Mark Scheme (Results)

Summer 2018

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, mark both methods **then award the lower number of marks.**

5 Incorrect method

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 for your Team Leader to check.

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.

11 Number in brackets after a calculation

Where there is a number in brackets after a calculation E.g. 2 × 6 (=12) then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

12 Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas E.g. “12” × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

13 Word in square brackets

Where a word is used in square brackets E.g. [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

14 Misread

If a candidate misreads a number from the question. Eg. uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

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	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1 (a)	$\frac{95}{28}$	M1	for a method to add using common denominators with at least one fraction correct (matching numerator with common denominator) eg $\frac{60}{28}+\frac{35}{28}$ **or** $(2)\frac{4}{28}+(1)\frac{7}{28}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	$\frac{95}{28}$ oe eg $3\frac{11}{28}$	
(b)	$1\frac{3}{5}$	M1	for $\frac{6}{5}\times\frac{4}{3}$ **or** $\frac{24}{20}\div\frac{15}{20}$ **or** $\frac{8}{5}$ oe eg $1\frac{9}{15}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	cao	
2	140	P1	for beginning to solve the problem eg $50 \div 5 \times 8$ (= 80) **or** 14 : 8 : 5 oe **or** 14 : 8 and 8 : 5 oe (linked)	80 may be seen in the ratio 80 : 50
		P1	for a full process to solve the problem eg "80" $\div 4 \times 7$ **or** $\frac{50}{5}\times$ "14" **or** 140 : 80 : 50	
		A1	cao	If 140 clearly identified as houses in working award full marks

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3	30	P1	for full process to find the number of bags sold eg 5 × 1000 ÷ 250 (= 20) **OR** for process to find selling price of 1 kg of sweets eg 0.65 × 4 (= 2.60)	This could be by repeated addition Calculations can be in £ or pence
		P1	for [number of bags] × 0.65 **or** "20" × 0.65 (= 13) **or** "2.60" × 5 (= 13) **OR** for 10 ÷ "20" oe (= 0.50) **OR** for 0.65 × 4 (= 2.60) **and** 10 ÷ 5 (= 2)	[number of bags] can only come from 5 × 10 ÷ 250 (= 0.2) or 5 × 100 ÷ 250 (= 2) or 5 ÷ 250 (= 0.02)
		P1	(dep on previous P1) for a process to find the percentage profit eg ("13" – 10) ÷ 10 × 100 **or** (0.65 – "0.50") ÷ "0.50" × 100 **or** ("2.60" – "2") ÷ "2" × 100 **OR** "13" ÷ 10 ×100 (= 130) oe	3/10 or 0.3 is not enough but should be awarded 2 marks Award P3 for 130(%)
		A1	cao	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4 (a)	Estimated value	P1	for using a rounded value in a correct process eg 3000 ÷ 15 **or** 15 × 8 **or** 20 × 8	Their rounded value must be used in a calculation Rounding may appear after a correct process eg 15.12 × 8 = 120.96 ≈ 100 followed by eg 3069.25 ÷ 100
		P1	for a full process to find the number of days eg "3000" ÷ "15" ÷ "10" (= 20) **or** "3000" ÷ "15" ÷ 8 (= 25)	Accept 3069.25 ÷ 15.12 ÷ 8 oe
		A1	for a correct answer following through their rounded values	
(b)	Explanation	C1	eg less days required **or** it doesn't affect the answer because I would still round 16.27 down to 15 (or up to 20)	Refers to time taken

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
5 (a)	isosceles triangle, base 6 cm, height 4 cm	M1	for drawing an isosceles triangle **or** for drawing a triangle of base 6cm and height 4cm	Accept a freehand drawing Only a single triangle is acceptable; do **not** accept any attempted nets or 3-D diagrams
		A1	for a fully correct diagram	Condone a perpendicular drawn from base to vertex
(b)	96 cm^2	M1	for a method to find the area of a triangular face eg ½ × 6 × 5 (= 15)	
		M1	(dep) for finding the total surface area eg 4 × "15" + 6 × 6	
		A1	for a numerical answer of 96	Ignore incorrect or absent units for this mark
			SC B1 for an answer of 84 if M0 scored	[The SC is from: 4 × ½ × 6 × 4 + 6 × 6]
		B1	cm^2	Ignore incorrect or absent numerical answer for this mark

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
6	(22, 20)	P1	for process to find width or height of diagram eg 38 − 6 (= 32) **or** 36 – 7 (= 29)	Figures may be shown on the diagram
		P1	for process to find length of side of square eg "32" ÷ 4 (= 8) **or** process to find half width of diagram eg "32" ÷ 2 (= 16)	
		P1	for process to find x coordinate eg 6 + 2 × "8" (= 22) **or** 6 + "16" (= 22) **or** (6 + 38) ÷ 2 (= 22)	If (6 + 38) ÷ 2 leads to an answer other than 22, award P2 only
		P1	for process to find y coordinate eg 36 – 2 × "8" (= 20) **or** 36 – "16" (= 20) **or** 7 + "8" + "29" – 3 × "8" (= 20)	
		A1	cao SC: award 4 marks for (20, 22)	Award for P3 for (22, y) or (x, 20) or x = 22 or y = 20
7	rotation 180° about (−1, −2) **or** enlargement sf −1 centre (−1, −2)	B2	rotation 180° about (−1, −2) **or** enlargement sf −1 centre (−1, −2)	Condone missing brackets but do not accept centre written as a vector
		(B1	rotation 180° **or** rotation about (−1, −2) **OR** enlargement sf −1 **or** enlargement centre (−1, −2)) Award no marks for the description if more than one transformation is given	Do not accept 'half turn' for 'rotation 180°' Ignore references to clockwise and anticlockwise
			SC B1 for fully correct diagram if B0 scored	Triangles at (−3, 1), (−5, 1), (−4, 3) and (−3, −5), (−5, −5), (−4, −7)

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
8	216	P1 P1 P1 A1	for process to work with ratio eg $72 \div (3 + 4 + 5)$ (= 6) **or** $72 \div 12$ (= 6) for process to find length of base or height of triangle eg $3 \times$ "6" (= 18) **or** $4 \times$ "6" (= 24) **OR** process to find area scale factor eg "6" × "6" (= 36) complete process to find the area of the triangle eg $\frac{1}{2} \times$ "18" × "24" **or** $\frac{1}{2} \times 3 \times 4 \times$ "6"^{2} cao	
9 (a)	6	B1	cao	Accept ±6
(b)	1	B1	cao	
(c)	$\frac{1}{9}$	M1 A1	for evidence of working with a cube root eg $\sqrt[3]{27}$ or $\sqrt[3]{729}$ **OR** evidence of working with a reciprocal eg $\frac{1}{27^{2/3}}$ or $\left(\frac{1}{27}\right)^{\frac{2}{3}}$ cao	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
10 (a)	Box plot drawn	B3	for a fully correct box plot	Condone the lack of a vertical marker at the end of the tails
		(B2	for at least 3 correctly plotted values including box and whiskers/tails)	Note that a box must be present, as must "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)	60	M1	for a method to find ¾ of 80 eg 20 + 20 + 20 or ¾ × 80	
		A1	cao	
11	90 – 2x	M1	for identifying an unknown angle eg $BAO = x$, $AOB = 180 - 2x$, $OBC = 90$, $ABC = 90 + x$	Could be shown on the diagram alone
		M1	full method to find the required angle eg a method leading to $180 - x - x - 90$	Needs to be an algebraic method Accept $x + x + 90 + y = 180$ for M2
		A1	for 90 – 2x	
		C2	(dep M2) full reasons for their method, from base angles in an <u>isosceles triangle</u> are equal <u>angles</u> in a <u>triangle</u> add up to 180° a <u>tangent</u> to a circle is perpendicular to the <u>radius (diameter)</u> <u>angles</u> on a straight <u>line</u> equal 180° the <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u>	Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked do not credit.
		(C1	(dep M1) for a <u>tangent</u> to a circle is perpendicular to the <u>radius (diameter)</u>)	Apply the above criteria

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12	Statement supported by algebra	B1	writing a general expression for an odd number eg $2n+1$	Could be $2n - 1$, $2n + 3$, etc
		M1	(dep) for expanding ("odd number")^2 with at least 3 out of 4 correct terms	Note that $4n^2 + 4n + 2$ or $2n^2 + 4n + 1$ in expansion of $(2n + 1)^2$ is to be regarded as 3 correct terms
		A1	for correct simplified expansion, eg $4n^2 + 4n + 1$	
		C1	(dep A1) for a concluding statement eg $4(n^2 + n) + 1$ (is one more than a multiple of 4)	
13	5	M1	for $\sqrt{40}$ **or** $\sqrt{90}$ **OR** $2\sqrt{2}$ **or** $3\sqrt{2}$	
		M1	for $2\sqrt{10}$ **or** $3\sqrt{10}$ **or** $\sqrt{4}\times\sqrt{10}$ **or** $\sqrt{9}\times\sqrt{10}$ **or** $\sqrt{4\times10}$ **or** $\sqrt{9\times10}$ **OR** $2\sqrt{2}+3\sqrt{2}$	
		A1	cao	Answer of $5\sqrt{10}$ from correct working gets M2 A0

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
14	$y = \frac{100}{9x^4}$	P1	for setting up a correct proportional relationship, eg $d \propto x^2$ **or** $d = kx^2$	Condone the use of '$\propto$' instead of '=' for the four P marks
		P1	for setting up a second proportional relationship, eg $y \propto \frac{1}{d^2}$ **or** $y = \frac{K}{d^2}$	
		P1	(dep P1) for a process to find one of the constants of proportionality eg $24 = k \times 2^2$ ($k = 6$) **or** $4 = K \div 100$ ($K = 400$)	
		P1	full process to find y in terms of x eg $y = \frac{"400"}{("6"x^2)^2}$ oe	Both constants must come from a correct process
		A1	$y = \frac{100}{9x^4}$ oe	Expression must have been simplified, but could be given other equivalent ways eg $y = 11.111.. x^{-4}$

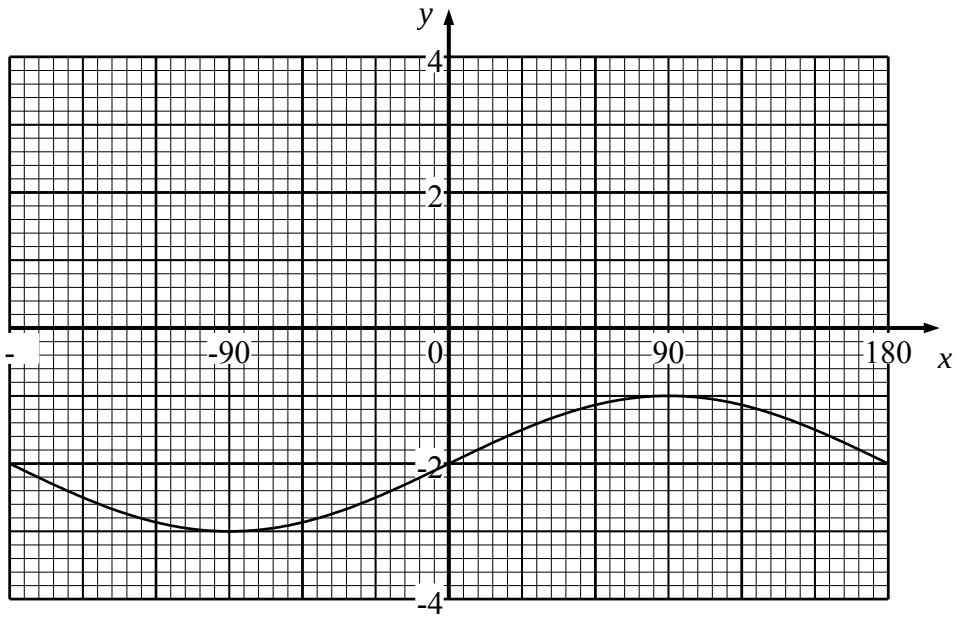
Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15 (a)	$(a - b)(a + b)$	B1	cao	Accept reversed brackets
(b)	$12(x^2 + 1)$	M1	for using 'a' = $x^2 + 4$ and 'b' = $x^2 - 2$ **OR** multiplying out both brackets, at least one fully correct	Correct 4 terms if not simplified or 3 terms if simplified
		M1	(dep) for a correct expression for ('a' + 'b')('a' – 'b') with no additional brackets, simplified or unsimplified eg $(x^2 + 4 + x^2 - 2)(x^2 + 4 - x^2 + 2)$ **or** $(2x^2 + 2) \times 6$ **OR** ft for a correct expression without brackets, simplified or unsimplified eg $x^4 + 8x^2 + 16 - x^4 + 4x^2 - 4$	
		A1	for $12(x^2 + 1)$ **or** $12x^2 + 12$ oe	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16	0.12	P1	for process to start eg $(1 - 0.2) \div (3 + 17)$ $(= 0.04)$ **or** $(3 + 17) \div (1 - 0.2)$ oe $(= 25)$ **or** $(100 - 20) \div (3 + 17)$ $(= 4)$ **or** 3×4 $(= 12)$ and 17×4 $(= 68)$	Just $1 - 0.2 = 0.8$ is **not** sufficient for P1 May be seen in a ratio
		P1	full process to find the required probability eg $3 \times$ "0.04" **or** $\frac{3}{20} \times (1 - 0.2)$ oe **or** $3 \div$ "25" or $3 \times$ "4" $\div 100$	
		A1	oe	0.12 using incorrect probability notation gets P2
17	$\frac{3x + 1}{2x}$	M1	for $(3x + 1)(x - 3)$ **or** $2x(x - 3)$	Accept $(2x + 0)$ for the first two marks but not for the final answer
		A1	for $(3x + 1)(x - 3)$ **and** $2x(x - 3)$	
		A1	$\frac{3x + 1}{2x}$ oe	
18	Graph drawn	C2	for graph translated by -2 in the y direction	Key points: $(-180, -2)$, $(-90, -3)$, $(0, -2)$, $(90, -1)$, $(180, -2)$
		(C1	for a graph translated in the y direction **OR** for a correct graph through four of the five key points)	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	$b = \frac{2}{3}a + 2$	P1	for process to rearrange the equation to give y in terms of x eg $y = \frac{7-3x}{2}$ **or** $y = -\frac{3}{2}x + \left(\frac{7}{2}\right)$ **or** $m = -\frac{3}{2}$	
		P1	for using their gradient in $mn = -1$	
		P1	for showing a process to find the gradient of PQ eg $\frac{b-4}{a-3}$ **OR** for substituting $x = 3$ and $y = 4$ in $y = \text{“}\frac{2}{3}\text{”}x + c$	
		P1	(dep P3) for forming an equation in a and b eg $\frac{b-4}{a-3} = \text{“}\frac{2}{3}\text{”}$ **or** $b = \text{“}\frac{2}{3}\text{”}a + \text{“2”}$ **OR** correct equation in terms of x and y eg $y = \frac{2}{3}x + 2$	$y - 4 = \frac{2}{3}(x-3)$ gets P4
		A1	for $b = \frac{2}{3}a + 2$ oe	Accept 0.66 or 0.67 oe for 2/3

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	2, 3, 4	M1	for method to solve $3n + 2 \leq 14$ eg $n \leq (14 - 2) \div 3$ oe	This could be shown within an equation rather than an inequality at this stage
		M1	for complete method to rearrange $\frac{6n}{n^2 + 5} > 1$ to the form $an^2 + bn + c$ (< 0)	For the 2rd and 3rd M marks condone no '< 0' and condone use of incorrect inequality signs or '='
		M1	for method to begin to solve $n^2 - 6n + 5$ (< 0) eg $(n \pm 5)(n \pm 1)$ (< 0)	Accept $\frac{--6 \pm \sqrt{(-6)^2 - 4 \times 1 \times 5}}{2 \times 1}$ (condone one sign error)
		M1	(dep on previous M2) for $n > 1$ and $n \leq 4$ **or** $1 < n < 5$	Must come from correct working Could be shown on a number line
		A1	(dep M4) cao	
			Alternative method	
		M1	for method to solve $3n + 2 \leq 14$ eg $n \leq (14 - 2) \div 3$ oe **OR** for $3 \times 4 + 2 = 14$	This could be shown within an equation rather than an inequality at this stage
		M3	for trials with 1, 2, 3 and 4 in the quadratic inequality, correctly evaluated	The values from the trials may be given as improper fractions eg $\frac{24}{21}, \frac{18}{14}, \frac{12}{9}, \frac{6}{6}$
		(M2	for trials with three of 1, 2, 3 and 4, correctly evaluated)	
		(M1	for trials with two of 1, 2, 3 and 4, correctly evaluated)	
		A1	(dep M4) cao	

Q18

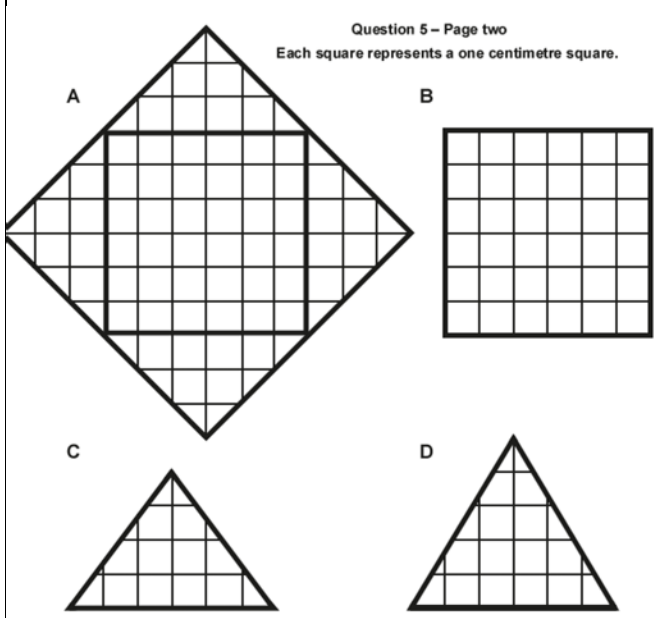


Modifications to the mark scheme for Modified Large Print (MLP) papers.

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**
5	(a)	Model and a diagram provided. Diagram enlarged. Dashed lines made longer and thicker. Dotted lines made more obvious. Question reversed: Four different options of the front view of the pyramid have been provided. The pyramid has been put on page one for question 23(a) and the four shapes labelled A to D have been put on page two for question 23(a). Question changed to 'Look at the model or at the diagrams for Question 23(a) in the Diagram Book. They are shown on two pages in the Diagram Book. Page one shows a solid square-based pyramid, VABCD. The base of the pyramid is a square of side 6 cm. The height of the pyramid is 4 cm. M is the midpoint of BC and VM = 5 cm. Page two for Question 23 shows four shapes, labelled A, B, C and D. Each square represents a one centimetre square. Which shape shows the accurate front elevation of the pyramid from the direction of the arrow?' [See below for diagram]	Award 1 mark for an answer of D Award 2 marks for an answer of C NB: Accept any other unambiguous indication of the answer such the diagram indicated by circling etc.

Paper: 1MA1/1H			
Question		**Modification**	**Mark scheme notes**
5			See above for question 5 mark scheme.

Paper: 1MA1/1H			
Question		**Modification**	**Mark scheme notes**
6		Diagram enlarged. Crosses changed to solid dots. Wording changed to 'It shows a pattern made from four identical squares.'	Standard mark scheme
7		Question reversed. Diagram enlarged. Shading changed to dotty shading. Shapes R and S also drawn on the grid. Shapes labelled, shape R, shape S and shape T. Axis extended to go from minus 8 to 5. One unlabelled shape is provided. Wording added 'A cut out shape is available if you wish to use it.' New question wording 'Look at the diagram for Question 7 in the Diagram Book. It shows shape T, shape R and shape S on a grid. A cut out shape is available if you wish to use it. (a) Describe the single transformation that maps shape T to shape R. [1 mark] (b) Describe the single transformation that maps shape T to shape S. [1 mark].	(a) B1 for "a reflection in the line $x = -1$" (b) B1 for "rotation 180° about $(-1, -2)$" or "enlargement sf −1 centre $(-1, -2)$" Note: award either 0, 1 or 2 for Q7; do not award separate marks for (a) and (b) on MLP scripts.
10		Values in the table changed: Least height changed from 133 cm to 135 cm. Upper quartile changed from 157 cm to 160 cm. Median changed from 151 cm to 150 cm.	
10	(a)	Diagram enlarged. Wording added 'It shows a grid.' The axis label to the left of the horiz.axis.	Standard mark scheme
10	(b)	Question wording changed to, 'Work out an estimate for the number of these girls with a height between 135 cm and 160 cm'.	Standard mark scheme

Paper: 1MA1/1H			
Question		**Modification**	**Mark scheme notes**
11		Diagram enlarged. Dot at O made bigger. Dashed line added from OB and an angle arc has been marked labelled x^o.	Standard mark scheme
15	(a)	Braille only: *a* changed to *q* and *b* changed to *r*.	Standard mark scheme with *a* changed to *q* and *b* changed to *r* for Braille.
15	(b)	*x* changed to *y* – MLP only.	Standard mark scheme with *x* changed to *y* – MLP only.
18		Diagram enlarged. Wording changed to 'It shows'.	Standard mark scheme, but apply normal tolerance for MLP papers in taking readings.

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