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Mark Scheme (Results)

November 2013

Pearson Edexcel GCSE
in Mathematics Linear (1MA0)
Higher (Non-Calculator) Paper 1H

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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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
1			90 450 225 1.5 960	3	M1 for 6 ÷ 4 (= 1.5) or 4 ÷ 6 (= 0.66..) or ÷4 × 6 oe or sight of any one of the correct answers A1 for three correct A1 for all correct
2	(a)		Plot (90,17)	1	B1 cao
	(b)		Positive	1	B1 Positive
	(c)		In range 16 to 20	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a vertical line from 110 or a point plotted at (110, *y*) where *y* is in the range 16 to 20 A1 for an answer in the range 16 to 20 inclusive
3			120 cm^3	4	M1 for $\frac{1}{2} \times 3 \times 4$ M1 (dep) for '$\frac{1}{2} \times 3 \times 4$' × 20 A1 for 120 B1 (indep) for cm^3

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		$4y + 5x + 5$	2	M1 $5x$ or 5 seen A1 cao
	(b)		$3x(3x - 2y)$	2	B2 for $3x(3x - 2y)$ (B1 for $x(9x - 6y)$ or $3(3x^2 - 2xy)$ or $3x(ax - by)$ where a and b are integers not equal to zero)
	(c)		$4x + 8$	1	B1 cao
	(d)		$x^2 - 2x - 15$	2	M1 for 4 terms correct with or without signs or 3 out of no more than 4 terms correct with correct signs A1 cao
5	(a)		0.25	1	B1 oe
	(b)		150	2	M1 for 0.75×200 oe A1 cao
6	(a)		Shape with vertices at (–1, 3), (0, 6), (2, 6), (1, 3)	1	B1 for correct shape in correct position
	(b)		Rotation centre (0,0) 90° anticlockwise	3	B1 rotation B1 (centre) (0,0) B1 90° anticlockwise or 270° clockwise Note: award no marks if more than one transformation is given

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(i)	20, 40, 60 12, 24, 36, 48, 60	3 and 5 or any multiple of 3, 5	4	M1 attempts multiples of both 20 and 12 (at least 3 of each shown but condone errors if intention is clear) or identifies 60 or a multiple of 60 M1 (dep on M1) for a division by 20 or 12 or counts up 'multiples' or identifies a common multiple (implied if one answer is correct or answers reversed) A1 cheese slices (packets) 3, burgers (boxes) 5 or any multiple of 3, 5 OR M1 for expansion of either 20 or 12 into factors M1 for demonstration that both expansions include 4 (or 2 × 2) A1 cao for cheese slices (packets) 3, burgers (boxes) 5
		20 = 4×5 = 2×2×5 12 = 4×3 = 2×2×3			
	(ii)		60		B1 for 60 or ft from their correct answer in (i) or ft 'common multiple'
8			38	5	M1 $3x - 5 = 19 - x$ M1 for a correct operation to collect the x terms or the number terms on one side of an equation of the form $ax + b = cx + d$ A1 for $x = 6$ M1 for substituting their value of x in the three expressions and adding **or** substituting their value of x after adding the three expressions A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
9	(a)		Criticisms	2	B1 Qu 1 Overlapping boxes, no units B1 Qu 2 e.g. no time frame, non-specific responses, no number quantities, open to interpretation, no option for those who do not exercise
	(b)		Question given	2	B1 for a correct question with a time frame B1 for at least 3 correctly labelled non-overlapping response boxes (need not be exhaustive) or at least 3 response boxes that are exhaustive for all integer values of their time unit (could be overlapping) NB Units must be included in either question or response boxes to score full marks [Do not allow inequalities in response boxes]

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
*10			Not enough, needs £133	5	M1 for splitting the shape (or showing recognition of the "absent" rectangle) and using a correct method to find the area of one shape M1 for a complete and correct method to find the total area M1 for a complete method to find 70% of 19 (= 13.3) or 70% of their total cost or 70% of their area A1 114(m^2) and (£)133 **or** 114(m^2) and (£)13.3(0) and 108(m^2) C1 (dep on M2) for a conclusion supported by their calculations OR M1 for a complete method for the number of tins required for one section of the area of the floor M1 for a complete method to find the number of tins for the whole floor M1 for a complete method to find 70% of their total number of tins and multiply by 19 A1 (£)133 C1 (dep on M2) for a conclusion supported by their calculations
11			164	5	M1 200 ÷ (3+2) (= 40) or an equivalent ratio seen M1 (dep) 3 ×'40' (= 120) or 2 ×'40' (= 80) or 120: 80 or 80:120 M1 a complete method to find 70% of their total number of large letters e.g. 0.7 × '80' (=56) M1 multiplies their three totals by the correct unit price and adds, e.g. 60(p) × '120' + (£)1 × '56' + (£)1.50 × '24' A1 164

<table>
<tr><th colspan="6">PAPER: 1MA0_1H</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>12</td><td></td><td><table><tr><td>x</td><td>–2</td><td>–1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>y</td><td>–4</td><td>–1</td><td>2</td><td>5</td><td>8</td></tr></table></td><td>$y = 3x + 2$ drawn</td><td>4</td><td>B1 for axes scaled and labelled

(Table of values)
M1 for at least 2 correct attempts to find points by substituting values of x
M1 ft for plotting at least 2 of their points (any points from their table must be correctly plotted)
A1 for correct line between $x = –2$ and $x = 2$

(No table of values)
M1 for at least 2 correct points with no more than 2 incorrect points
M1 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y = 3x + 2$ drawn
A1 for correct line between $x = –2$ and $x = 2$

(Use of $y = mx + c$)
M1 for line drawn with gradient of 3 OR line drawn with y intercept at 2
M1 for line drawn with gradient of 3 AND with y intercept at 2
A1 for correct line between $x = –2$ and $x = 2$

SC B2 (indep of B1) for correct line segment between $x = 0$ and $x = 2$ (ignore any additional incorrect line segment(s))</td></tr>
</table>

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
13		35 × 10 = 350 33 × 11 = 363 363 – 350 = 13 OR 10×(35–33) =20 33 – 20 = 13	13	3	M1 35 × 10 (= 350) or 33 × 11 (= 363) M1 (dep) finding the difference in their totals e.g. '363' – '350' A1 cao OR M1 10×(35 – 33) (=20) or 11×(35 – 33) (=22) M1 (dep) 33 – '20' or 35 – '22' A1 cao
14	(a)		$\frac{1}{5}$	1	B1 oe
	(b)		$\frac{1}{9}$	1	B1 cao
	(c)	$9\times10^4\times3\times10^3$	2.7×10^8	2	M1 27×10^7 oe or $9\times3\times10^{4+3}$ A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
15		$6x + 8y = 10$ $6x - 9y = 27$ $y = -1$ $3x - 4 = 5$ $3x = 9$ $x = 3$ OR $9x + 12y = 15$ $8x - 12y = 36$ $x = 3$ $9 + 4y = 5$ $4y = -4$ $y = -1$	$x = 3$, $y = -1$	4	M1 for a correct process to eliminate either variable (condone one arithmetic error) A1 cao for either x or y M1 (dep on M1) for correct substitution of found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao OR M1 for full method to rearrange and substitute to eliminate either variable (condone one arithmetic error) A1 cao for either x or y M1 (dep on M1) for correct substitution of found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao Trial and improvement scores 0 marks unless both x and y are correct
16		$120 \div 20 = 6$ $6^2 = 36$ $36 \times 300 = 10\,800$	10 800	3	M1 $120 \div 20$ (= 6) oe, can be implied by $120^2 \div 20^2$ M1 '6'$^2 \times 300$ A1 cao
17		(3,6,7) to (–2,2,5) (–5, –4, –2) (–2– 5, 2 – 4, 5 – 2)	(–7, –2, 3)	2	M1 for midpoint plus change or complete method for 2 out of 3 coordinates, can be implied by 2 correct values A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
18	(a)		68	1	B1 cao
	*(b)		Yes as 28 > 20 or 35% > 25% or 53 < 60	3	M1 for reading a value from graph at time = 60 (=28, accept 27 to 28) M1 for '28' ÷ 80 × 100 (= 35) or 25 ÷ 100 × 80 (= 20) C1 (dep on M2) for correct decision based on their figures OR M1 for 25 ÷ 100 × 80 (= 20) M1 for reading a value from graph at cf = 20 (=53, accept 52 to 54) C1 (dep on M2) for correct decision based on their figures
	(c)	28, 53, 68, 76, 96	Box plot plotted	3	B1 for ends of whiskers at 28 and 96 with a box B1 ft for median at '68' inside a box B1 for ends of box at 53 (accept 52 to 54) and 76
19			0.82	3	M1 for 1 – 0.7 (= 0.3) or 1 – 0.4 (= 0.6) M1for 1– '0.3'×'0.6' A1 for 0.82 oe OR M1 for 1 – 0.7 (= 0.3) or 1 – 0.4 (= 0.6) M1 (0.7 × 0.4) + (0.7 × '0.6') + ('0.3'× 0.4) A1 for 0.82 oe

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
20	(a)		4	3	M1 for correct expansion to $32x - 8$ or multiplying both sides by $3x$ or dividing both sides by 4 M1 for a compete and correct method to isolate the x terms and the number terms (condone one arithmetic error in multiplying out the bracket) A1 cao
	(b)	$\frac{2(y-6)-(y+3)}{(y+3)(y-6)}$	$\frac{y-15}{(y+3)(y-6)}$	3	M1 for common denominator of $(y+3)(y-6)$ M1 for $\frac{2(y-6)}{(y+3)(y-6)} - \frac{y+3}{(y+3)(y-6)}$ oe or $\frac{2(y-6)-(y+3)}{(y+3)(y-6)}$ oe A1 for $\frac{y-15}{(y+3)(y-6)}$ or $\frac{y-15}{y^2-3y-18}$
21			100	4	M1 $y = kx^2$ oe or $36 = k \times 3^2$ A1 $k = 4$ M1 (dep on M1) ($y =$) '4' $\times 5^2$ A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
*22		$360 - y$	$180 - \frac{y}{2}$	4	M1 $ADC = \frac{y}{2}$ A1 $180 - \frac{y}{2}$ C2 (dep on M1) for both reasons Angle at centre is twice the angle at the circumference Opposite angles in cyclic quadrilateral add to 180° (C1 (dep on M1) for one appropriate circle theorem reason) OR M1 reflex $AOC = 360 - y$ A1 $\frac{360 - y}{2}$ oe C2 (dep on M1) for both reasons Angles around a point add up to 360° Angle at centre is twice the angle at the circumference (C1 (dep on M1) for one appropriate circle theorem reason)
23			Triangle with vertices at (–1,–4), (–1,–5), (–3,–4.5)	2	M1 for correct shape and size and the correct orientation in the wrong position or two vertices correct A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)	$\overrightarrow{AB} = -\mathbf{a} + \mathbf{b}$ $\overrightarrow{ON} = \overrightarrow{OA} + \frac{2}{3}\overrightarrow{AB}$ $\overrightarrow{ON} = \mathbf{a} + \frac{2}{3}(-\mathbf{a} + \mathbf{b})$ $= \frac{1}{3}\mathbf{a} + \frac{2}{3}\mathbf{b}$ OR $\overrightarrow{ON} = \overrightarrow{OB} + \frac{1}{3}\overrightarrow{BA}$ $\overrightarrow{ON} = \mathbf{b} + \frac{1}{3}(-\mathbf{b} + \mathbf{a})$ $= \frac{1}{3}\mathbf{a} + \frac{2}{3}\mathbf{b}$	$\frac{1}{3}\mathbf{a} + \frac{2}{3}\mathbf{b}$	3	M1 for correct vector equation involving $\overrightarrow{ON}$, eg. $\overrightarrow{ON} = \overrightarrow{OA} + \overrightarrow{AN}$, may be written, partially or fully, in terms of **a** and **b**, e.g. ($\overrightarrow{ON} =$) $\mathbf{a} + \frac{2}{3}\overrightarrow{AB}$ M1 for showing answer requires $\overrightarrow{AN} = \frac{2}{3}\overrightarrow{AB}$ or $\overrightarrow{BN} = \frac{1}{3}\overrightarrow{BA}$ A1 $\frac{1}{3}\mathbf{a} + \frac{2}{3}\mathbf{b}$ oe
	(b)	$\overrightarrow{OD} = \overrightarrow{OA} + \overrightarrow{AC} + \overrightarrow{CD}$ $= \mathbf{a} + \mathbf{b} + \mathbf{b}$ $= \mathbf{a} + 2\mathbf{b}$ $\overrightarrow{OD} = 3(\frac{1}{3}\mathbf{a} + \frac{2}{3}\mathbf{b})$ $\overrightarrow{OD} = 3\overrightarrow{ON}$	Proof	3	M1 for a correct vector statement for $\overrightarrow{OD}$ or $\overrightarrow{ND}$ in terms of **a** and **b**, e.g. $\overrightarrow{OD} = \mathbf{a} + \mathbf{b} + \mathbf{b}$ oe or $\overrightarrow{ND} = \frac{2}{3}(-\mathbf{b} + \mathbf{a}) + \mathbf{b} + \mathbf{b}$ oe A1 for correct and fully simplified vectors for $\overrightarrow{ON}$ (may be seen in (a)) **and** for $\overrightarrow{OD}$ (= **a** + 2**b**) or $\overrightarrow{ND}$ ($= \frac{2}{3}\mathbf{a} + \frac{4}{3}\mathbf{b}$) C1 (dep on A1) for statement that $\overrightarrow{OD}$ or $\overrightarrow{ND}$ is a multiple of $\overrightarrow{ON}$ (+ common point)

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: 1MA0_1H			
Question		**Modification**	**Notes**
2		*x* axis 2cm for 10 *y* axis 2cm for 2 ½ . Crosses changed to filled in circles. Right axis labelled.	Standard mark scheme
3		Model as well as diagram	Standard mark scheme
4	(a)	*x* changed to *e*. *y* changed to *f*.	M1 5*e* or 5 seen A1 cao
	(c)	*x* changed to *y*	Standard mark scheme
	(d)	*x* changed to *y*	Standard mark scheme

PAPER: 1MA0_1H			
Question		**Modification**	**Notes**
6	(a)	Move shape A two squares to the right. Cut left axis at -5. 2cm grid.	B1 for correct shape in correct position
	(b)	2cm grid. *x* axis -6 to +7. *y* axis -3 to +7.	Standard mark scheme
Q11		Remove 501 – 750g row. .	Standard mark scheme
Q12		2 cm grid. Axes drawn but not labelled	Standard mark scheme
Q18		Change line so it goes through (20, 0) (50, 20) (60, 30) (70, 40) (80,60) (100, 80). *x* axis 2cm for 10, *y* axis 2cm for 5.	B1 for 70 (accept 68 to 72) M1 for reading a value from graph at time = 60 (=30, accept 28 to 32) M1 for '30' ÷ 80 × 100 (= 37.5) or 25 ÷ 100 × 80 (= 20) C1 (dep on M2) for correct decision based on their figures OR M1 for 25 ÷ 100 × 80 (= 20) M1 for reading a value from graph at cf = 20 (=50, accept 48 to 52) C1 (dep on M2) for correct decision based on their figures
	(c)	28 seconds changed to 30 seconds. 96 seconds changed to 100 seconds. Boxplot *x* axis 3cm for 10 in an intermediate line.	B1 for ends of whiskers at 30 and 100 with a box B1 ft for median at '70' inside a box B1 for ends of box at 50 (accept 52 to 54) and 80 (accept 78 to 82)

PAPER: 1MA0_1H			
Question		**Modification**	**Notes**
Q23		Triangle A (the image) moved down 1 square. Triangle B (the enlargement) given scale factor $-\frac{1}{2}$ centre (0, -1). Wording: 'Describe fully the single transformation that will map Triangle A onto Triangle B'.	B1 for enlargement scale factor $-\frac{1}{2}$ B1 for (centre) (0, –1)
Q24		Vectors increased in size.	Standard mark scheme







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