Mark Scheme (Results)

November 2014

Pearson Edexcel GCSE
In Mathematics A (1MA0)
Higher (Calculator) Paper 2H

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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.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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)

14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question 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_2H					
Question		Working	Answer	Mark	Notes
1	(a)		360	2	M1 30 ÷ 10 (= 3) or 120 ÷ 10 (=12) or 120 + 120 + 120 oe A1 cao
	(b)		25	2	M1 for $\dfrac{750}{300}$ (=2.5) oe A1 cao
2	(a)		Relationship	1	B1 for description of relationship eg "As the length of the pine cone increases the width increases" oe (accept positive correlation)
	(b)		6.1 to 6.4	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 8.4 or a point at (8.4, *y*) where *y* is from 6.1 to 6.4 A1 for given answer in the range 6.1 to 6.4
3	(a)		−1	2	M1 for 3 × −5 + 7 × 2 A1 cao
	(b)		$3(x + 2)$	1	B1 cao
	(c)		$7y - 16$	2	M1 for intention to expand a bracket eg $5y - 10$ or $2y - 6$ A1 cao
	(d)		m^8	1	B1 cao
	(e)		p^4	1	B1 cao

Question		Working	Answer	Mark	Notes
4	(a)		Correct shape	2	B2 cao (B1 for shape in the correct orientation below the line $y = x$ or for 2 vertices correct) with vertices at (2, 1), (4, 1), (4, 0), (3, 0)
	(b)		Translation by $\begin{pmatrix} 4 \\ -1 \end{pmatrix}$	2	B1 for translation B1 for $\begin{pmatrix} 4 \\ -1 \end{pmatrix}$ NB: B0 if more than one transformation given
5	(a)		0.2	2	M1 for $1 - 0.16 - 0.4 - 0.24$ oe A1 cao
	(b)		20	2	M1 for 0.16×125 oe A1 cao
6			2.10 euros or £1.81	3	M1 for 2.5×1.16 (= 2.9) M1 (dep) for $5 - $ "2.9" (=2.1) A1 for 2.1(0) euros OR M1 for $5 \div 1.16$ (= 4.31...) M1 (dep) for "4.31" $- 2.50$ (=1.81) A1 for £1.81
7	(a)		$4n - 2$	2	B2 for $4n - 2$ oe (B1 for $4n + k$, $k \neq -2$ or k is absent, or $n = 4n - 2$)
	*(b)		Yes + reason	1	C1 ft from (a) for decision and explanation, e.g. equating 86 with nth term **and** "Yes, its the 22nd term" or continuing the sequence up to 86 **and** "Yes, 86 is in the sequence" oe

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
8			Polygon drawn	2	B2 for fully correct frequency polygon - points plotted at the midpoint (B1 for all points plotted accurately but not joined with straight line segments) **or** all points plotted accurately and joined with last joined to first to make a polygon **or** all points at the correct heights and consistently within or at the ends of the intervals and joined (can include joining last to first to make a polygon) NB: ignore parts of graph drawn to the left of the 1st point or the right of the last point; ignore any histograms drawn.

PAPER: 1MA0_2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
*9		Decision (No the attendance target was not met)	3	M1 for attempting to find total number of students or 1210 seen M1 for $\frac{'1092'}{'1210'} \times 100$ oe or $\frac{'118'}{'1210'} \times 100$ oe C1 for correct decision with 90.(2479...) or correct decision with 6 and 9.(752...) **OR** M1 for attempting to find total number of students or 1210 seen M1 for $\frac{94}{100} \times$ '1210' oe C1 for correct decision with 1137 (.4) and 1092 or correct decision with 72(.6) and 118 **OR** M1 for a correct % method for one year, e.g. $\frac{192}{208} \times 100$ or $\frac{94}{100} \times 208$ M1 for a correct % method for each year C1 for correct decision with 92.(30...), 90.(87...), 89.(31...), 89.(27...), 89.(91...) or 195(.5..), 226.(9…), 246.(2..), 245.(3…), 223.(7…)

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
10		<table><tr><td>5</td><td>115</td></tr><tr><td>6</td><td>204</td></tr><tr><td>5.1</td><td>122.(451)</td></tr><tr><td>5.2</td><td>130.(208)</td></tr><tr><td>5.3</td><td>138.(277)</td></tr><tr><td>5.4</td><td>146.(664)</td></tr><tr><td>5.5</td><td>155.(375)</td></tr><tr><td>5.6</td><td>164.(416)</td></tr><tr><td>5.7</td><td>173.(793)</td></tr><tr><td>5.8</td><td>183.(512)</td></tr><tr><td>5.9</td><td>193.(579)</td></tr><tr><td>5.11</td><td>123.2(12..)</td></tr><tr><td>5.12</td><td>123.9(77..)</td></tr><tr><td>5.13</td><td>124.7(45..)</td></tr><tr><td>5.14</td><td>125.5(16..)</td></tr><tr><td>5.15</td><td>126.2(90..)</td></tr></table>	5.1	4	B2 for a trial $5.1 \le x \le 5.2$ evaluated (B1 for a trial $5 \le x \le 6$ evaluated) B1 for a different trial $5.1 < x \le 5.15$ evaluated B1 (dep on at least one previous B1) for 5.1 Accept trials correct to the nearest whole number (rounded or truncated) if the value of x is to 1 dp but correct to 1dp (rounded or truncated) if the value of x is to 2 dp. (Accept 124 for $x = 5.12$) NB : no working scores no marks even if the answer is correct.
*11			No + reason	4	M1 for intention to find the circumference eg $140 \times \pi$ (= 439.82...) A1 for circumference = 439 - 440 M1 (dep on M1) for a complete method shown that could arrive at two figures that are comparable eg "C"÷60×12 (=87.96..) , 90÷12×60 (=450) , 90×60÷"C" (12.27), "C"÷90×12 (=58.64..) C1 (dep on both M marks) for No and explanation that shows a correct comparison eg only 84 people could sit around the tables or that 13 tables are needed or that 480 cm is needed.

PAPER: 1MA0_2H					
Question	**Working**	**Answer**	**Mark**	**Notes**	
12	<table><tr><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>-7</td><td>-5</td><td>-3</td><td>-1</td><td>1</td><td>3</td></tr></table>	Straight line from (–2, –7) to (3, 3)	4	**(Table of values)** C1 for axes scaled and labelled 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 plotted from their table must be plotted correctly) A1 for correct line between $x = -2$ and $x = 3$ **(No table of values)** C1 for axes scaled and labelled 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 $y = 2x - 3$ drawn A1 for correct line between $x = -2$ and $x = 3$ **(Use of $y = $ mx+c)** C1 for axes scaled and labelled M1 for line drawn with gradient of 2 OR line drawn with a y intercept of –3 M1 for line drawn with gradient of 2 AND with a y intercept of –3 A1 for correct line between $x = -2$ and $x = 3$ SC : B2 for the correct line from $x = 0$ to $x = 3$	

Question		Working	Answer	Mark	Notes
13	(a)		65	5	M1 for splitting up the cross section into separate areas and a method to find the area of one part OR for splitting up the pool into smaller prisms and a method to find the volume of one small prism, e.g. a cuboid M1 (dep) for a complete method to find the area of the cross section [with correct dimensions] OR for a method to find the total volume of more than one correct prism M1 (dep) for a complete method to find the volume of the pool [with correct dimensions] (= 195) M1 for "195" × 1000 ÷ 50 (=3900) oe where "195" comes from a volume A1 cao
	(b)		C	1	B1 cao
*14		$1.025^2 = 1.050625$ 1.04×1.015 $\quad = 1.0556$	Bonus Saver with correct comparable values	4	M1 for a method to calculate 4% or 2.5% of 20000 (= 800 or 20800 or 500 or 20500) M1 for a method to calculate using a compound interest method, eg 1.025^2 oe or 1.04 followed by 1.015 oe A1 for 1.050625 or 1.0556 or 10556 or 556 or 21112 or 21012.5 or 1112 or 1012.5 C1 for a correct decision in a statement with two correct comparable values. **NB** all final money values can be rounded or truncated to nearest integer or left unrounded.

Question	Working	Answer	Mark	Notes
15	$3x + y = 30$ $x + 3y = 22$	8.50 4.50	4	M1 for forming two algebraic equations M1 for a 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 8.5(0) and 4.5(0)
16	$AC^2 = 5^2 + 3^2$ $AC = \sqrt{25 + 9}$ (=5.83) $\dfrac{5}{5.83} = \dfrac{DB}{3}$ $DB = \dfrac{5}{5.83} \times 3$ (= 2.57) $5 + 3 + 5.83 + 2.57 =$ **OR** $AC = \sqrt{25 + 9}$ (=5.83) $\tan A = \dfrac{3}{5}$ $A = 30.96$ $\sin 30.96 = \dfrac{DB}{5}$ $DB = 5 \times \sin 30.96$ (= 2.57) $5 + 3 + 5.83 + 2.57 =$	16.4	5	M1 for $(AC^2) = 5^2 + 3^2$ =34) M1 for $\sqrt{25 + 9}$ or $\sqrt{34}$ (=5.83) M1 for $\dfrac{5}{'5.83'} = \dfrac{DB}{3}$ or $DB \times AC = 5 \times 3$ M1 for $(DB =) \dfrac{5}{'5.83'} \times 3$ A1 for 16.4 to 16.41 **OR** M1 for $(AC^2) = 5^2 + 3^2$ (=34) M1 for $\sqrt{25 + 9}$ or $\sqrt{34}$ (=5.83) M1 for using a correct trig ratio in an attempt to find angle A or angle C, e.g. $\tan A = \dfrac{3}{5}$, $\sin A = \dfrac{3}{'5.83'}$, $\cos C = \dfrac{3}{'5.83'}$ M1 for using DB in a a correct trig ratio, e.g. $\sin '30.96' = \dfrac{DB}{5}$ A1 for 16.4 to 16.41

Question		Working	Answer	Mark	Notes
17			35°	4	M1 for *ABC* = 90 M1 for (*ACB* =) 180 – 90 – 25 (= 65) M1 for (*DBC* =) 180 – '65' – 80 (=35) A1 cao supported by working OR M1 for (*AOB* =) 180 – 2 × 25 (= 130) M1 for (*ADB* =) 130 ÷ 2 (=65) M1 for (*DAC* =) 180 – 65 – 80 A1 cao supported by working.
18	(a)	5 × 8 = 40 12.5 × 15 = 187.5 17.5 × 11 = 192.5 25 × 10 = 250 40 × 6 = 240 910 ÷ 50 = 18.2	18.2	4	M1 for *fx* consistently within interval including ends (allow 1 error) M1 consistently using appropriate midpoints M1 (dep on first M1) for Σ*fx* ÷ Σ*f* A1 for 18.2 cao
	(b)	$0 \le t < 10$ fd 0.8 $10 \le t < 15$ fd 3 $15 \le t < 20$ fd 2.2 $20 \le t < 30$ fd 1 $30 \le t < 50$ fd 0.3	Correct histogram	3	B3 fully correct histogram with vertical axis correctly scaled. (B2 for 4 correct blocks or 5 correct blocks with incorrect or no scale) (B1 for 2 correct blocks of different widths or any 3 correct blocks or correct FD values for at least 3 frequencies) eg fd of 0.8, 3, 2.2, 1, 0.3
19	(a)		0.3 0.3, 0.7, 0.3	2	B1 for 0.3 as first spin oe B1 for 0.3, 0.7, 0.3 in correct positions for second spin oe
	(b)		0.42	3	M1 for '0.3' × '0.7' or 0.7 × '0.3' (=0.21) M1 for '0.3' × '0.7 + 0.7 × '0.3 (OR M2 for $1 – 0.7^2 – 0.3^2$) A1 for 0.42 oe

Question	Working	Answer	Mark	Notes
20		1.85 and – 0.180	3	M1 for $\dfrac{--5 \pm \sqrt{-5^2 - 4 \times 3 \times -1}}{2 \times 3}$ (condone one sign error) M1 for $\dfrac{5 \pm \sqrt{37}}{6}$ (=1.8 to 1.85 or −0.18 to −0.181) A1 for answers in the ranges 1.8 to 1.85, and −0.18 to −0.181
21		8.52	5	M1 for $\dfrac{BD}{\sin 45} = \dfrac{7.4}{\sin 80}$ oe M1 for $(BD =) \dfrac{7.4}{\sin 80} \times \sin 45 \ (= 5.3133..)$ M1 for $5.8^2 + \text{'}5.31\text{'}^2 - 2 \times 5.8 \times \text{'}5.31\text{'} \cos 100$ M1 (dep) for correct order of evaluation or 72.5(73...) A1 for 8.51 – 8.52 OR M1 for $\dfrac{AD}{\sin(180 - 80 - 45)} = \dfrac{7.4}{\sin 80}$ oe M1 for $(AD =) \dfrac{7.4}{\sin 80} \times \sin(180 - 80 - 45) \ (= 6.15...)$ M1 for $7.4^2 + (\text{'}6.15\text{'} + 5.8)^2 - 2 \times 7.4 \times (\text{'}6.15\text{'} + 5.8) \times \cos 45$ M1 (dep) for correct order of evaluation or 72.5(7398...) A1 for 8.51 – 8.52

Question		Working	Answer	Mark	Notes
22	(a)	$\dfrac{(2x-3)(x-1)}{(x+6)(x-1)}$	$\dfrac{2x-3}{x+6}$	3	M1 for $(2x-3)(x-1)$ M1 for $(x+6)(x-1)$ A1 cao
	(b)	$\dfrac{mb-tv}{vb}=\dfrac{m-t}{R}$ $mbR-tvR=mvb-tvb$ $mbR-mvb=tvR-tvb$ $m(bR-vb)=tvR-tvb$ OR $\dfrac{m}{v}-\dfrac{t}{b}=\dfrac{m}{R}-\dfrac{t}{R}$ $\dfrac{m}{v}-\dfrac{m}{R}=\dfrac{t}{b}-\dfrac{t}{R}$ $\dfrac{mR-mv}{vR}=\dfrac{tR-tb}{bR}$ $\dfrac{m(R-v)}{vR}=\dfrac{tR-tb}{bR}$	$m=\dfrac{tv(R-b)}{b(R-v)}$	4	M1 for putting LHS over a common denominator with at least one correct numerator (ignore signs) or for showing an intention to multiply each term on both sides by R or v or b M1 for rearranging correctly to isolate terms in m M1 for factorising with common factor m from 2 terms A1 for $m=\dfrac{tv(R-b)}{b(R-v)}$ oe
*23			Yes, average speed could have been as high as 80.622...	5	B1 for 4535 or 4534.999... or 202.5 M1 for 4535 (oe) ÷ 202.5 M1 for ×3600 and ÷1000 A1 for 80.622... C1 (dep on first M1) for correct conclusion from their calculations

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

PAPER: 1MA0_2H			
Question		**Modification**	**Notes**
2		2 cm grid	
	(b)	8.4 changed to 8.5	
3	(b)	MLP – *x* changed to *y*	
4	(a)	2 cm grid	
	(b)	2 cm grid	
8		Table frequencies changed: 2 5 10 25 15 5 Grid – X axis 3 cm for 5 with an intermediate line Y axis 1.5 cm for 5	
11		No model – table top only drawn showing the diameter	
12		2 cm grid Braille axes put on grid and labelled	