



Pearson
Edexcel

Mark Scheme (Results)

November 2019

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. $2 \times 6 (=12)$ 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" \times 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] \times 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 awarded for a fully correct statement(s) with no contradiction or ambiguity
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	1080	M1	for method to write one number as a product of prime factors (condone one division error in method chosen), eg. one complete factor tree or 2, 2, 3, 3, 3 or 2, 2, 2, 3, 5 or for listing at least 5 multiples of either number (condone one error) or for any common multiple ($\neq 1080$), eg. 12960 ($= 108 \times 120$)	Accept first 5 multiples if all correct or one error in the first 6 multiples For the list not containing 1080, accept first 5 correct multiples or one error in the first 6 multiples
		M1	for method to write both numbers as a product of prime factors (condone a total of one division error) eg. two complete factor trees or 2, 2, 3, 3, 3 and 2, 2, 2, 3, 5 or lists of multiples of the two numbers, at least 5 of each, one of which includes 1080	
		A1	cao SC: B2 for any product that would lead to 1080, eg. $2^3 \times 3^3 \times 5$ or $12 \times 9 \times 10$	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
2	2 (supported)	P1 P1 P1 A1	for a process to find the number of men, eg. $(60 \div 2) \div 3 (= 10)$ for a process to find the number of children, eg. $60 - "30" - "10" (= 20)$ for a start of a process to find the value of n , eg. $(“20” : “10”) \div 5$ or $20 : 10 = 10 : 5$ or $“20” \div “10”$ for 2 with supportive working	 $60 \div 3 = 20$ scores no marks Any ratio must come from correct processes to find the number of children and the number of men Award 0 marks for 2 with no correct supportive working Award full marks for 2 : 1 given as a final answer from correct supportive working
3	$2 \frac{1}{3}$	M1 M1 A1	for either $\frac{7}{4}$ oe or $\frac{4}{3}$ oe for method to find the product, eg. $\frac{7 \times 4}{4 \times 3}$ or $\frac{21 \times 16}{12 \times 12}$ oe or for $\frac{28}{12}$ or $\frac{7}{3}$ oe for $2 \frac{1}{3}$ or an equivalent mixed number	
4	perpendicular line constructed	C2 (C1	for a fully correct construction with all relevant arcs drawn for a perpendicular line drawn from P to the line CD or all relevant arcs drawn)	Perpendicular line segment between P and CD must be within guidelines Accept dotted lines

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
5	93	M1 M1 M1 A1	for method to find angle ACB , eg. $180 - 75 - 51 (= 54)$ (dep M1) for method to use the ratio, eg. $"54" \div (2 + 1) (= 18)$ for complete method, eg. $180 - 51 - "18" \times 2$ or $75 + "18"$ oe cao	Angles may be shown on diagram but must not be ambiguous eg. M0 for angle of 54° shown in the wrong place
6	No (supported)	P1 P1 C1	for process to find total weight of the 4 red bricks, eg. $5 \times 4 (= 20)$ or for process to find total weight of the 5 blue bricks eg. $9 \times 5 (= 45)$ for process to find total weight of all 10 bricks, eg. $"20" + "45" + 6 (= 71)$ No with correct supporting evidence Acceptable examples No, it is 7.1 She is wrong, it is 0.1 more No, (the total weight is) 71 not 70 Not acceptable examples Yes No, it is 71	May be seen next to statements 20 must be clearly referenced to the red bricks. $5 + 9 + 6 = 20$ gets no marks Candidates working in grams will need to give 7100 and 7000 for example as comparable figures

Paper: 1MA1/1H						
Question	Answer	Mark	Mark scheme	Additional guidance		
7	(a)		p^{10}	B1	cao	
	(b)		$2x^4y^2$	M1	for any two of $12 \div 6 (= 2)$, $x^{7-3} (= x^4)$, $y^{3-1} (= y^2)$ in a single product or written as a fraction with complete and correct cancelling of at least two terms	
				A1	cao	
8	(i)		Distance in the range 20 to 23	P1	for a process to draw a bearing of 070° , eg. a line drawn 70° from the North line at P	Accept a line of any length as long as the intention is clear.
	(ii)		Bearing in the range 317 to 330	P1	for a process to work out the distance PQ , eg. $12 \times 1.5 (= 18)$	
				P1	(dep previous P1) for the process to use the given scale, eg. " $18" \div 4 (= 4.5 \text{ cm})$	Award P3 for Q shown in the correct place on the diagram. 4.5 scores 2 marks provided there is a link to $12 \times 1.5 (= 18)$
				A1	(dep P3) for distance in the range 20 to 23	Award no marks if no supportive processes
				A1	(dep P3) for bearing in the range 317 to 330	Award no marks if no supportive processes Award A0A0 if Q is not in the correct place

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
9	(a)	21.6	M1 for a method using distance = speed \times time, eg. $72 \times \frac{18}{60}$ or 7.2 km in 6 minutes, so 7.2×3 oe partitioning method	Accept 72×18
		A1 for 21.6 oe		
	(b)	No (supported)	M1 for a method to convert 20 m/s to km/h or 72 km/h to m/s, eg. $20 \times \frac{3600}{1000}$ (= 72) or $72 \times \frac{1000}{3600}$ (= 20)	
C1 for No since 72 km/h = 20 m/s oe				
10	(a)	cf graph through (40, 5), (60, 25), (80, 35), (100, 38) and (120, 40)	C2 for a complete and accurate cf graph	May be a cumulative frequency curve or a cumulative frequency polygon Ignore any graph drawn to the left of the first point If histograms drawn, plots must be identified
		(C1 for at least 4 or 5 cf values plotted correctly)		
		SC: B1 for 4 or 5 points plotted not at end but consistently within each interval and joined provided no gradient is negative		
	(b)	answer in range 21 to 28	M1 for UQ in the range 66 to 70 or LQ in the range 42 to 46 or ft their cf graph	
			A1 for answer in range 21 to 28 or ft their cf graph	
	(c)	answer in the range $\frac{19}{40}$ to $\frac{24}{40}$	M1 for finding the difference between readings taken from the cf axis at points from a mark of 50 and a mark of 90 or ft their graph (if possible)	
A1 for an answer in the range $\frac{19}{40}$ to $\frac{24}{40}$ or ft their cf graph			Accept any equivalent fraction, decimal from 0.475 to 0.6 or percentage from 47.5% – 60%	

Paper: IMA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
11	72	M1 A1	for $\frac{5}{30} = \frac{12}{p}$ oe, eg $\frac{12}{p} \times 30 = 5$ or $12 \div \frac{5}{30}$ or $5 : 30 = 12 : p$ or 1 in 6 ($30 \div 5$) counters are yellow, so $12 \times "6"$ or using equivalent ratios to $5 : 30$, eg. $2 : 12$ and $10 : 60$ and adding to give $2 + 10 : 12 + 60$ cao	
12	Mistake identified	C1	for a correct mistake identified Acceptable examples all three terms should be multiplied by 2 and not just two of them the 5 should be multiplied by 2 it should be $2 \times T = q + 2 \times 5$ should subtract 5 first (before multiplying by 2) Not acceptable examples Should remove the 5 first $2 \times T$ should be $2T$ should have got rid of the denominator	Accept answers showing a correct first step
13 (a)	$\frac{17x + 2}{3x(x + 1)}$	M1 A1	for a correct common denominator with at least one correct numerator eg. $\frac{5 \times 3x}{3x(x+1)} + \frac{2(x+1)}{3x(x+1)}$ for a single simplified fraction, eg. $\frac{17x+2}{3x(x+1)}$ or equivalent eg. $\frac{17x+2}{3x^2+3x}$	$\frac{15x+2(x+1)}{3x(x+1)}$ gets M1 only
(b)	$(x + y)(x + y + 3)$	B1	cao	

Paper: IMA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
14	5	P1 P1 P1 A1	<p>for process to find the area of the triangle, eg. $0.5 \times (x + 4)(x - 2)$ oe OR for process to find the area of rectangle and 27.5×2, eg. $(x + 4)(x - 2)$ and 55</p> <p>(dep P1) for process to expand the brackets and derive a quadratic equation, eg. $x^2 + 4x - 2x - 8 = 55$ or $0.5(x^2 + 4x - 2x - 8) = 27.5$ oe</p> <p>(dep P2) for complete process to solve the quadratic equation $x^2 + 2x - 63 = 0$ eg $(x - 7)(x + 9) (= 0)$ or $\frac{-2 \pm \sqrt{2^2 - 4 \times 1 \times -63}}{2 \times 1}$ or $(x + 1)^2 - 1 - 63 (= 0)$</p> <p>cao</p> <p>SC: B1 for $x^2 + 4x - 2x - 8 = 27.5$</p>	<p>Trial and improvement methods must be fully correct identifying the value of x as 7 (3 marks) or the shortest side as 5 (4 marks)</p> <p>An answer of 5 with no supportive working gets no marks</p>

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
15	$\frac{414}{990}$	M1 M1 A1	for $(x =) 0.41818\dots$ or $(10x =) 4.\dot{1}8$ or $4.1818\dots$ or $(100x =) 41.\dot{8}1$ or $41.818\dots$ or $(1000x =) 418.\dot{1}8$ or $418.18\dots$ for using two recurring decimals with a terminating decimal difference, eg. $(1000x - 10x =) 418.\dot{1}8 - 4.\dot{1}8$ or $418.18\dots - 4.1818\dots (= 414)$ for $\frac{414}{990}$ oe, eg $\frac{23}{55}$	Accept $(100x - x =) 41.\dot{8}1 - 0.4\dot{1}8$ or $41.818\dots - 0.41818\dots (= 41.4)$ $\frac{41.4}{99}$ must be simplified to gain the accuracy mark
16 (a)	$2\sqrt{11}$	M1 A1	for method to multiply numerator and denominator by $\sqrt{11}$ or a multiple of $\sqrt{11}$, eg $\frac{22}{\sqrt{11}} \times \frac{\sqrt{11}}{\sqrt{11}}$ for $2\sqrt{11}$	
(b)	$\frac{6 + \sqrt{3}}{11}$	M1 M1 A1	for method to multiply numerator and denominator by $2\sqrt{3} + 1$ or a multiple of $2\sqrt{3} + 1$, eg $\frac{\sqrt{3}}{2\sqrt{3} - 1} \times \frac{2\sqrt{3} + 1}{2\sqrt{3} + 1}$ (dep) for $\sqrt{3} \times 2\sqrt{3} = 6$ or $2\sqrt{3} \times 2\sqrt{3} = 12$ for $\frac{6 + \sqrt{3}}{11}$ (accept $a = 6$ and $b = 11$)	

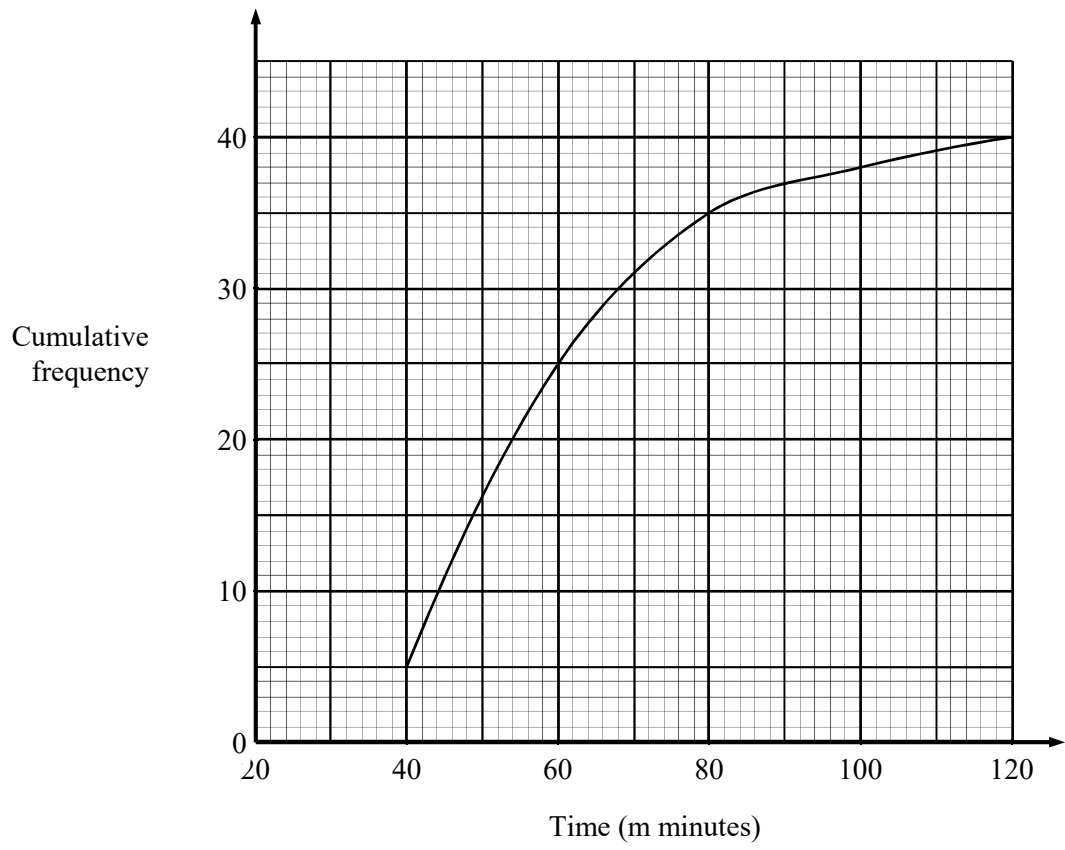
Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
17	4	P1	for process to find ratio of corresponding lengths, eg. $\sqrt{4}:\sqrt{9}$ (= 2 : 3)	This may be seen by checking their volume, eg. "8" \times 4 (= 32) and "8" \times 3 (= 24) An answer of 4 with no supportive working gets no marks
		P1	for process to find ratio of volumes, eg "2" ³ : "3" ³ (= 8 : 27)	
		P1	for "27" \div "8" (= 3.375)	
		A1	for rounding to give an answer of 4 from correct working	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
18 (a)	Shown	C1	for $f^{-1}(x) = \sqrt[3]{\frac{x+4}{2}}$ OR for $2x^3 - 4 = 50$ OR for substituting $x = 3$ to find $f(3)$	
		C1	for substituting $x = 50$ to show the result giving $f^{-1}(50) = 3$ OR solving for x to give $x = 3$ OR for showing that $f(3) = 50$	
		P1	for $hg(x) = (x + 2)^2$	
		P1	(dep) for start to a process to derive a quadratic equation eg. $x^2 + 4x + 4 = 3x^2 + x - 1$	$(x + 2)^2$ must be correctly expanded
18 (b)	$x = -1$ and $x = 2.5$	P1	for a process to solve the quadratic equation $2x^2 - 3x - 5 = 0$ eg $(2x - 5)(x + 1) (= 0)$ or $\frac{-(-3) \pm \sqrt{(-3)^2 - 4 \times 2 \times -5}}{2 \times 2}$ or $2\left[\left(x - \frac{3}{4}\right)^2 - \frac{9}{16} - \frac{5}{2}\right] (= 0)$	
		P1		
		A1	for $x = -1$ and $x = 2.5$	2.5 or $2\frac{1}{2}$ or $\frac{5}{2}$ acceptable
19	$\frac{3}{4}$ oe	P1	for a first step to converting to a common base with one correct conversion, eg. $9^{-\frac{1}{2}} = 3^{-1}$ or $\frac{1}{3}$ or $27^{\frac{1}{4}} = 3^{\frac{3}{4}}$ oe	$9^{-\frac{1}{2}} = 3^{-1}$ (or $\frac{1}{3}$) oe or $27^{\frac{1}{4}} = 3^{\frac{3}{4}}$ oe seen alone gets the P1
		P1	(dep) for $3^{-1} = 3^{\frac{3}{4}} \div 3^{x+1}$ oe	
		A1	cao	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
20 (a)	graph	C2	for a translation of the graph by the vector $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$	Condone graph of $y = f(-x)$ also being drawn on the grid Correct vector gets 1 mark
		(C1	for a translation of the graph by the vector $\begin{pmatrix} -1 \\ b \end{pmatrix}$ where $b \neq -3$ or $\begin{pmatrix} a \\ -3 \end{pmatrix}$ where $a \neq -1$ or for a translation by the vector $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$ of 3 or 4 critical points)	
(b)	2, 1	B1	cao	
21	Sketch graph with TP at (2, -13) and intercepts at (0, -5), $(2 + \sqrt{\frac{13}{2}}, 0)$ and $(2 - \sqrt{\frac{13}{2}}, 0)$	B1	for a parabola drawn with intercept at the point (0, -5)	Turning point may be just seen and labelled on the sketch
		M1	for the start of a method to find the roots of $y = 0$, eg. $2(x - 2)^2 - 13 (= 0)$ oe or $(x =) \frac{- -8 \pm \sqrt{(-8)^2 - 4 \times 2 \times -5}}{2 \times 2}$	
		M1	(dep) for method to find the roots, eg. $2 \pm \sqrt{\frac{13}{2}}$ oe	
		B1	for turning point at (2, -13)	
		C1	for a fully correct parabola drawn with turning point at (2, -13) and intercepts at (0, -5), $(2 + \sqrt{\frac{13}{2}}, 0)$ oe and $(2 - \sqrt{\frac{13}{2}}, 0)$ oe clearly shown	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
22	Proof	C1	<p>for one correct pair of equal angles with correct reason from: angle $ACB = \text{angle } ADB$, (<u>angles</u> in the <u>same segment</u> are equal) angle $DBC = \text{angle } DAC$, (<u>angles</u> in the <u>same segment</u> are equal) angle $ABD = \text{angle } ACD$, (<u>angles</u> in the <u>same segment</u> are equal)</p> <p>or for recognising all angles of 60 in triangle AED and in triangle CEB)</p>	<p>Underlined words need to be shown; reasons need to be linked to their statement(s)</p>
		C1	<p>for one identity, with reason(s), from the following list of alternatives: Alternatives: a complete method to show that angle $ACB = \text{angle } DBC (= 60)$, or BC being common to both triangles or $DB = DE + EB = AE + EC = AC$ (sides of an <u>equilateral triangle</u> are equal) or angle $ABC = 60 + \text{angle } ABD = 60 + \text{angle } ACD = \text{angle } DCB$ (<u>angles</u> in the <u>same segment</u> are equal) or angle $BDC = \text{angle } CAB$ (<u>angles</u> in the <u>same segment</u> are equal)</p>	<p>Pairs of equal angles may be just shown on the diagram</p>
		C1	<p>for a second identity, with reason(s), from the alternatives above</p>	
		C1	<p>for concluding the proof with a third identity, with reason(s), from the alternatives above, together with the condition for congruency, ASA or SAS or AAS</p>	

Q10(a)



Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 1H

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: $\pm 5^\circ$

Measurements of length: ± 5 mm

PAPER: 1MA1_1H

Question	Modification	Mark scheme notes
2	Wording changed to 'Using the information work out the value of n.'	Standard mark scheme
4	P moved 1 cm to the left.	Standard mark scheme
5	Diagram enlarged. Wording added 'Angle BAC = 75° Angle ABC = 51°.' Angles moved outside of the angle arcs and angle arcs made smaller.	Standard mark scheme
8	North lines made 9 cm. Scale moved above the diagram. Changed the scale from '1 cm represents 4km' to '1 cm represents 2 km.'	Standard mark scheme but note the scale change P1 for a process to work out the distance PQ , eg. $12 \times 1.5 (= 18)$ P1 for the process to use the given scale eg. " $18 \div 2 (= 9 \text{ cm})$ " Award P3 for Q shown in the correct place on the diagram. A1 for distance in the range 20 to 23 A1 for bearing in the range 317 to 330

10	<p>Table left aligned. Diagram enlarged. Right axis labelled.</p> <p>Axes labels moved to the left of the horizontal axis and above the vertical axis.</p> <p>Frequency table:</p> <table data-bbox="353 347 573 517"> <tr> <td>$20 < m \leq 40$</td> <td>5</td> </tr> <tr> <td>$20 < m \leq 60$</td> <td>10</td> </tr> <tr> <td>$20 < m \leq 80$</td> <td>25</td> </tr> <tr> <td>$20 < m \leq 100$</td> <td>35</td> </tr> <tr> <td>$20 < m \leq 120$</td> <td>40</td> </tr> </table>	$20 < m \leq 40$	5	$20 < m \leq 60$	10	$20 < m \leq 80$	25	$20 < m \leq 100$	35	$20 < m \leq 120$	40	<p>Part (a) Standard mark scheme but plots at values shown.</p> <p>Part (b): M1 for $UQ = 90 (\pm 2)$ or $LQ = 60 (\pm 2)$ or ft their cf graph A1 answer in the range 36 to 44</p> <p>Part (c): M1 for finding the difference between readings taken from the cf axis at points from a mark of 50 and a mark of 90 eg $30 - 7.5$ A1 answer in the range 19/40 to 26/40</p>
$20 < m \leq 40$	5											
$20 < m \leq 60$	10											
$20 < m \leq 80$	25											
$20 < m \leq 100$	35											
$20 < m \leq 120$	40											

PAPER: IMA1_1H		
Question	Modification	Mark scheme notes
12	MLP only- q changed to m .	Standard mark scheme
13	(a) MLP only – x changed to y .	Standard mark scheme with letters changed as indicated.
13	(b) MLP only – x and y changed to e and f .	Standard mark scheme with change of letters as indicated.
14	Diagram enlarged. Triangle vertices labelled ABC . Wording ' ABC ' added. Wording ' $BC = (y+4)$ cm' and ' $BA = (y-2)$ cm' added. MLP only – x changed to y	Standard mark scheme with change of letters as indicated.
17	Diagram enlarged; model may be provided. Labels removed from inside the shapes and above the containers labelled 'container A' and 'container B'. Wording changed to 'They show two similar cylindrical containers, container A and container B' ; Container A is smaller than container B.'	Standard mark scheme
20	Diagram enlarged. In part (a) the wording changed from ' $y = f(x+1) - 3$ ' to ' $y = f(x+1) - 5$ '. Braille only – only point A on the diagram and wording 'Point A (-2,1)' added above the diagram.	Standard mark scheme, but note the graph required to be drawn in part (a) is now 2 squares below that normally expected, so in the standard mark scheme replace -3 by -5
21	A pair of axes provided.	Standard mark scheme
22	Diagram enlarged.	Standard mark scheme



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Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Calculator) Paper 2H

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	Two statements	C2	<p>Two different statements</p> <p>Acceptable</p> <p>There is no 'frequency' label / y-axis is not labelled / no title for the y-axis</p> <p>The polygon should not be closed / have a line at the bottom / have first and last points connected</p> <p>(15, 6) has been plotted incorrectly / at (15, 8) / (The first point is at) 8 rather than 6 / First point is on an incorrect frequency</p> <p>Not acceptable</p> <p>There is no title / Points should be joined with a curve / x-axis doesn't start at 0</p> <p>There is no label / The axes have not been labelled (x and y)</p> <p>The points haven't (all) been plotted correctly</p> <p>$10 < w \leq 20$ and $30 < w \leq 40$ have been plotted wrong</p> <p>The first point is plotted incorrectly, its at (15, 7) not (15, 6)</p> <p>The points have been joined up wrong / Points should not be joined in the shape of a triangle / They've connected all the points</p> <p>Done the midpoints rather than the numbers on the right side / The points are in the middle</p> <p>(C1 for one statement eg from those above)</p>	Ignore additional statements provided no contradiction
2	127.5 and 128.5	B1	for 127.5 in the correct position	
		B1	for 128.5 in the correct position	Accept 128.4 $\dot{9}$ or 128.499...
3	18	P1	for $240 \div 10 (= 24)$ or $240 \div 8 (= 30)$	Accept $3 + 7$ for 10, $3 + 5$ for 8
		P1	for $3 \times "24" (= 72)$ or $7 \times "24" (= 168)$ or $3 \times "30" (= 90)$ or $5 \times "30" (= 150)$	
		P1	for $3 \times "24" (= 72)$ and $3 \times "30" (= 90)$ or $7 \times "24" (= 168)$ and $5 \times "30" (= 150)$	
		A1	Cao	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
4	(i) 238	P1	for working with proportion eg $\frac{17}{50} \times 700$ oe	
		A1	cao	
	(ii) statement	C1	<p>for statement</p> <p>Acceptable</p> <p>Sample is representative (otherwise answer wrong)</p> <p>Random sample (otherwise answer will be different)</p> <p>The 50 people are from the 700 (otherwise not accurate)</p> <p>17 out of every 50 want a sports bag (otherwise answer will be different / wrong)</p> <p>There is no bias</p> <p>That the other 650 will want the same gifts as the 50</p> <p>Not acceptable</p> <p>There would be more than 17 people who want the sports bag</p> <p>I rounded my answer</p> <p>17 out of 50 want a sports bag</p> <p>A repeat of the calculation done in (i)</p> <p>Most of the people would want a sports bag</p> <p>References as what might change in the future (eg a change in membership)</p> <p>That all 700 people wanted a type of gift rather than no gift (otherwise would have changed my answer)</p>	
5	(a) F	B1	cao	
	(b) D	B1	cao	
6	Shown (supported)	M1	for method to find at least two terms, eg $2 \times 4^2 - 1 (= 31)$ and $40 - 3^2 (= 31)$	1 7 17 31 49 71 97 127 161 199 39 36 31 24 15 4 -9
		M1	for generating at least three correct terms of each sequence	
		A1	for generating at least the terms 1, 7, 17, 31, 49 of the first sequence and at least the terms 39, 36, 31, 24, 15, 4 of the second sequence	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	4.56×10^{-2}	M1 A1	for $0.000000342 \div 0.0000075$ OR for 0.0456 oe eg 0.456×10^{-1} or 45.6×10^{-3} or $\frac{57}{1250}$ OR for an answer of 4.56×10^n cao	
8	6	M1 M1 A1	for $720 \div 40 (= 18)$ or $720 \div 30 (= 24)$ for a complete process eg $(720 \div 30) - (720 \div 40)$ or “18” $\times 4/3 -$ “18” or “24” $-$ “24” $\times 3/4$ cao	
9	No (supported)	P1 P1 P1 P1 A1	for finding the area of 3 or more faces of the cuboid and adding eg $(6 \times 8) + (8 \times 18) + (6 \times 18) \dots$ or “48” + “144” + “108” ... (= 300) P1 complete process to find surface area of cuboid, eg $6 \times 8 \times 2 + 6 \times 18 \times 2 + 8 \times 18 \times 2 (= 600)$ P1 for process to find side length of cube, eg [surface area] $\div 6$ and square rooting (= 10) P1 (dep on previous P1) for processes to find volume of cube and volume of cuboid, eg [side length] ³ (= 1000) and $6 \times 8 \times 18 (= 864)$ for a process to find the volume of the cuboid $6 \times 8 \times 18 (= 864)$ and cube rooting (= 9.52...) to find a side length (dep on previous P1) for process to find surface area of cube, eg. (“9.52...”) ² $\times 6 (= 544.28\dots)$ No with 1000 and 864 OR No with 600 and 544(.28...)	Could be an addition of <i>any</i> three faces eg $48 + 48 + 144$ etc. [surface area] must come from the addition of at least three attempts at area, but not from volume.

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
10	$k = 2m - y^2$	M1 A1	correct first step of showing an intention to square both sides with no algebraic ambiguity in any resulting statements, eg $y^2 = 2m - k$ for $k = 2m - y^2$	
11	(a) Explanation (b) Comparison	C1 C1 C1	eg 'No' the median is 57 (ft) a correct comparison of medians eg the median weight for Megan was greater than the median weight for Amy a correct comparison of a measure of spread eg the interquartile range of weights for Megan was greater than the interquartile range of weights for Amy For the award of both marks at least one of the comparisons must be in the context of the question	Simply quoting values for median, range and IQR is insufficient, they must be compared Median Range IQR Megan 57 49 26 Amy 42 47 16 Figures given must be correct. Comparisons can relate to the range or the IQR
12	32.1	P1 P1 P1 A1	starts process, eg $\sin 40 = \frac{DB}{8.6}$ oe or for $8.6 \times \sin 40 (=5.52797\dots)$ complete process to find ED , eg $(8.6 \times \sin 40) \div 2 (=2.76\dots)$ process to find angle EAD , eg $\tan^{-1}\left(\frac{2.76\dots}{4.4}\right)$ or $\tan^{-1}("0.628\dots")$ answer in range 32.09 to 32.2	Accept values rounded or truncated to 2 dp. If an answer in the range is seen in working and then incorrectly rounded award full marks

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	2.2	P1 P1 A1	works out interest for one year, eg $3550 \times 0.026 (= 92.3(0))$ or $3550 \times 1.026 (=3642.3(0))$ for compound interest calculation, eg $3550 \times 1.026^2 (= 3736.9\dots)$ or for an answer given as 0.0219... or 1.0219... answer in range 2.19 to 2.2	If an answer in the range is seen in working and then incorrectly rounded award full marks
14	7	M1 A1	method to find number of combinations, eg 19×25 oe (= 475) or for $3325 \div 19 (= 175)$ or $3325 \div 25 (= 133)$ cao	
15	$6x^3 - 23x^2 - 33x - 10$	M1 M1 A1	for method to find the product of any two linear expressions (3 out of no more than 4 terms correct with correct signs or 4 correct terms ignoring signs) for method of multiplying out remaining products, half of which are correct (ft their first product) cao	Note that, for example, $6x^2 + 7x$ or $7x + 2$ are regarded as three terms in the expansion of $(3x + 2)(2x + 1)$ First product must be quadratic but need not be simplified or may be simplified incorrectly

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
16	$\frac{52}{72}$	P1 P1 A1	for $\frac{4}{9} \times \frac{3}{8} \left(\frac{12}{72} \right)$ or $\frac{4}{9} \times \frac{5}{8}$ or $\frac{5}{9} \times \frac{4}{8} \left(\frac{20}{72} \right)$ for $1 - \left(\frac{5}{9} \times \frac{4}{8} \right)$ or $\frac{4}{9} \times \frac{3}{8} + \frac{4}{9} \times \frac{5}{8} + \frac{5}{9} \times \frac{4}{8}$ oe for $\frac{52}{72}$, $\frac{13}{18}$ oe SC B1 for answer of $\frac{56}{81}$ (replacement)	Accept equivalent fractions, decimals (0.72...) or percentages (72.22.....%)
17	61	B1 M1 A1	angle $OAD = 90$, may be marked on diagram method to work out angle $OAB (=29)$ cao	Angle could be shown by a right-angle symbol Correct method can be implied from angles on the diagram if no ambiguity or contradiction. Reasons need not be given. Award 0 marks for an answer of 61 with no other working.
18	Bar of height 3.2	M1 M1 C1	method to find any frequency eg $1.2 \times 2.5 (= 3)$ or $2 \times 2.5 (= 5)$ or $2.8 \times 5 (= 14)$ or $0.8 \times 12.5 (= 10)$ or method to use areas eg $12 \times 5 (=60)$ or $20 \times 5 (=100)$ or $28 \times 10 (=280)$ or $8 \times 25 (=200)$ complete method to find total frequency for the four intervals eg “3” + “5” + “14” + “10” (=32) or “60” + “100” + “280” + “200” (=640) cao	Accept equivalent methods proportional to those shown

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
19	155	M1 A1	for a complete method to find the volume of the hemisphere, eg $\frac{1}{2} \times \frac{4}{3} \times \pi \times 4.2^3$ oe answer in range 155 to 155.2	If an answer in the range is seen in working and then incorrectly rounded award full marks
20	160 (supported)	B1 M1 A1 C1	stating bound of 10.85 or 10.95 using both UB and LB to work out value of d eg [UB of c] ³ \div 8 and [LB of c] ³ \div 8 or gives a bound of 159.66... from correct working or gives a bound of 164.11... from correct working for 159.66... and 164.11... from correct working for 160 from 159.66... and 164.11... with a supporting reason eg “since both UB and LB round to 160”	Accept 10.949 or 10.9499... for 10.95 $10.9 < \text{UB} \leq 10.98$ $10.85 \leq \text{LB} < 10.9$ Accept bounds rounded or truncated to at least 4 sig fig

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
21 (a)	52.5	P1	starts to find area under graph, eg $\frac{30 \times 12}{2}$ (=180) or 50×12 (=600) or $\frac{20 \times 12}{2}$ (=120)	
		P1	complete process to find area under graph, eg $\frac{30 \times 12}{2} + 50 \times 12 + \frac{20 \times 12}{2}$ (= 900)	
		P1	starts process to find half way time, eg $((\text{"900"} \div 2) - 180) \div 12$ (=22.5)	
		A1	52.5 oe	
(b)	Comparison	C1	acceptable comparison Acceptable (acceleration) during first part is positive but (acceleration) during last part is negative / deceleration (acceleration is) greater during the last part than during the first part gradient is steeper in the last part / longer to speed up than slow down speed / (acceleration) is increasing at start and decreasing at end (acceleration) is slower in the first part (acceleration) is ascending in the first part and descending in the last part 0.4 is the first part and -0.6 in the last part Not acceptable goes down in the last part speed is greater in last part than first part	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
22 (a)	163 or 164	P1	uses formula eg $1.2 \times 200 - 50 (= 190)$	
		P1	for complete process, eg May: $1.2 \times "190" - 50 (= 178)$ and June: $1.2 \times "178" - 50 (= 163.6)$	
		A1	for 163 or 164	
(b)	Statement	C1	(dep P1) ft statement, eg there won't be any rabbits, fewer rabbits, decrease	
23 (a)	Shown	C1	for a method to find the area of half of the parallelogram or of the whole parallelogram, eg $\frac{1}{2}(2x - 1)(10 - x) \sin 150$ or $\frac{1}{2}(2x - 1)(10 - x) \times \frac{1}{2} \text{ oe}$ or $(2x - 1)(10 - x) \sin 150$ or $(2x - 1)(10 - x) \times \frac{1}{2} \text{ oe}$	
		C1	for a correct expansion of the whole area eg $\frac{1}{2} (20x - 10 - 2x^2 + x)$ or $\frac{1}{2} (-2x^2 + 21x - 10)$ or $-x^2 + 10.5x - 5$	
		C1	complete chain of reasoning with fully correct algebra dealing with the inequality eg $x^2 - 10.5x + 5 < -15$ or $x^2 - 10.5x + 20 < 0$ or $2x^2 - 21x + 10 < -30$ which lead to $2x^2 - 21x + 40 < 0$	
(b)	$2.5 < x < 8$	M1	for factorising, $(2x - 5)(x - 8)$	Could use the formula
A1	for critical values, 2.5, 8			
A1	for any statement that x is greater than 2.5 and x is less than 8	Need not be given as an inequality statement		

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2H

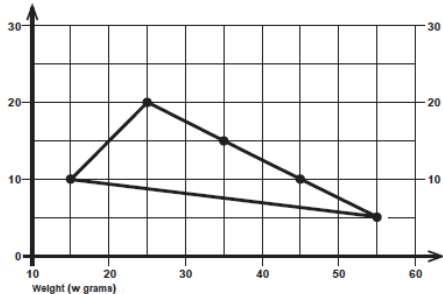
Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

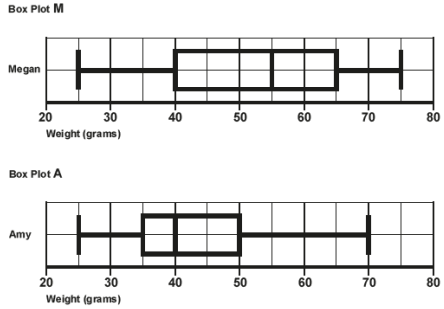
Angles: $\pm 5^\circ$

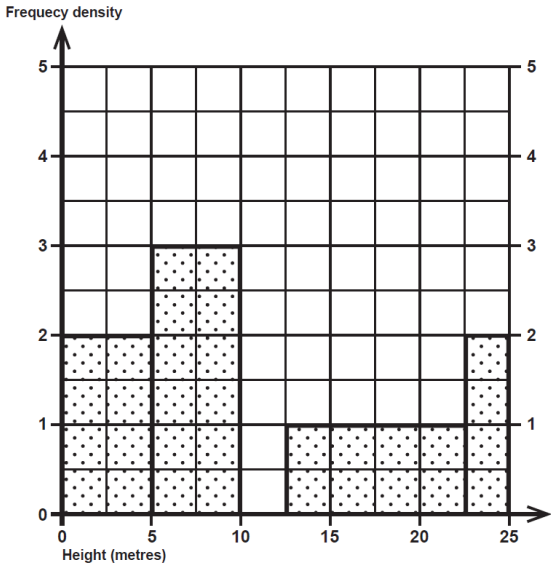
Measurements of length: ± 5 mm

PAPER: 1MA1_2H

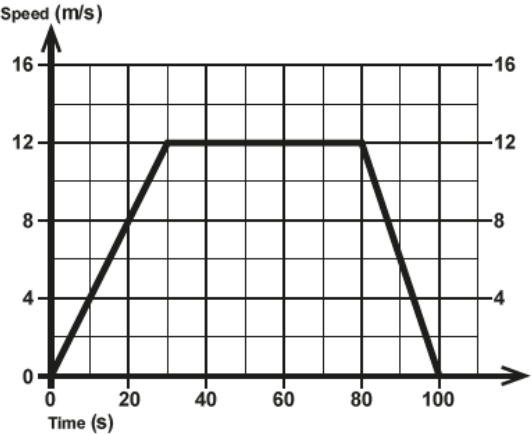
Question	Modification	Mark scheme notes
1	<p>Diagram enlarged and changed:</p>  <p>Crosses changed to solid circles. Axes label moved to the left of the horizontal axis. Frequency changed as follows: $10 < w \leq 20$ 5 $20 < w \leq 30$ 20 $30 < w \leq 40$ 15 $40 < w \leq 50$ 10 $50 < w \leq 60$ 5 Question wording changed from '50 potatoes' to '55 potatoes'.</p>	<p>Standard mark scheme, but reference to the first point is now "(15,5) has been incorrectly plotted at (15,10)"</p>
3	<p>Wording added 'Tom and Adam have some stamps.' Information moved to Diagram Book.</p>	<p>Standard mark scheme</p>
5	<p>Diagram enlarged. Graphs labelled as 'Graph A, graph B etc'.</p>	<p>Standard mark scheme</p>
9	<p>Diagrams enlarged; models should be provided for all candidates. Wording added 'The cuboid has length 18 cm, width 8 cm and height 6 cm.'</p>	<p>Standard mark scheme.</p>

PAPER: 1MA1_2H

Question	Modification	Mark scheme notes
11	<p>Box plots changed as shown.</p>  <p>Box Plot M</p> <p>Megan</p> <p>Weight (grams)</p> <p>Box Plot A</p> <p>Amy</p> <p>Weight (grams)</p> <p>Wording added ‘They show box plot M and box plot A.’ Megan’s box plot labelled ‘Box plot M’ and Amy’s box plot labelled ‘Box plot A.’ Horizontal axes labels moved to the left. Megan’s box plot: Lowest 25, Highest 75, Median 55, IQR 40-65 (=25), range = 50 Amy’s box plot: Lowest 25, Highest 70, Median 40, IQR 35-60 (=25), range = 45</p>	<p>Part (a): C1 explanation eg ‘No’ the median is 55 Part (b): C1: a correct comparison of medians eg the median weight for Megan was greater than the median weight for Amy C1: a correct comparison of a measure of spread eg the IQR of weights for Megan was the same as the IQR of weights for Amy For the award of both marks at least one of the comparisons must be in the context of the question Additional guidance: Simply quoting values for median, range and IQR is insufficient, they must be compared Figures given must be correct. Comparisons can relate to the range or the IQR</p>
12	<p>Diagram enlarged. Angle <i>EAD</i> marked with an angle arc. Angle moved outside of the angle arc and the angle arc made smaller.</p>	<p>Standard mark scheme</p>
15	<p>MLP only: <i>x</i> changed to <i>y</i>.</p>	<p>Standard mark scheme with letters changed as indicated.</p>
16	<p>Wording added ‘Each card is numbered from 1-9.’</p>	<p>Standard mark scheme</p>
17	<p>Diagram enlarged. Angle moved outside of the angle arc and the angle arc made smaller.</p>	<p>Standard mark scheme</p>

Question	Modification	Mark scheme notes
18	<p>Histogram changed as shown below.</p>  <p>Diagram enlarged. Right axis labelled. Shading changed to dotted shading. Axes labels moved to the left of the horizontal axis and above the vertical axis. Wording added 'It shows an incomplete histogram.' Grid extended to 5 on the vertical axis.</p>	<p>Mark scheme adjusted as follows:</p> <p>M1: method to find any frequency, eg $2 \times 5 (= 10)$ or $3 \times 5 (= 15)$ or $1 \times 10 (= 10)$ or $2 \times 2.5 (= 5)$ oe</p> <p>or method to use areas eg $2 \times 4 (=8)$ or $2 \times 6 (=12)$ or $4 \times 2 (=8)$ or $1 \times 4 (=4)$ oe</p> <p>complete method to find total frequency for the four intervals eg "10 + "15" + "10" + "5" (=40)</p> <p>or "8" + "12" + "8" + "4" (=32)</p> <p>C1: Bar of height 4 (8 squares high)</p>
19	<p>Diagram enlarged. Wording added for MLP only 'A hemisphere is half a sphere.' Formula placed above hemisphere. Wording for Braille only: 'The model represents a hemisphere with diameter 8.4cm.'</p>	<p>Standard mark scheme</p>
20	<p>Braille only- c changed to r and d changed to s</p>	<p>Standard mark scheme with the letters changed as indicated.</p>

PAPER: 1MA1_2H

Question	Modification	Mark scheme notes
21	<p>Diagram enlarged. Right axis labelled. Vertical axis marked in units of 4. Axes labels moved to the left of the horizontal axis and above the vertical axis.</p> 	Standard mark scheme
23	<p>Diagram enlarged. Angle moved outside of the angle arc and the angle arc made smaller. Wording added 'with sides $(2x - 1)$ cm and $(10 - x)$ cm. An angle of 150° is marked'</p>	Standard mark scheme
24	<p>Diagram enlarged. Shading changed to dotted shading. Wording added 'It shows square $ABCD$ on a coordinate grid.' Shape provided for all candidates labelled $ABCD$ on both sides. Wording added 'A cut out shape may be available if you wish to use it.'</p>	Standard mark scheme



Pearson
Edexcel

Mark Scheme (Results)

November 2019

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Calculator) Paper 3H

Paper: 1MA1/3H					
Question	Answer	Mark	Mark scheme	Additional guidance	
1	(a)	$x^2 - 4x - 45$	M1	for 3 of 4 terms correct or 4 terms correct ignoring signs	3 terms correct can be implied, eg $x^2 - 4x + c$
			A1	cao	
	(b)	$3x(3x + 2)$	B2	for $3x(3x + 2)$	
			(B1)	for $3(3x^2 + 2x)$ or $x(9x + 6)$ or $3x(ax + b)$ where a and b are integers or $(3x + 2)$ as a factor)	
2	(a)	157.668(255)	M1	for 836.4 or 5.304(809139) or 28.141 or a truncated or rounded version of 157.668255 to no less than 3 sf	Answer must be given to at least 3 decimal places rounded or truncated Accept a clear indication of the decimal point. Check first 3 decimal places only
			A1	for 157.668(255)	
	(b)	157.7	B1	ft from part (a) provided answer to (a) has at least 5 sf	
3		35 to 42	M1	for drawing a suitable line of best fit or for a line from $x = 34$ or for a point marked on the grid at $(34, y)$, y in the range 33 to 44	Line at $x = 34$ does not have to be full length of grid but should be in or reach the data set. Acceptable values for the data set are $y = 33$ to $y = 44$
			A1	answer in the range 35 to 42	

Paper: 1MA1/3H														
Question	Answer	Mark	Mark scheme	Additional guidance										
4	18.6	M1 A1	for finding 4 products within intervals (including end points) for $\Sigma fx \div (1+2+7+8)$ or $(7.5 \times 1 + 12.5 \times 2 + 17.5 \times 7 + 22.5 \times 8) \div (1+2+7+8)$ or $(“7.5” + “25” + “122.5” + “180”) \div “18”$ or $“335” \div “18”$ for 18.6(111...)	<table border="1"> <thead> <tr> <th>Min fx</th> <th>Max fx</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>10</td> </tr> <tr> <td>20</td> <td>30</td> </tr> <tr> <td>105</td> <td>140</td> </tr> <tr> <td>160</td> <td>200</td> </tr> </tbody> </table> Σfx must come from 4 products fx within intervals (including end points)	Min fx	Max fx	5	10	20	30	105	140	160	200
Min fx	Max fx													
5	10													
20	30													
105	140													
160	200													
5	37 000	B1	cao											
6	50	B1 P1 P1 A1	for finding the time difference, eg, 1hr 18 mins or 78 mins oe for correct process to convert minutes to hours, eg $18 \div 60 (=0.3)$ or $78 \div 60 (=1.3)$ or for a correct process to convert speed in miles per minute to mph eg $“0.833..” \times 60$ for using speed = distance \div time eg, $65 \div [\text{time}]$ or $65 \div 78 (=0.833..)$ cao SCB2 for 83(.333...) seen as the answer	Allow 1.18 for this mark 118 scores B0 For a conversion of time or speed [time] is what the candidate clearly indicates as time difference										

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
7	(a) 3.246×10^7	B1	cao	Decision eg “No” may be seen by the question. “She is incorrect” is equivalent to “no”
	(b) 0.00496	B1	cao	
	(c) No with explanation	C1	<p>No and explanation that B is bigger as the power of 10 is bigger.</p> <p>Acceptable examples She is incorrect as 10^8 is smaller than 10^9 No, because B has more digits than A No, A is millions but B is billions No, if you subtract A from B the answer is positive (but if you subtract B from A the answer is negative) A= 621200000, B=4730000000, B is bigger No because she did not take into account standard form No as when you find the ordinary number B is greater than A</p> <p>Not acceptable examples Yes... A = 5 zeros after the number where as B = 7 zeros after the number No as 4.73×10^9 is one more than 6.212×10^8 6.212 is to the power of 8 and 4.73 is to the power of 9 so there is an extra digit Asma is wrong because she has more numbers behind the decimal point which means that it will be bigger than A No B has more zeros</p>	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
8	45	P1	for $180 - 117 (=63)$ or states, or uses, exterior angle $+ x = 117$	Angles may be shown on the diagram.
		P1	for process to find the exterior or the interior angle of the pentagon, eg $360 \div 5 (=72)$ or $180 - (360 \div 5) (=108)$ or $((5-2) \times 180) \div 5 (=108)$	Any angle labelled correctly as 63 and not contradicted scores this mark
		P1	for a complete process to find x , eg $180 - "72" - "63"$ or $"108" - "63"$ or $117 - "72"$	Exterior = 108 or interior = 72 does not score the mark
		A1	cao	An answer of 45 with no supporting working scores 0
9	Enlargement	B2	vertices at (2.5, 1) (2.5, 6) (5, 6)	
		(B1)	for triangle of the correct size and orientation in the wrong position or a correct enlargement of a different scale factor centre (0, 1) or correct orientation with 2 of 3 vertices correct)	
10	(a)	M1	for multiplying both sides by 7 as a first step eg $9 + x = 7(11 - x)$ or dividing each term on the left hand side by 7 eg $\frac{9}{7} + \frac{x}{7} = 11 - x$	$\times 7$ written near the equation is not enough for this mark
			M1	
		A1	oe	
	(b)	4(y + 3)	B1	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
11	0.1709	M1	for one product, $0.07 \times 0.98 (=0.0686)$ or $0.93 \times 0.11 (=0.1023)$ or $0.07 \times 0.02 (=0.0014)$ or $0.93 \times 0.89 (= 0.8277)$	If all products shown, award this mark
		M1	for a fully correct method, eg $0.07 \times 0.98 + 0.93 \times 0.11$ or $1 - (0.07 \times 0.02) - (0.93 \times 0.89)$	
		A1	oe	
12	Box plot	M1	for correctly identifying one of the LQ (188), median (197) or UQ (209) from the stem leaf	May be implied by one of these values being correctly plotted.
		M1	for showing a box and at least 3 correctly plotted values from 173, 188, 197, 209, 219	
		A1	for a fully correct box plot	
13	739	P1	process to find the volume of C, eg $\pi \times 3^2 \times 25 (= 706.8583471$ or $225\pi)$	For use of 3.14 Volume of C is 706.5
		P1	process to find the volume of A or the volume of B, eg $"706.8..." \times \frac{2}{2+13} (= 94.24777961$ or $30\pi)$ or $"706.8..." \times \frac{13}{2+13} (= 612.6105675$ or $195\pi)$ or process to work with density and ratio, eg $(2 \times 1.21 + 13 \times 1.02) (= 15.68)$	Volume of A is 94.2 Volume of B is 612.3
		P1	process to find the mass of C, eg $"30\pi" \times 1.21 (= 114.0398133) +$ $"195\pi" \times 1.02 (= 624.8627788)$ or $"225\pi" \times "15.68" \div (2+13)$	Mass of A is 113.982 Mass of B is 624.546
		A1	for an answer in the range 738.5 to 739	Do not award accuracy mark if the figure is from obvious incorrect working

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
14	$\frac{13}{20}$	P1	for finding the fraction who chose either soup ($\frac{2}{5}$ oe) or chose prawns ($\frac{3}{5}$ oe) or for process to share any number in the ratio 2 : 3 eg $100 \div (2 + 3) \times 2$ (=40)	Starting number 100 Soup : Prawn 40:60
		P1	for a process that could lead to the proportion who chose lasagne or curry for either starter, eg sharing 40% (soup) in the ratio 5 : 3 or sharing 60% (prawns) in the ratio 1 : 5 or $\frac{2}{5} \times \frac{5}{8}$ or $\frac{2}{5} \times \frac{3}{8}$ or $\frac{3}{5} \times \frac{1}{6}$ or $\frac{3}{5} \times \frac{5}{6}$ or for continuing the process with their starting number to find the number who chose lasagne or curry for either starter	L:C L:C 25:15 10:50
		P1	for a complete process to find the proportion who chose curry for both starters, eg $(\frac{2}{5} \times \frac{3}{8}) + (\frac{3}{5} \times \frac{5}{6})$ or to find the number who chose curry for both starter for their starting number	$15 + 50 = 65$ and $\frac{15+50}{100}$
		A1	$\frac{13}{20}$ or equivalent fraction	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
15	Proof	M1	for correct expressions for two consecutive even numbers eg $2n$ and $2n+2$	$(2n)^2 + (2n + 2)^2$ $= 4n^2 + 4n^2 + 8n + 4$ $= 8n^2 + 8n + 4 = 4(2n^2 + 2n + 1)$
		M1	(dep M1) for expanding both expressions with at least one expansion fully correct eg $4n^2$ and $4n^2 + 4n + 4n + 4$ or for factorising both terms and intention to square correctly eg $(2n)^2$ and $2^2(n+1)^2$	Or $(2n)^2 + (2n - 2)^2$ $= 4n^2 + 4n^2 - 8n + 4$ $= 8n^2 - 8n + 4 = 4(2n^2 - 2n + 1)$
		A1	complete proof	Or $(2n)^2 + (2n + 2)^2$ $= 4(n)^2 + 4(n + 1)^2$ $= 4(n^2 + (n + 1)^2)$
16	-7.5	M1	for stating a correct relationship, eg $y = \frac{k}{x^2}$ or $8 = \frac{k}{2.5^2}$	Accept $y \propto \frac{k}{x^2}$ where k may be 1
		A1	for $k = 50$, could be seen in an equation	
		A1	-7.5 oe	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
17	2.7 and -0.7	M1	for $x^2-3 = 2x-1$ oe or $x^2-3 -2x + 1 (=0)$ or completing the square eg $(y=)(x-1)^2-1-2$	Line segments required For 1.7 allow from 1.6 to 1.8 For -1.7 allow from -1.8 to -1.6 Points indicated or attempt to read off x -axis at the appropriate points – maybe indicated by dashes No marks will be awarded for correct answers only
		M1	(dep M1) draws graph of $y = 2x-1$ or drawing the translated graph or describing the translation in words or $-1.7 + 1 (= -0.7)$ or $1.7 + 1 (=2.7)$	
		M1	shows the points of intersection clearly for the given quadratic graph and linear graph or for one correct solution from appropriate supportive working	
		A1	for x in the range 2.6 to 2.8 and -0.6 to -0.8 SCB2 for plotting $y = 2x + 1$ and values for x in the range -1.1 to -1.3 and 3.1 to 3.3	
18	1.95	P1	for correct substitution into the cosine rule, eg $3.4^2 = 6.1^2 + 6.2^2 - 2 \times 6.1 \times 6.2 \times \cos BCA$	Can be any angle within triangle ABC P2 can be awarded for $BCA = 32(.08046913\dots)$ Must not come from incorrect processing
		P1	for a full process to find BCA eg $(\cos BCA =) \frac{6.1^2 + 6.2^2 - 3.4^2}{2 \times 6.1 \times 6.2}$ or $(BCA =) 32(.08046913\dots)$	
		P1	correct substitution into the sine rule, eg $\frac{DC}{\sin("32.08\dots" \times \frac{2}{5})} = \frac{6.2}{\sin(180 - "32.08\dots" - ("32.08\dots" \times \frac{2}{5}))}$	
		P1	for complete process to find DC eg $(DC =) \frac{6.2 \times \sin "12.832"}{\sin "135.088"}$	
		A1	Answer in the range 1.94 to 1.951	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
19	3.4	M1 M1 A1	for drawing a suitable tangent at $t = 6$ for a full method to find the gradient of the tangent at $t=6$, eg $20 \div 5.8$ answer in the range 3.05 to 3.7	Use of change in y over change in x Answers of $\frac{10}{6}$ oe scores no marks
20	$n^2 - 2n$	M1 A1	for correct deduction from differences, eg 2nd difference of 2 implies $1n^2$ or gives a quadratic expression which includes the term $1n^2$ or states 1,4,9,16,25 and deduces 2,4,6,8,10 oe	
21	$\frac{1}{81}$	M1 A1	for finding the probability of heads eg $\sqrt[4]{\frac{16}{81}}$ ($=\frac{2}{3}$) or for finding the probability of tails $1 - \sqrt[4]{\frac{16}{81}}$ ($=\frac{1}{3}$) oe	Seeing a probability of $\frac{2}{3}$ or $\frac{1}{3}$ is enough for this mark

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
22	$7x$	M1	multiplication by reciprocal, eg $\frac{7(x-2)}{(x-2)(x+6)} \times \frac{x(x+6)(x-6)}{x-6}$	Independent mark, may be awarded at any point
		M1	for factorising the numerator or denominator of the 1 st fraction, eg $\frac{7(x-2)}{(x-2)(x+6)}$ or $\frac{7(x-2)}{x^2+4x-12}$ or $\frac{7x-14}{(x-2)(x+6)}$	
		M1	for factorising the denominator of the second fraction, eg $\frac{x-6}{x(x+6)(x-6)}$ ($= \frac{1}{x(x+6)}$)	
		A1	completing the algebra to reach $7x$	
23	264	P1	correct substitution into the volume formula, eg $56.8 = \frac{1}{3} \times \pi \times r^2 \times 3.6$	<i>AOB</i> does not need to be the subject of the equation
		P1	completes process to find base radius or the value of r^2 , eg $r = \sqrt{\frac{56.8 \times 3}{\pi \times 3.6}}$ ($=3.88158\dots$) or $r^2 = \frac{56.8}{1.2\pi}$ ($=15.066$)	
		P1	Uses Pythagoras to find the sloping length, eg $\sqrt{3.88\dots^2 + 3.6^2}$ ($=5.29\dots$)	
		P1	process to find an equation in <i>AOB</i> , eg $\pi \times "3.88" \times "5.29" = \frac{AOB}{360} \times \pi \times "5.29"{}^2$ or $\frac{AOB}{360} \times \pi \times 2 \times "5.29" = 2 \times \pi \times "3.88"$ or $\frac{AOB}{360} \times "5.29" = "3.88"$	
		A1	answer in the range 263.9 to 264.1	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
24	4 : 3	P1	Process to find a missing vector using the given ratios as fractions, eg. $\frac{1}{3}$ of \overrightarrow{OX} ($=\frac{1}{3}\mathbf{a}$) or. $\frac{1}{4}$ of \overrightarrow{OY} ($=\frac{1}{4}\mathbf{b}$)	<p>Might be embedded in their answer for ZP</p> <p>The award of this mark implies the first two process marks.</p>
		P1	for a process to use $\overrightarrow{ZO} = \overrightarrow{YX} = \mathbf{a} - \mathbf{b}$ oe	
		P1	for a process to find either \overrightarrow{ZP} or \overrightarrow{ZR} in terms of \mathbf{a} and \mathbf{b} , eg. either $\overrightarrow{ZP} = \mathbf{a} - \mathbf{b} + \frac{1}{3}\mathbf{a}$ or $\overrightarrow{ZR} = \mathbf{a} - \mathbf{b} + \frac{1}{4}\mathbf{b}$	
		P1	for a process to write \overrightarrow{ZP} and \overrightarrow{ZR} as multiples of the same vector, eg. multiplying both by 12 to get the ratio, $\frac{4}{3}(\mathbf{a} - 0.75\mathbf{b})$ and $\mathbf{a} - 0.75\mathbf{b}$ respectively	
		A1	oe	

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 3H

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:

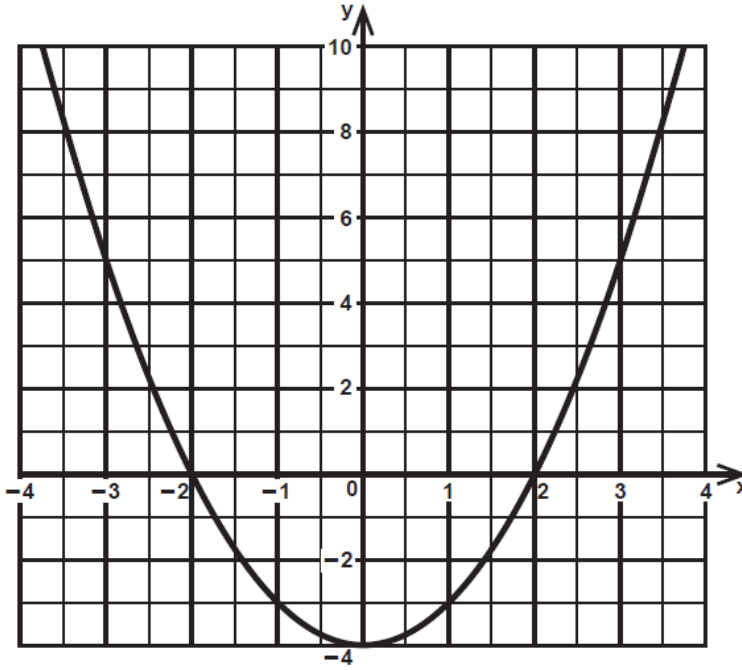
Angles: $\pm 5^\circ$

Measurements of length: ± 5 mm

PAPER: 1MA1/3H		
Question	Modification	Mark scheme notes
1	MLP only: x changed to y .	Standard mark scheme but note the letter change.
3	Diagram enlarged. Crosses changed to solid circles. Right axis labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis. Question wording changed to 'Jamie got a mark of 35 in the Science test.'	M1 for drawing a suitable line of best fit or for a line from $x = 35$ to a point at $(35, y)$, y in the range 30 – 45 or for a point marked on the grid at $(35, y)$, y in the range 30 – 45 A1 for an answer in the range 30 to 45
4	Frequency column widened.	Standard mark scheme
6	Wording changed to 'The table shows the information on his Sat Nav at 13 30.'	Standard mark scheme
8	Diagram enlarged. Angles moved outside angle arcs and angle arcs made smaller. Wording added 'Two angles are marked 117° and x°	Standard mark scheme

PAPER: 1MA1/3H												
Question	Modification	Mark scheme notes										
9	<p>Wording added ‘It shows triangle A and triangle B on a coordinate grid.’ Diagram enlarged. Label removed from inside triangle. Shading removed. Enlargement drawn at (2.5,1), (2.5,6) (5,6) Triangles labelled as ‘triangle A’ and ‘triangle B’. Cross removed from (0,1) on the diagram. Grid cut at 7 on the x axis and 6 on the y axis. Grid cut before the x and y axes labels. Question wording now ‘Describe fully the transformation that maps triangle A onto triangle B.’ Three answer lines provided. Braille only: Two labelled shapes, triangle A and triangle B.</p>	<p>Amended mark scheme as follows: B1 for “enlargement scale factor 2.5” B1 for “centre (0,1)” Award B0 for any mention of a different transformation.</p>										
10	(a) MLP only: x changed to y .	Standard mark scheme but note letter change.										
11	Diagram enlarged.	Standard mark scheme										
12	<p>Diagrams enlarged. Key moved above and to the left of the stem and leaf diagram. Horizontal line added to the base of the stem and leaf diagram. Wording changed to ‘Look at Diagram 1 and Diagram 2 for Question 12... Diagram 1 shows a stem and leaf diagram. Diagram 2 shows a grid.’ Wording added ‘below Diagram 1’. Numbers in the stem and leaf changed (see table below)</p> <table style="margin-left: 40px;"> <tr><td>17</td><td>5 7 9</td></tr> <tr><td>18</td><td>4 5 5</td></tr> <tr><td>19</td><td>0 0 1 3 4 5 8</td></tr> <tr><td>20</td><td>1 3 4 4 5 7</td></tr> <tr><td>21</td><td>2 3 3 5</td></tr> </table>	17	5 7 9	18	4 5 5	19	0 0 1 3 4 5 8	20	1 3 4 4 5 7	21	2 3 3 5	<p>Amended mark scheme: P1 for correctly identifying one of the LQ (185), median (195) or UQ (205) from the stem leaf M1 for showing a box and at least 3 correctly plotted values from 175, 185, 195, 205, 215 A1 for a fully correct box plot</p>
17	5 7 9											
18	4 5 5											
19	0 0 1 3 4 5 8											
20	1 3 4 4 5 7											
21	2 3 3 5											

PAPER: 1MA1/3H

Question	Modification	Mark scheme notes
14	Wording added 'shown in the table.'	
17	<p>Question wording 1st line changed to 'It shows the graph of $y = x^2 - 4$'</p> <p>Question demand changed to 'Use the graph to find estimates to the equation $x^2 - 2x - 3 = 0$.'</p> <p>Diagram enlarged and changed (see below). The graph line will go through (-3, 5) and (3,5).</p> 	<p>Mark scheme first P1 now process to rearrange the equation to $x^2 - 4 = 2x - 1$</p> <p>Otherwise standard mark scheme.</p>
18	Diagram enlarged.	Standard mark scheme
19	<p>Diagram enlarged. Right axis labelled.</p> <p>Axes labels moved to the left of the horizontal axis and above the vertical axis.</p>	Standard mark scheme

PAPER: 1MA1/3H		
Question	Modification	Mark scheme notes
23	<p>Diagrams enlarged and model and shape may be provided. Sector $OACB$ labelled as Diagram 1 and the cone labelled as Diagram 2. Add wording 'Diagram 1 shows a sector $OACB$... Diagram 2 shows a hollow cone...' There may be a model of the hollow cone and a cut out shape of the sector $OACB$. Wording added 'The formulae are shown above Diagram 1 and Diagram 2 in the Diagram Book.' Dashed lines made longer and thicker.</p>	Standard mark scheme
24	Diagram enlarged.	Standard mark scheme

