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Mark Scheme (Results)

November 2017

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Non-Calculator) Paper 1H

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General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no 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.

Questions where working is not required: In general, the correct answer should be given full marks.
Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3 **Crossed out work**
This should be marked **unless** the candidate has replaced it with an alternative response.

4 **Choice of method**
If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line then mark both methods **as far as they are identical** and award these marks.

5 **Incorrect method**
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

6 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, 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.

7 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 or its context. (eg. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. 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 fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified 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).

10 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 all numbers within the range.

Guidance on the use of abbreviations within this mark scheme	
M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
1		2×2×3×3	M1 A1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error **or** 2,2,3,3,(1) 2×2×3×3 oe
2		14:21:42	P1 P1 P1 A1	for 2 out of 3 expressions in one letter eg from x, x+7 $2x$+14 **or** see a set of numbers to show interpretation of the relationships, eg 10, 17, 34 (dep) for sum of their 3 expressions =77 eg $x + x+7+2x+14 =77$ oe **or** 2 systematic correct trials including addition for a correct process to isolate their term in x **or** x=14 for ratio 14:21:42 oe
3	*CB* extended to form *CG*	Reasoning	B1 M1 C2 (C1	for 35 **or** 75 **or** 145 **or** 105 **or** *DEF* = 70, marked on the diagram or 3 letter description for 180-70-35 **or** 180-75-35 **or** a correct pair of angles that would lead to 75 or 70, eg *AFB* = 35 and *FAB* = 75 **or** *AFB* = 35 and *ABG* = 75 **or** *FBC* = 35 and *ABG* = 75 **or** *EDF* = 75 and *DEF* = 70 **or** *FDC* = 105 and *FBC* = 35 **or** *ABC* = 105 and *FBC* = 35 (dep on B1M1) All figures correct with all appropriate reasons stated. Angles must be clearly labelled or on the diagram. Full solution must be seen (dep on B1 or M1) for one reason clearly used and stated.) Corresponding angles are equal, alternate angles are equal, opposite angles in a parallelogram are equal, angles in a triangle sum to 180, angles on a straight line sum to 180, vertically opposite angles are equal, vertically opposite angles are equal, angles in a quadrilateral sum to 360, co-interior angles sum to 180, allied angles sum to 180, angles around a point sum to 360

Paper: 1MA1/1H						
Question	**Working**	**Answer**	**Mark**	**Notes**		
4		Daisy is wrong (supported)	P1 P1 A1 C1	for process to find area of any relevant circle ie $\pi\times4^2$ (=16π), $\pi\times7^2$ (=49π), $\pi\times10^2$ (=100π) **or** 7^2 and 4^2 for completed method to find shaded area eg "$\pi\times7^2$" – "$\pi\times4^2$" (=33π) **or** use of radii eg $7^2 - 4^2$ (=33) for 2 comparable figures, eg 33π and 100π **or** 33 and 100 **or** 103 to 103.7 and 314 to 314.2 **or** 103 to 103.7 and 104.6 to 104.8 statement eg No because it should be $\frac{33}{100}$ and their accurate figures Allow use of π = 3 or better		
5 (a)		365	M1 M1 A1	*fx* with *x* consistent within intervals eg 200 × 1 , 300 × 11 , 400 × 5 , 500 × 0 , 600 × 3, if 200, 3300, 2000, 0, 1800 are seen without working then condone 1 error (dep) $\Sigma fx \div \Sigma f$ eg "7300" ÷ 20 cao		
(b)		Comment	C1	for comment about outliers affecting mean		
6		Shows reasoning to reach *y*=3	M1 M1 M1 A1	forms equation eg $2x + 6 = 5x - 9$ isolates *x* and number terms $3x = 15$ substitutes "5" into side length eg 2 × 5 + 6 (=16) 48÷16=3 **or** 16×3=48	48÷3 (=16) forms equation $2x+6=$"16" **or** $5x - 9 =$ "16" isolates *x* and number terms $2x =$ "10" **or** $5x =$ "25" shows *x*=5 for both solutions	$3(2x + 6) = 48$ **or** $3(5x - 9) = 48$, condone missing bracket Isolates *x* and number terms 6x = "30" **or** $15x =$ "75" forms the second equation *x*=5 from 2 different equations.

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
7		Comment	B1	for correct mathematical comment eg line segments not a curve **or** should draw freehand **or** should not use a ruler, **or** should be a curve NB Do not accept statements about scale or plotting accuracy.
8		0.246, 0.$\dot{2}4\dot{6}$ 0.24$\dot{6}$, 0.24$\dot{6}$	M1 A1	for correct use of recurring symbol eg 0.24$\dot{6}$ = 0.24646… **or** 3 terms in the correct relative position cao
9		22.5	P1 P1 P1 P1 A1	for process to find James' speed eg 50÷2.5(=20) **or** 50 ÷ 150 ($=\frac{1}{3}$) for process to find James' time for 15 km eg 15 ÷ "20" (=0.75) **or** 15 ÷ $\frac{1}{3}$ (=45) for process to find Peter's time for 15 km eg "45" − 5 (=40) for process to find Peter's speed eg 15 ÷ "40" **or** 15 ÷ $\frac{"40"}{60}$ oe
10 (a)		10	B1	accept ±10
(b)		25	M1 A1	for $(\sqrt[3]{125})^2$ **or** $\sqrt[3]{125} = 5$ **or** $125^2 = 15625$ **or** $\sqrt[3]{125^2}$ cao

Paper: 1MA1/1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
11			Tea £1.40 Coffee £1.80	P1 M1 M1 A1	for setting up two appropriate equations eg $3t + 2c = 7.80$, $5t + 4c = 14.20$ for method to eliminate one variable, condone one arithmetic error for method to substitute found variable or start again Tea £1.4(0) and Coffee £1.8(0) with amounts linked to correct drinks
12	(a)	161 + 7 154 + 20	Box plot	M1 M1 A1	for method to find UQ (168) **or** highest value (174), may be implied by correct values plotted for showing a box and at least 3 correctly plotted values from 154, 161, 165, 168, 174 for fully correct box plot
	(b)	Med IQR Range Y11 165 7 20 Y7 157.5 10.5 24.5	Comparison	C1 C1	(ft) for comparison of the median (ft) for comparison of the spread NB: for award of both marks, at least one comparison must be in context. NB: figures need not be stated, but if they are they must be correct (ft)
13	(a)		120	P1 A1	for $\frac{4\times450}{15}$ **or** $\frac{4}{15}=\frac{x}{450}$ oe cao
	(b)		$\frac{165}{450}$	P1 A1	5.5 **or** 6.5 **or** 165 **or** $\frac{5\times450}{15}$ (=150) and $\frac{6\times450}{15}$ (=180) for $\frac{165}{450}$ oe

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
14	 $ky-y=x+kx$ $y(k-1)=x(1+k)$	$y=\frac{x(k+1)}{k-1}$	M1 M1 A1	$y+x=k(y-x)$ **or** $\frac{y+x}{y-x}=k$ oe For isolating x and y on opposite sides eg $ky-y=x+kx$ Completing correct algebraic reasoning to reach conclusion
15		Proof to reach $\frac{24}{55}$	M1 M1 A1	for $100x = 43.636\ldots$ $(43.\dot{6}\dot{3})$ **or** $10x = 4.3636\ldots$ $(4.\dot{3}\dot{6})$ and $1000x = 436.36\ldots.(436.\dot{3}\dot{6})$ (dep) for finding difference that would lead to a terminating decimal for completing algebra to reach $\frac{24}{55}$
16		$\frac{7}{3}$	M1 M1 A1	for $y = k\sqrt[3]{x}$ oe **or** $\frac{7}{6}=\sqrt[3]{8}\,k$ oe for $k=\frac{7}{6\times\sqrt[3]{8}}$ oe for $\frac{7}{3}$ oe
17		Completes proof	M1 C1	Expands both expressions eg $\frac{1}{2}(n^2+n+n^2+n+2n+2)$ **or** n^2+n and $n^2+n+2n+2$ **or** factorises $\frac{1}{2}(n+1)(n+n+2)$ Completes proof with explanation and reference to $(n+1)^2$

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
18		Correct enlargement	B2 (B1	Correct enlargement (-1,-1.5), (-1,-3.5) (-2,-1.5) correct size, correct orientation in incorrect position **or** 2 out of 3 vertices correctly placed)
19		$y = 2x + 36$	P1 P1 P1 A1	starts process, eg by rearranging to find gradient, eg $y = 6 - \frac{x}{2}$ **or** $\frac{-1}{2}$ **or** positions of *B* and *E* complete process to find position of *A* **or** uses $\frac{-1}{m}$ to find the gradient of **M** complete process to find equation of **M** $y = 2x + 36$ oe
20		$1+\sqrt{2}$	B1 P1 P1 A1	for a value for a known trigonometric ratio stated for process to form 2 equations in *a* and *b* **or** one correct value stated for complete process to solve to reach $a = 2$ and $b = 1$ for $1+\sqrt{2}$ oe

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
21	$\frac{6-\sqrt{8}}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1}$ $=\frac{6\sqrt{2}+6-\sqrt{8}\sqrt{2}-\sqrt{8}}{2-1}$ $=6\sqrt{2}+6-4-2\sqrt{2}$	$2 + 4\sqrt{2}$	M1 M1 A1	for correct first step eg multiplies numerator and denominator by $\sqrt{2}+1$ condone missing brackets (dep) for expansion of numerator with 4 terms correct with or without signs **or** 3 out of exactly 4 terms correct for $2 + 4\sqrt{2}$ oe **or** for stating $a = 2$ and $b = 4$
22		2, 14.5	P1 A1 P1 A1 C1	for scale factor of $\frac{12}{3}$ **or** $\frac{3}{12}$ **or** $\frac{15}{12}$ **or** $\frac{12}{15}$ **or** $\frac{8}{12}$ **or** $\frac{12}{8}$ **or** $\frac{15}{8}$ oe **or** correctly identifies 2 pairs of corresponding sides for $x=2$ for complete method to find other value for x eg $\frac{15}{8}\times 12 - 8$ for $x = 14.5$ Describes both assumptions for similarity
23		$x > 2$	P1 M1 M1 M1 A1	for process to derive algebraic expressions for area of both rectangle and triangle eg $(x - 1)(3x - 2)$ and $(2x \times x) \div 2$ (condone missing brackets) for method to rearrange inequality to $2x^2-5x+2> 0$ oe providing in the form $ax^2 + bx + c >0$ for a correct method to solve $2x^2-5x+2>0$ for establishing critical values 2 and $\frac{1}{2}$ $x > 2$

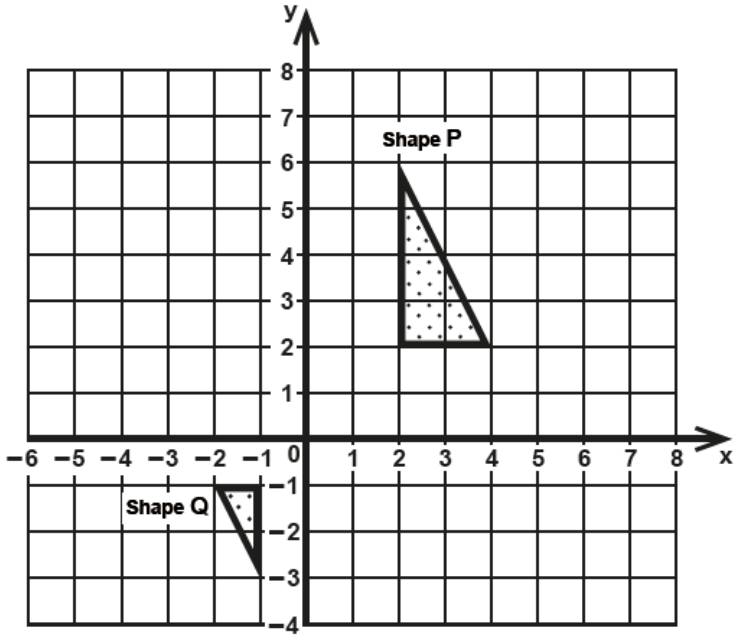
Modifications to the mark scheme for Modified Large Print (MLP) papers.

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: 1MA1_1H			
Question		**Modification**	**Mark scheme notes**
3		Diagram enlarged. Angles moved outside the angle arcs and the angle arcs made smaller. Arrow heads made longer and more obvious. Wording added 'AD is parallel to BC. AB is parallel to EC.'	Standard mark scheme
4		Diagram enlarged. Cross changed to a solid dot. Shading changed to dotty shading.	Standard mark scheme
5		Frequency column has been extended to allow for working.	Standard mark scheme
6		Diagram enlarged. Wording added 'All marked angles are right angles'. MLP only: x changed to e, y changed to f. Braille only: will label the corners of the rectangle A to D and will give information about the rectangle.	Standard mark scheme with x replaced by e, and y replaced by f.
7		Diagram enlarged. Crosses changed to solid dots.	Standard mark scheme

PAPER: 1MA1_1H			
Question		**Modification**	**Mark scheme notes**
12		Numbers on the table changed: least height changed from 154 to 155, lower quartile changed from 161 to 160 and interquartile range changed from 7 to 10.	
12	(a)	Diagram enlarged and labelled 'Diagram (i)'. Diagram (ii) put below Diagram (i) on the same page in the diagram book. Axis label moved to the left of the horizontal axis.	M1 for method to find UQ (168) or highest value (174), may be implied by correct values plotted M1 for showing a box and at least 3 correctly plotted values from 155, 160, 165, 170, 175 A1 fully correct box plot
	(b)	Diagram enlarged and labelled 'Diagram (ii)'. Axis label moved to the left of the horizontal axis. Points on the box plot changed to: 145, 155, 160, 165 and 170.	Med IQR Range Y7 160 10 25 Y11 165 10 20 otherwise standard mark scheme using these figures
14		MLP only: x has been changed to e and y has been changed to f.	Standard mark scheme with x replaced by e, and y replaced by f.

PAPER: 1MA1_1H			
Question		**Modification**	**Mark scheme notes**
18		Question reversed. Wording added 'It shows Shape P and Shape Q given on a grid.' Question changed to 'Describe fully the transformation that maps Shape P onto Shape Q.' Three answer lines provided. Shape Q drawn on the grid. Shape P and Shape Q labelled. Shape P has been moved down a square so that the new coordinates of Shape P are (2,2) (4,2)(2,6). New coordinates of Shape Q are (-1,-1)(-2,-1)(-1,-3). X axis has been reduced so it goes from -6 to 8; Y axis has been reduced so it goes from -4 to 8.  	B1 for centre of enlargement (0,0) B1 for sf given as $-\frac{1}{2}$

PAPER: 1MA1_1H			
Question		**Modification**	**Mark scheme notes**
19		Diagram enlarged.	Standard mark scheme
20		Table has been turned to vertical format	Standard mark scheme
22		Diagram enlarged. Wording changed to 'It shows two triangles CDA and BEA that are similar.' Wording added 'CB equals x cm, BA = 8 cm, AE = 12 cm and ED = 3 cm.'	Standard mark scheme
23		Diagrams enlarged. Braille only: will add information about the diagram.	Standard mark scheme

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