Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
In Mathematics A (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 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

Question		Working	Answer	Mark	Notes
1	(a)		$\dfrac{2}{21}$	1	B1 for $\dfrac{2}{21}$
	(b)		$\dfrac{4}{15}$	2	M1 for attempting to use a suitable common denominator with at least one of the two fractions correct A1 for $\dfrac{4}{15}$ oe
2			0 | 5 9 1 | 3 5 6 8 9 9 2 | 1 2 3 3 5 7 8 9 3 | 1 2 4 4 | 0	3	B2 for fully correct diagram. Accept a stem of 10, 20, etc. (B1 for ordered with at most 2 errors or omissions or for correct unordered diagram) B1 for a correct key (units may be omitted) consistent with diagram.
3		<table><tr><td></td><td>Sq</td><td>G</td><td>S</td><td>Tot</td></tr><tr><td>F</td><td>**2**</td><td>**4**</td><td>**15**</td><td>21</td></tr><tr><td>M</td><td>6</td><td>**14**</td><td>9</td><td>**29**</td></tr><tr><td>Tot</td><td>8</td><td>18</td><td>**24**</td><td>50</td></tr></table>	4	4	M1 for a correct first step which results in a value that could be in the table: eg. 50 – 18 – 8 (= 24) or 50 – 21 (= 29) or 8 – 6 (= 2) M1 for a correct method to find a second value that could be in the table using their first value eg "29" – 9 – 6 (=14) or "24" – 9 (=15) M1 for a fully correct and complete method. A1 cao
4			25.60	4	M1 for a correct method to find $\frac{1}{3}$ of 24 (=8) or $\frac{2}{3}$ of 24 (=16) M1 for a correct method to find 60% (= 7.2) or 40% (= 4.8) of 12 or 60% (=14.4) or 40% (= 9.6) of 24 M1 (dep on at least M1) for a method to find the sum of their discounted adult ticket + 2 × their discounted child ticket A1 25.6(0)

Question		Working	Answer	Mark	Notes
5			Question given	2	B1 for a suitable question which includes a time frame (the time frame could appear with the response boxes) B1 for at least 3 non-overlapping exhaustive response boxes with no use of inequality symbols
6	(a)		$2m^2 + 6m$	1	B1 for $2m^2 + 6m$
	(b)		$3xy(y-2)$	2	B2 for $3xy(y-2)$ (B1 for $3x(y^2-2y)$ or $3y(xy-2x)$ or $xy(3y-6)$ or $3xy$(a two term algebraic expression))
*7			3	4	M1 for a method to calculate at least one area eg 10×7 (=70) or 16×10 (=160) M1 for a method to find the total area (=124) M1 (dep on M1) for "124" ÷ 36 C1 (dep on M3) for 3 (pigs) clearly identified and supported by correct calculations Or M1 for an area of 36m² drawn with dimensions shown M1 for 3 areas of 36m² drawn with dimensions shown M1 (dep on M1) for method to find the area left (=16) C1 (dep on M3) for 3 (pigs) clearly identified and supported by correct calculations
8			Correct region	3	B1 for full line drawn 1.5 cm from edge of patio and parallel to it B1 for full arc of circle radius 3 cm centre the centre of the pond B1 ft for shading region to the right of their vertical line **and** outside the arc of their circle with correct centre

Question		Working	Answer	Mark	Notes
9	(a)		Shape drawn	2	B2 for shape with vertices at (0, –1), (–1, – 3), (–2, –3), (–2, –1) (B1 for rotation of 180° about the wrong centre)
	(b)		Triangle drawn	2	B2 for triangle with vertices at (6, 9), (9, 9), (9, 3) (B1 for 2 vertices correct or enlargement sf 3 in wrong position or enlargement, centre (0, 0), but sf >1, ≠ 3)
*10		$1.18 \div 4 = 0.295$ $(118 \div 4 = 29.5)$ $1.74 \div 6 = 0.29$ $\underline{(174 \div 6 = 29)}$ $1.18 \div 2 = 0.59$ $\underline{1.74 \div 3 = 0.58}$ $1.74 \times 4 = 6.96$ $\underline{1.18 \times 6 = 7.08}$ $1.74 \times 2 = 3.48$ $\underline{1.18 \times 3 = 3.54}$ $\underline{1.18 \div 2 \times 3 = 1.77}$ $\underline{1.74 \div 3 \times 2 = 1.16}$ $4 \div 1.18 = 3.3(…)$ $\underline{6 \div 1.74 = 3.4(…)}$	6 pints	3	M1 for division of price by quantity for both bottles or division of quantity by price for both bottles or complete method to find price of same quantity of milk A1 for two correct values that could be used for a comparison C1 ft (dep on M1) for comparison of their values with a correct conclusion.
11			36	3	M1 for a correct method to find either an interior or an exterior angle; eg. $(180 \times 3) \div 5$ or $540 \div 5$ (=108) or $360 \div 5$ (=72) M1 (dep) for a complete method to find angle *CFD*. A1 cao

Question		Working	Answer	Mark	Notes
12	*(a)		No, temp is 25°C	3	M1 for substitution of 77 into the RHS of the formula A1 for 25 cao or for 225/9 and 180/9 cao C1 (dep on M1) for conclusion (ft) following from working shown OR M1 for substitution of 20 into LHS of formula and correct process to find F A1 for 68 cao C1 (dep on M1) for conclusion (ft) following from working shown
	(b)		$F = \dfrac{9C}{5} + 32$	3	M1 for expansion of the brackets (eg $5 \times F - 5 \times 32$) or an attempt to multiply both sides by 9, or divide both sides by 5 as the first step. M1 (dep) for a correct second step A1 for $F = \dfrac{9C}{5} + 32$ oe
*13			Answer in range 35 – 50	4	M1 for a method to either find the exact or approximate number of seconds in one day, e.g. $24 \times 60 \times 60$ (=86400) or the number of minutes in 2014 seconds, e.g. $2014 \div 60$ or $2000 \div 60$ (≈30) M1 for a correct method to find the number of prizes; eg. '$24 \times 60 \times 60$' $\div 2014$ oe or $60 \div$ "30" $\times 24$ oe B1 for rounding at least one appropriate value in the working to 1 sf, e.g. 24 rounded to 20 or 2014 rounded to 2000 or 86400 rounded to 90000 C1 (dep on M2) for answer in 35 – 50 clearly identified
14			6 hours	4	B1 for 5 miles = 8 km or equivalent statement or for $\dfrac{8}{5}$ or $\dfrac{5}{8}$ used correctly M1 for $50 \times r$ with $1.5 \le r \le 1.7$ oe or $480 \times s$ with $0.6 \le s \le 0.7$ oe M1 for $480 \div$ speed or distance $\div 50$ A1 oe

Question		Working			Answer	Mark	Notes
15	(a)				2, –1, 2, 7	2	B2 for all correct (B1 for 2 or 3 correct)
	(b)				Correct graph	2	M1 (dep on at least B1) for at least 6 points from their table plotted correctly A1 cao for fully correct graph
	(c)	$x^2 - 3x - 4 = 0$ $(x - 4)(x + 1) = 0$			–1, 4	2	M1 for line $y = x + 3$ drawn correctly or for reduction to correct 3 term quadratic (=0) and : $(x \pm 1)(x \pm 4)$ or formula using $a = 1$, $b = -3$ and $c = -4$, allow one sign error in the formula, or $\left(x - \dfrac{3}{2} \right)^2 = 4 + \left(\dfrac{3}{2} \right)^2$ A1 cao
16	(a)				0.75	2	M1 for "5.6" – "4.85" with at least one value correct A1 cao
	(b)				20	2	M1 for a complete method e.g. $80 \div 4$ A1 cao
	(c)		**1st half**	**2nd half**	2 comparisons	2	B1 ft from (a) for a correct comparison of a measure of spread B1 for a correct comparison of medians (accept averages) For the award of both marks at least one of the comparisons made must be in the context of the question.
		Med	5.3	4.75			
		Range	2.2	2.45			
		IQR	0.75	0.75			

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Question		**Working**	**Answer**	**Mark**	**Notes**
17	(a)		1	1	B1 cao
	(b)		$\dfrac{1}{100}$	1	B1 for $\dfrac{1}{100}$ or 0.01
	(c)		0.00273 27.3×10^{-3} 2.73×10^{3} 273×10^{2}	2	M1 for converting all numbers to same form with at least one conversion correct A1 for fully correct order with correct numbers in any correct form (SC B1 if one number incorrectly placed or all 4 numbers listed in reverse order)
18			$x = 7$ $y = -3$	3	M1 for correct process to eliminate one variable (condone one arithmetic error) M1 (dep) for substituting found value in one of the equations or appropriate method after starting again (condone one arithmetic error) A1 for $x = 7$ and $y = -3$
19			$y = \dfrac{1}{2}x - 5$	3	M1 for method to find gradient of L$_1$ e.g $\dfrac{6-3}{6-0}$ $\left(=\dfrac{1}{2}\right)$ M1 for $y = "\dfrac{1}{2}"x + c$ or $y = mx - 5$ (c, m do not have to be numerical, or correct numerical values) or for $(L =)\dfrac{1}{2}x - 5$ A1 $y = \dfrac{1}{2}x - 5$ oe

Question		Working	Answer	Mark	Notes
20			6	3	M1 for $\dfrac{15}{10}$ (=1.5) or $\dfrac{10}{15}$ (=0.66..) or $\dfrac{16}{10}$ (=1.6) or $\dfrac{10}{16}$ (=0.625) M1 for $\dfrac{15}{10} \times 16$ (=24) oe A1 cao OR M1 for $\dfrac{15}{16}$ (=0.9375) or $\dfrac{16}{15}$ (=1.066…) or $\dfrac{16}{10}$ (=1.6) or $\dfrac{10}{16}$ (=0.625) M1 for $\dfrac{15}{16} \times 10$ (=9.375) oe A1 20.625 oe
21			55	3	M1 for angle ABO = 90 or angle ADO = 90, or angle OBC = 15 or angle FDO = 90 or angle EBO = 90 (could be marked on the diagram) M1 for reflex angle BOD = 360 – (360 – 90 – 90 – 40) (= 220) or angle BCD = (360 – 90 – 90 – 40) ÷ 2 (= 70) or angle BDO or angle DBO = 90 – (180 – 40)/2 (= 20) or angle BOC = 180 – (15 + 15) (=150) A1 cao
22	(a)		$27x^6y^{12}$	2	B2 cao (B1 for any two terms correct in a product, e.g. $9x^6y^{12}$)
	(b)		$\dfrac{x-3}{2x-1}$	3	M1 for $(x-3)(x+3)$ M1 for $(2x-1)(x+3)$ A1 for $\dfrac{x-3}{2x-1}$ cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
23	(a)		$\dfrac{3}{10}, \dfrac{6}{9}, \dfrac{3}{9}, \dfrac{7}{9}, \dfrac{2}{9}$	2	B1 for $\dfrac{3}{10}$ on LH yellow branch B1 for $\dfrac{6}{9}, \dfrac{3}{9}, \dfrac{7}{9}, \dfrac{2}{9}$ correct on tree diagram
	(b)		$\dfrac{48}{90}$	3	M1 for $\dfrac{7}{10} \times "\dfrac{3}{9}"$ or $"\dfrac{3}{10}" \times "\dfrac{7}{9}"$ or $"\dfrac{3}{10}" \times "\dfrac{2}{9}"$ M1 for $\dfrac{7}{10} \times "\dfrac{3}{9}" + "\dfrac{3}{10}" \times "\dfrac{7}{9}" + "\dfrac{3}{10}" \times "\dfrac{2}{9}"$ A1 for $\dfrac{48}{90}$ oe OR M1 for $\dfrac{7}{10} \times "\dfrac{6}{9}"$ M1 for $1 - \dfrac{7}{10} \times "\dfrac{6}{9}"$ A1 for $\dfrac{48}{90}$ oe

Question		Working	Answer	Mark	Notes
*24			Proof	3	M1 for $\overrightarrow{MN} = \overrightarrow{MO} + \overrightarrow{ON}$ $(= \mathbf{n} - \mathbf{m})$ or $\overrightarrow{NM} = \overrightarrow{OM} + \overrightarrow{NO}$ $(= \mathbf{m} - \mathbf{n})$ or $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$ $(= 2\mathbf{n} - 2\mathbf{m})$ or $\overrightarrow{BA} = \overrightarrow{OA} + \overrightarrow{BO}$ $(= 2\mathbf{m} - 2\mathbf{n})$ M1 for $\overrightarrow{MN} = \mathbf{n} - \mathbf{m}$ and $\overrightarrow{AB} = 2\mathbf{n} - 2\mathbf{m}$ oe C1 (dep on M1, M1) for fully correct proof, with $\overrightarrow{AB} = 2\overrightarrow{MN}$ or $\overrightarrow{AB}$ is a multiple of $\overrightarrow{MN}$ [SC M1 for $\overrightarrow{MN} = 0.5\mathbf{n} - 0.5\mathbf{m}$ and $\overrightarrow{AB} = \mathbf{n} - \mathbf{m}$ C1 (dep on M1) for fully correct proof, with $\overrightarrow{AB} = 2\overrightarrow{MN}$ or $\overrightarrow{AB}$ is a multiple of of $\overrightarrow{MN}$]
25	(a)		$4\sqrt{3}$	2	M1 for $\dfrac{12}{\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}}$ A1 for $\dfrac{12\sqrt{3}}{3}$ oe with a rational denominator
	(b)		18	2	M1 for $\sqrt{2}\times\sqrt{2} + \sqrt{2}\times\sqrt{8} + \sqrt{8}\times\sqrt{2} + \sqrt{8}\times\sqrt{8}$ oe A1 cao OR M1 for $(\sqrt{2} + 2\sqrt{2})^2$ A1cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)		180, 0	1	B1 for 180, 0 Accept π, 0
	(b)		270, –1	1	B1 for 270, –1 accept $\dfrac{3\pi}{2}$, –1
	(c)		$a = 2$ $b = 3$ $c = 1$	3	B1 cao B1 cao B1 cao

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

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Question		Modification	Notes
Q08		Diagram made x 2 size. 3 metres changed to 6 metres. 6 metres changed to 12 metres.	B1 for full line drawn 3 cm from edge of patio and parallel to it B1 for full arc of circle radius 6 cm centre the centre of the pond B1 ft for shading region to the right of their vertical line **and** outside the arc of their circle with correct centre
Q09	(a) (b)	2 cm grid. A cut-out shape is provided. Axis removed. 2 cm plain grid. L shape put on grid. 3 squares down and an extra square across. Total 4 squares. Candidates asked to enlarge the shape by SF3	B2 for shape with vertices at (0, –1), (–1, – 3), (–2, –3), (–2, –1) (B1 for rotation of 180° about the wrong centre) B2 for a correct enlargement (B1 for an enlargement with a SF other than 3 or for 3 sides correct)
Q10		No pictures	M1 for division of price by quantity for both bottles or division of quantity by price for both bottles or complete method to find price of same quantity of milk A1 for two correct values that could be used for a comparison C1 ft (dep on M1) for comparison of their values with a correct conclusion.

PAPER: 1MA0_1H		
Question	**Modification**	**Notes**
Q14	No picture, just a box giving the distances	B1 for 5 miles = 8 km or equivalent statement or for $\dfrac{8}{5}$ or $\dfrac{5}{8}$ used correctly M1 for $50 \times r$ with $1.5 \le r \le 1.7$ oe or $480 \times s$ with $0.6 \le s \le 0.7$ oe M1 for $480 \div$ speed or distance $\div 50$ A1 oe
Q15	Grid x 2 – 2 cm squares. Top row removed.	B2 for all correct (B1 for 2 or 3 correct) M1 (dep on at least B1) for at least 6 points from their table plotted correctly A1 cao for fully correct graph M1 for line $y = x + 3$ drawn correctly or for reduction to correct 3 term quadratic (=0) and : $(x \pm 1)(x \pm 4)$ or formula using $a = 1$, $b = -3$ and $c = -4$, allow one sign error in the formula, or $\left(x - \dfrac{3}{2} \right)^2 = 4 + \left(\dfrac{3}{2} \right)^2$ A1 cao

Question		Modification	Notes
Q16	(a)	Box plots: "first half" – relevant figures are 4.25, 4.75, 5.25, 5.5, 6.4.	M1 for "5.5" – "4.75" with at least one value correct A1 cao
	(c)	"Second half" figures are 3.6, 4.25, 4.75, 5, and 6. 2 cm squares	B1 ft from (a) for a correct comparison of a measure of spread B1 for a correct comparison of medians (accept averages) For the award of both marks at least one of the comparisons made must be in the context of the question.
Q19		2 cm grid	M1 for method to find gradient of L_1 e.g $\dfrac{6-3}{6-0}$ $\left(=\dfrac{1}{2}\right)$ M1 for $y = “\dfrac{1}{2}”x + c$ or $y = mx - 5$ (c, m do not have to be numerical, or correct numerical values) or for $(L =)\dfrac{1}{2}x - 5$ A1 $y = \dfrac{1}{2}x - 5$ oe

PAPER: 1MA0_1H			
Question		**Modification**	**Notes**
Q20		Picture removed – box with the word "Photo inserted" Diagram labelled Diagram (i) and (ii)	M1 for $\dfrac{15}{10}$ (=1.5) or $\dfrac{10}{15}$ (=0.66..) or $\dfrac{16}{10}$ (=1.6) or $\dfrac{10}{16}$ (=0.625) M1 for $\dfrac{15}{10} \times 16$ (=24) oe A1 cao OR M1 for $\dfrac{15}{16}$ (=0.9375) or $\dfrac{16}{15}$ (=1.066…) or $\dfrac{16}{10}$ (=1.6) or $\dfrac{10}{16}$ (=0.625) M1 for $\dfrac{15}{16} \times 10$ (=9.375) oe A1 20.625 oe
Q22	(b)	MLP only : x changed to y	M1 for $(y-3)(y+3)$ M1 for $(2y-1)(y+3)$ A1 for $\dfrac{y-3}{2y-1}$ cao
Q25		x 2 size, solid answer lines Braille only – Roman numerals inserted on the five answer lines	Standard mark scheme