg size of sample too small
	(b)		Question and response boxes	2	B2 for a suitable question with at least 3 exhaustive non-overlapping response boxes (must include a time period and units). [B1 for a suitable question with time period or at least 3 exhaustive non-overlapping response boxes with units]
2	(a)		Positive	1	B1 for positive
	(b)		40 - 50	2	M1 for suitable line of best fit drawn or evidence of vertical line at 10 or a point indicated at $(10, y)$ where $40 \leq y \leq 50$ A1 for 40 – 50
	(c)(i) (ii)		Point plotted	2	B1 for point plotted at (6.5, 45) B1 for explanation of outlier eg holiday, party, special event etc
3			$\frac{x+10+x+x-4}{3}$	3	M1 for $x + 10$ or $x - 4$ M1 for $x + 10 + x + x - 4$ A1 for $\frac{x+10+x+x-4}{3}$ oe
4	(a) (b)		36.5 37.5	1 1	B1 B1 for 37.5 or 37.4$\dot{9}$ or 37.499

PAPER: 5MB1H/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5			1746	3	M1 for 1 – 0.03 (= 0.97) or for 0.03 × 1800 (=54) M1 for "0.97" × 1800 or for 1800 − "54" A1 cao
6			Tulip 130 Hyacinth 90 81° and 162° sectors	4	M1 for 360 ÷ 400 (= 0.9) or 400 ÷ 360 (= 1.1..) M1 for 117 ÷ "0.9" (=130) or 117 × "1.1.." (=130) or 400 – 180 – 130 (= 90) M1 for "90" × "0.9" (=81) or "90" ÷ "1.1.." (=81) or 180 × "0.9" (=162) or 180 ÷ "1.1.." (=162) A1 2 correct angles drawn on pie chart ± 2° with labels.
7	(a)	8 × 1000 = 8000 14 × 3000 = 42000 28 × 5000 = 140000 10 × 7000 = 70000 4 × 9000 = 36000 296000 ÷ 64	4625	4	M1 for finding at least 4 products f*x* consistently within interval (including end points) M1 (dep) for use of at least 4 correct midpoints M1 (dep on first M1) for Σf*x* ÷ 64 A1 cao
	(b)		8,22,50,60,64	1	B1 all 5 correct
	(c)		Cumulative frequency graph	2	M1 for at least 4 of '5 points' plotted consistently within each interval, and joined by curve or line segments providing no gradient is negative. A1 for correct cumulative frequency graph
	(d)		2500 - 3000	2	M1 dep on cf graph for readings at cf = 16 or 16.25 and cf = 48 or 48.75 A1 ft from cf graph

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Question		**Working**	**Answer**	**Mark**	**Notes**
8			School £8930 Hospital £13395	5	M1 for 23.5×1000 or for $\frac{1}{20} \times 1000$ (=50) oe M1 for "23500" $\times \frac{19}{20}$ (=22325) oe or for $(1000 - 50) \times 23.50$ (=22325) oe M1 for "22325" ÷ 5 (= 4465) M1 for "4465" × 2 or "4465" × 3 C1 for £8930 for school and £13395 for hospital.
9	(a)	Lowest = 16 LQ = 18 Median = 27 UQ = 36 Highest = 57	Box plot drawn	3	B3 for a fully correct box plot (B2 for at least 3 correctly plotted values including box and whiskers/tails) (B1 for at least 2 correctly plotted values including box or whiskers/tails or 5 correct values plotted or clearly identified and no box or whiskers/tails)
	*(b)		2 comparisons	2	C1 ft from (a) for a correct comparison of a measure of spread C1 ft from (a) for a correct comparison of medians For the award of both marks at least one of the comparisons made must be in the context of the question.
10			146	3	M1 for 98 × 5 (=490) or 114 × 7 (=798) M1 for a complete method eg "798" – "490" − 162 (=146) A1 cao

PAPER: 5MB1H/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11			3	2	M1 for an attempt to evaluate 2800×1.025^n for at least one value of n (with $n > 1$) OR $\frac{3000}{2800}$ (=1.0714..) and 1.025^n evaluated (n>1) OR finding at least two correct interest payments (ie 70 and 71.75) A1 cao
12	(a)		0.27	2	M1 for method to work out the gradient for train A A1 for 0.26 – 0.28
	*(b)		Comparison	1	C1 for speed of train B is constant, speed of train A is increasing. oe
13			14	2	M1 for $\frac{486}{1720} \times 50$ (=14.1279….) oe A1 cao
14			0.036	2	M1 for $0.6 \times 0.3 \times 0.2$ A1 cao

PAPER: 5MB1H/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)	$12 \div 20 = 0.6$ $20 \div 10 = 2$ $17 \div 10 = 1.7$ $6 \div 15 = 0.4$	Correct histogram	3	B3 for fully correct histogram (B2 for 3 correct blocks or all 4 frequency ÷ class interval, *y*-axis labelled and 1 correct block) (B1 for 2 correct blocks of different widths or for correct key eg $1cm^2 = 1$ egg or for frequency ÷ class interval for at least 3 frequencies) Due to scale accept to within 1mm on plotting
	(b)		19	3	M1 for splitting one of relevant rectangles or for $\frac{7}{10} \times 20$ (=14) or $\frac{3}{10} \times 17$ (=5.1) M1 for (area of 53 – 63 interval) ÷ (total area) × 55 or for "14" + "5.1" A1 for 19
16			$\frac{11}{30}$	3	M1 for at least one of $\frac{2}{6} \times \frac{1}{5}$ or $\frac{3}{6} \times \frac{1}{5}$ or $\frac{3}{6} \times \frac{2}{5}$ or $\frac{3}{6} \times \frac{3}{5}$ oe M1 for $\frac{2}{6} \times \frac{1}{5} + \frac{3}{6} \times \frac{1}{5} + \frac{3}{6} \times \frac{2}{5}$ oe A1 for $\frac{11}{30}$ oe (SCB2 for $\frac{11}{36}$)

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: ±5º
Measurements of length: ±5 mm

PAPER: 5MB1H_01			
Question		**Modification**	**Notes**
Q2		Wording added 'It shows a scatter graph. Diagram enlarged. Crosses changed to solid circles.	B1 for positive M1 for suitable line of best fit drawn or evidence of vertical line at 10 or a point indicated at (10, y) where $40 \leq y \leq 50$ A1 for 40 – 50 B1 for point plotted at (6.5, 45) B1 for explanation of outlier eg holiday, party, special event etc

PAPER: 5MB1H_01			
Question		**Modification**	**Notes**
Q6		Diagram enlarged. Circumference of the circle marked off in 10° divisions. '117°' moved outside the angle arc. Wording added 'There are two spaces to fill' below 'Complete the table above'. Wording added 'Complete the pie chart in the Diagram Book'. 'Tulip' and 'Hyacinth' in table exchanged. [Leeway needed for drawing].	M1 for 360 ÷ 400 (= 0.9) M1 for 117 ÷ 0.9 (=130) or for 400 – 180 – 130 (= 90) M1 for "90" × "0.9" (=81) or for 180 × "0.9" (=162) A1 2 correct angles drawn on pie chart ± 5° with labels.
Q7	(a)	Frequencies changed to 5, 15, 30, 10, 4.	M1 for finding at least 4 products fx consistently within interval (including end points) M1 (dep) for use of at least 4 correct midpoints M1 (dep on first M1) for Σfx ÷ 64 A1 cao
Q7	(b)	Wording added 'There are five spaces to fill' below 'Complete the…' [Cumulative frequencies will have changed because of part (a).] 5, 20, 50, 60, 64	B1 all 5 correct
Q7	(c)	Wording added 'It shows a grid'. Diagram enlarged. [Leeway needed for answering parts (c) and (d)].	M1 for at least 4 of '5 points' plotted consistently within each interval, and joined by curve or line segments providing no gradient is negative. A1 for correct cumulative frequency graph

PAPER: 5MB1H_01			
Question		**Modification**	**Notes**
Q9	(a)	Wording added 'It shows a grid'. Numbers changed to 15, 16, 17, 20, 21, 22, 23, 30, 34, 34, 35, 40, 47, 54, 55. Diagram enlarged.	B3 for a fully correct box plot (B2 for at least 3 correctly plotted values including box and whiskers/tails) (B1 for at least 2 correctly plotted values including box or whiskers/tails or 5 correct values plotted or clearly identified and no box or whiskers/tails)
Q9	(b)	Diagram enlarged. Vertical lines on box plot moved to 5, 10, 15, 35, 60.	C1 ft from (a) for a correct comparison of a measure of spread C1 ft from (a) for a correct comparison of medians For the award of both marks at least one of the comparisons made must be in the context of the question.
Q12		Diagram enlarged. Line for train A moved to go through (0, 07), (60, 15) and (120, 30). Train B changed to dashed line.	M1 for method to work out the gradient for train A (allow tolerance in reading from the graph) A1 ft for 0.25 oe C1 for speed of train B is constant, speed of train A is increasing. oe
Q14		Wording added 'It shows information about a weather forecast'.	M1 for $0.6 \times 0.3 \times 0.2$ A1 cao

Q15		Table turned to vertical format. Number of eggs changed to 8, 20, 18, 6. [Leeway needed for answering the question].	B3 for fully correct histogram (B2 for 3 correct blocks) (B1 for 2 correct blocks or for correct key eg 1cm2 = 1 egg or for frequency ÷ class interval for at least 3 frequencies) M1 for splitting one of relevant rectangles or for number of eggs for either interval 53 to 60 or 60 to 63 M1 for (area of 53 – 63 interval) ÷ (total area) × 55 or for summing their number of eggs for the intervals 53 to 60 and 60 to 63 A1 for 19

PAPER: 5MB1H_01			
Question		**Modification**	**Notes**
Q16		Diagram enlarged.	M1 for identifying all 3 possibilities (1,2), (50, 2) and (50,1) or for a fully correct sample space or for at least one of $\frac{2}{6}\times\frac{1}{5}$ or $\frac{3}{6}\times\frac{1}{5}$ or $\frac{3}{6}\times\frac{2}{5}$ M1 for identifying all 3 possibilities (1,2), (50, 2) and (50,1) or for $\frac{2}{6}\times\frac{1}{5}+\frac{3}{6}\times\frac{1}{5}+\frac{3}{6}\times\frac{2}{5}$ A1 for $\frac{11}{30}$ oe

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