Mark Scheme (Results)

Summer 2022

Pearson Edexcel GCSE
In Mathematics (1MA1)
Foundation (Non-Calculator) Paper 1F

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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 exha**ustive. 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.
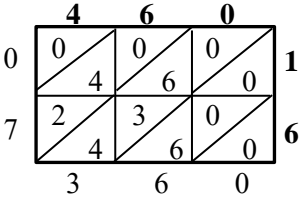
7   Ignoring subsequent work
It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (eg an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).
It is not appropriate 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 (eg 3.5 – 4.2) then this is inclusive of the end points (eg 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 eg 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 eg "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 eg [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 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: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	400	B1	cao	
2	4*e*	B1	for 4*e* oe	e^4 gets no marks, where the 4 is clearly a power
3	Reflection shown	B1	cao	
4	6000	B1	for 6000 oe	Accept six (6) thousand(s) or just thousand(s)
5	45%, $\frac{1}{2}$, 0.55	B1	Accept equivalent notation eg $\frac{45}{100}$, $\frac{50}{100}$, $\frac{55}{100}$ or 45%, 50%, 55% or 0.45, 0.5, 0.55 or a combination of notation	Do NOT accept reverse order
6	8	B1	cao	
7	7	P1	for 20 − 6 (= 14) **or** 20 ÷ 2 (=10) **and** 6 ÷ 2 (=3)	May be seen as a build-up method or by a method of repeated subtraction, listing multiples of 2
		P1	for "14" ÷ 2 (= 7) **or** "10" − "3" (= 7)	
		A1	cao	

Paper: 1MA1/1F					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
8 (a)		Completed bar chart	B2	for a fully correct bar chart	Condone bars of unequal width Condone no gaps or inconsistent gaps
			(B1	for one bar correct eg May plotted at 35 **or** June plotted at 20 **OR** May plotted at 20 **and** June plotted at 35)	
	(b)	Explanation	C1	**Acceptable examples** Half a square is worth 2.5 (not 0.5) It goes to 17.5 Halfway between 15 and 20 is not 15.5 It is between 17 and 18 It could/would be 17 or 18 It goes up in 5s (not 1s) **Not acceptable examples** The bar is in the middle It could/would be 16 (or 19 or 15.6) You can't have half a cm of rain The answer would be a whole number	
9 (a)		Shape drawn	B1	cao	
	(b)	9 and 11	B1	cao	Ignore any subsequent values
10		27	M1 A1	for –15 + 42 (=27) oe cao	SC: B1 for answer of 26 if M0 scored

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
11	£73.60 or 7360p	M1	for 89198 – 88738 (= 460) OR for showing 89198 × 16 **or** 88738 × 16 OR for showing (89198 + 88738) × 16	May see 0.16 used 89198 × 16 = 1427168 88738 × 16 = 1419808 (89198 + 88738) × 16 = 2846976
		M1	for showing "460" × 16 OR for showing 89198 × 16 – 88738 × 16	

		M1	(dep on M1) for a complete method of multiplication with relative place value correct including an intention to add all the appropriate elements of the calculation
			eg, 2 lines of the 1st method, internal numbers of grids, or complete structure shown of partitioning methods.
				Accept in any units, correct figures would imply previous mark
				  4600
				  <u>2760</u>
				  7360
				
				(lattice multiplication grid: 460 × 16 with internal values)
				
				|
					400	60 |
						|---|---|---|
						| 10 | 4000 | 600 |
						| 6 | 2400 | 360 |
						4000+2400+600+360

		A1	for £73.6(0) or 7360p SC B3 for an answer with digits 736 with incorrect or missing units	

Paper: 1MA1/1F					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12 (a)		$\frac{7}{12}$	M1	for finding two fractions with a correct common denominator, with at least one correct corresponding numerator, eg. $\frac{5}{12}$, $\frac{2}{12}$	
			A1	for $\frac{7}{12}$ oe eg $\frac{14}{24}, \frac{21}{36}, \frac{28}{48}, \frac{35}{60}, \frac{42}{72}, \ldots\ldots$	Ignore errors in cancelling following sight of an equivalent fraction to $\frac{7}{12}$
(b)		$\frac{3}{16}$	M1	for method to multiply fractions, eg $\frac{3\times5}{10\times8}$ $(=\frac{15}{80})$ **or** simplifies the calculation eg $\frac{3}{2} \times \frac{1}{8}$ **or** for an answer equivalent to $\frac{3}{16}$ unsimplified	
			A1	cao	
13 (a)		$\frac{4}{15}$	B1	oe	4 : 15 gets B0
(b)		0.7	B1	for 0.7 oe or $\frac{7}{10}$ oe or 70%	
14		19	M1	for a correct substitution, eg (y =) $6 \times 4 - 5$	
			A1	cao	
15 (a)		180	M1	rounds one figure appropriately 92 to 90 or 100 **or** 1.63 to 2 or 1.5 or 1.6 or 1.7	
			A1	for 180 (= 90×2) or 135 (= 90×1.5) or 144 (= 90×1.6) or 153 (= 90 × 1.7) or 200 (= 100×2) or 150 (= 100×1.5) or 160 (= 100×1.6) or 170 (= 100 × 1.7) or 163 (= 100×1.63) or 184 (= 92 × 2) or 138 (= 92 × 1.5) or 147.2 (= 92 × 1.6) or 156.4 (= 92 × 1.7)	Answer of 149.96 (92 × 1.63) gets M0A0 Answer with no working gets M0A0 Ignore further rounding of their result
(b)		947.2	B1	cao	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 (a)	(0)8 45	P1	for 50 ÷ 40 (= 1.25) oe or (time =) (0)8 30 (after travelling for) 40 miles	
		P1	for a process to convert their time to minutes or hours and minutes, eg "1.25" × 60 (= 75 mins = 1 hr 15 mins) **or** for $\frac{10}{40} \times 60$ (= 15 mins)	May be seen as a build-up method and may state 1 hour 15 mins
		A1	for (0)8 45 oe	SC: B2 for answer of (0)8 55 (= 7.30 + 1.25)
(b)	Explanation	C1	**Acceptable examples** It will be earlier Time will be reduced He will get there quicker/faster He will arrive at a different time The journey will be shorter so he will arrive earlier **Not acceptable examples** He will arrive later The time will increase	Explanations must be unambiguous

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	Frequency diagram See end of m/s	C3 (C2 (C1	for a fully correct frequency diagram for at least 5 correct values in the frequency diagram) for at least 3 correct values in the frequency diagram)	If probabilities used instead of frequencies then maximum of C2 can be awarded
(b)	$\frac{12}{72}$	M1	for $\frac{a}{72}$ where $0 < a < 72$ and a is an integer **or** $\frac{12}{b}$ where $b > 12$ and b is an integer **or** 12 : 72 **or** ft their values for 72 and/or 12 from (a)	
		A1	for $\frac{12}{72}$ oe or ft (a)	Accept equivalent decimal or percentage forms of probability Ignore errors in cancelling of their $\frac{12}{72}$
18	100	M1	M1 for a correct first step, eg $25 \div 10$ (= 2.5) **or** $40 \div 10$ (= 4) **or** 20 (scones) = 40×2 (= 80g) **or** 5 (scones) = $40 \div 2$ (= 20g)	Multiplier may be seen as evidence of this mark
		A1	cao	
19	288	M1	for a method to find 20% eg $240 \times 20 \div 100$ (= 48) **or** shows a multiplier of 1.2 oe **or** 120%	
		M1	for a complete method eg 240 + "48" **or** 240×1.2 oe **or** $240 \times 120 \div 100$	
		A1	cao	

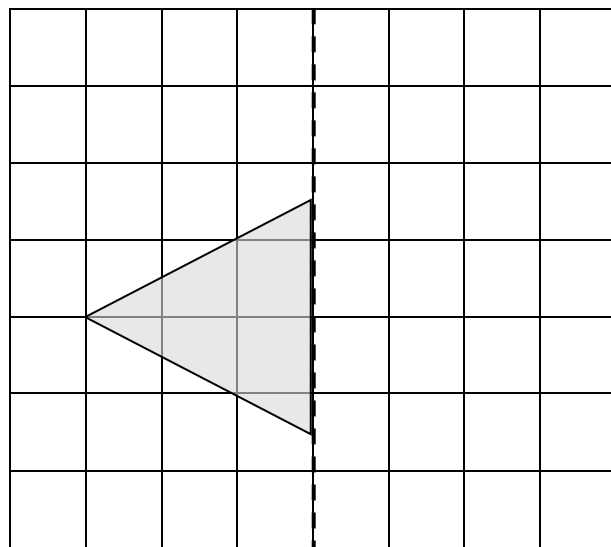| Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	$\frac{39}{88}$	M1	for finding the gap (A) $1 - \frac{5}{8}$ $(=\frac{3}{8}=\frac{33}{88})$ **or** (C) $1 - \frac{9}{11}$ $(=\frac{2}{11}=\frac{16}{88})$ **or** $\frac{5}{8} + \frac{9}{11}$ $(=\frac{55}{88}+\frac{72}{88}=\frac{127}{88})$	
		M1	for $\frac{9}{11} - \frac{3}{8}(=\frac{72}{88} - "\frac{33}{88}")$ **or** $\frac{5}{8} - \frac{2}{11}$ $(=\frac{55}{88} - "\frac{16}{88}")$ **or** $1 - \frac{3}{8} - \frac{2}{11}(=1 - "\frac{33}{88}" - "\frac{16}{88}")$ oe **or** $\frac{5}{8} + \frac{9}{11} - 1$ $(=\frac{55}{88}+\frac{72}{88} - 1)$	
		A1	oe	
21	1 | 79 2 | 55677789 3 | 377 4 | 57 Key: eg 2|5 = 25 **or** 20|5 = 25	B2 (B1 B1	for a fully correct ordered diagram for a complete unordered diagram **or** for an ordered diagram with at most one error or omission) for correct key (units not required but must be correct if stated) eg 2|5 **or** 20|5 represents 25 (years)	Accept stem of 10, 20, 30, 40 Can be in reverse vertical order (with matching leaves) eg 4, 3, 2, 1 Errors can be omissions; one number in the wrong position is one error. Key must be consistent with the stem

22	45π	P1
		
		 P1
		
		 A1
			for (area of circle =) $\pi \times 3^2$
			
			 for (volume =) [area of circle] $\times 5$
			
			 cao
				
				 [area of circle] $\times 5 = \pi \times 3^2 \times 5$ or $\pi \times 6^2 \times 5$ or $\pi \times r^2 \times 5$

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
23	$x < 5$	M1	for adding 27 to both sides or dividing throughout by 7 (in an inequality or an equation) as a first step	
			or showing 5 as the critical value	Can be written as $x = 5$
		A1	cao	
24	$2 \times 2 \times 31$	M1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error **or** by division by prime factors with no more than one error	Condone the inclusion of 1 for this mark
			or for 2, 2, 31, (1)	
		A1	for $2 \times 2 \times 31$ oe	Accept $2^2 \times 31$

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
25	30	P1	for $160 \div (3+7) \ (= 16)$ **or** $\dfrac{3}{3+7} \ (= \dfrac{3}{10})$	
		P1	for "16" $\times 3 \ (= 48)$ **or** "$\dfrac{3}{10}$" $\times 160 \ (= 48)$	
		P1	for a correct step using 48 eg "48" $\div 8 \ (= 6)$ **or** "48" $\times 25 \div 100 \ (= 12)$ **or** (indep) for combining $\dfrac{1}{8}$ and 25%, eg $\dfrac{1}{8} + \dfrac{1}{4} \ (= \dfrac{3}{8})$ or "0.125" + "0.25" $(= 0.375)$ or "12.5"(%) + 25(%) $(= 37.5(\%))$	
		P1	for a complete process to find the number of petrol cars, eg "48" − "6" − "12" oe **or** $(1 - "\dfrac{3}{8}") \times "48"$ oe **or** $\dfrac{3}{10} \times (1 - "\dfrac{3}{8}") \times 160$ oe	
		A1	cao SC B2 for an answer of 100 if P0 scored	Award no marks for a correct answer with no supportive working
26 (a)	0.00163	B1	cao	
(b)	4.38×10^5	B1	cao	
(c)	2.4×10^{-1}	M1	for $4 \times 6 \times 10^{3-5}$ **or** 0.24 oe eg 24×10^{-2} **or** 2.4×10^{n} where $n \neq -1$	
		A1	cao	

Paper: 1MA1/1F					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
27		132	M1	for finding an exterior angle eg 360 ÷ 6 (= 60) or 360 ÷ 5 (= 72) **or** an interior angle eg 180 × 4 ÷ 6 (= 120) or 180 × 3 ÷ 5 (= 108)	Angles may be shown on the diagram Only award this mark for an angle that is not contradicted
			M1	for a complete method eg 360 − "120" – "108" or "60" + "72"	
			A1	cao	Answer only award no marks
28	(a)	5,(1),(-1),-1,1,5	B2	for all 4 values correct	
			(B1	for 2 or 3 correct values)	
	(b)	Graph drawn	B2	for a fully correct graph	Accept a freehand graph drawn that is not made of line segments
			(B1	ft (dep on B1in (a)) for plotting at least 5 of the points from their table correctly)	Ignore anything drawn outside the required range
	(c)	0.3 to 0.5 and 2.5 to 2.7	M1	for a correct method, eg marking intercepts with *x*-axis **or** one correct solution **or** both solutions given as a coordinates, eg (0.4, 2.6) **or** (0.4, 0) **and** (2.6, 0)	ft their graph for this mark Accept these coordinates reversed
			A1	for answers in the range 0.3 to 0.5 and 2.5 to 2.7 **or** ft their graph with at least 2 solutions	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
29	3 : 2	P1	for a process to find either volume eg 3^3 (= 27) or 4^3 (= 64)	
		P1	for showing density **A** = 81 ÷ "27" (= 3) or density **B** = 128 ÷ "64" (= 2)	
		A1	for 3 : 2 oe	Ignore units quoted
30	0.5	B1	for 0.5 or $\frac{1}{2}$ oe	

Qu 3

Qu 17
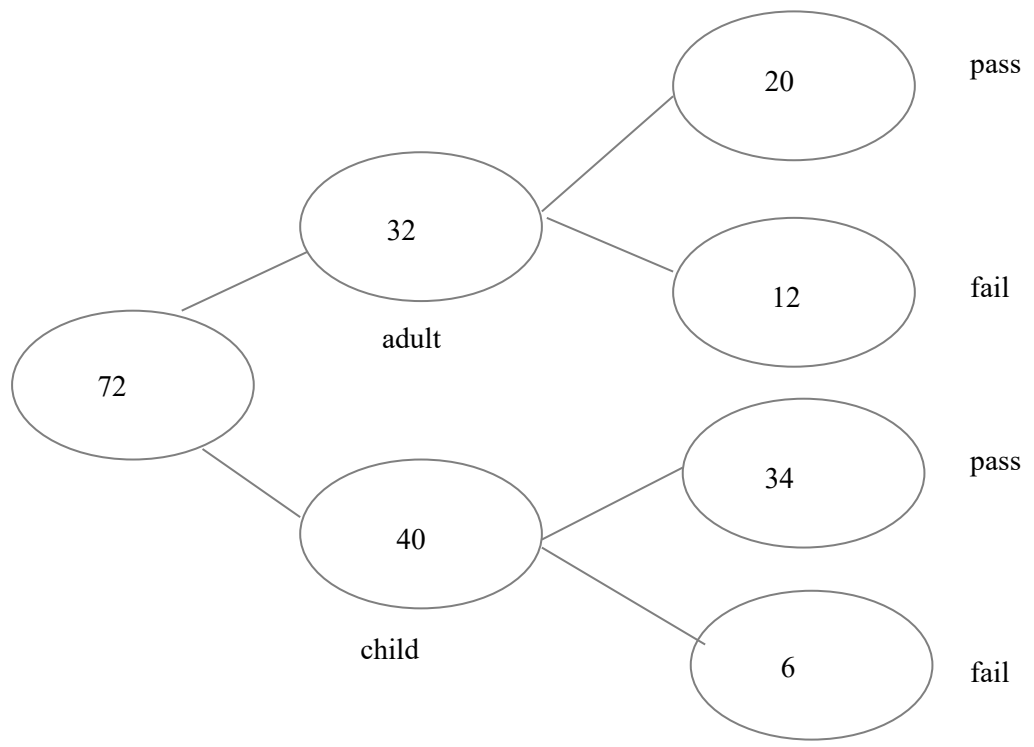
Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 1F

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme. Notes apply to both MLP papers and Braille papers unless otherwise stated.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
2		*e* changed to *p*.	Standard mark scheme but note change of letters
3		Wording added 'Look at the diagram for Question 3 in the Diagram Booklet. It shows a shaded triangle.'; 'You do not need to shade your shape. A cut out shape may be available if you wish to use it.' Cut out shape provided. Diagram enlarged. Shading changed. The dashed lines made longer and thicker. The mirror line labelled at the bottom of the line as well as the top.	Standard mark scheme
5		Wording added 'Write the three numbers below in order of size.'	Standard mark scheme
6		Wording added 'Look at the diagram for Question 6 in the Diagram Booklet. It shows a pictogram which…'. Diagram enlarged. The sun symbols changed to a hollow circle. The key moved above the diagram. The frame removed from the key.	Standard mark scheme
8		Wording added 'Look at the diagram for Question 8 in the Diagram Booklet. It is a bar chart which…'. Diagram enlarged. Shading changed. The right axis labelled. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis. Part (a) wording added 'in the Diagram Booklet.'	Standard mark scheme

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
9		Wording added 'Look at the diagram for Question 9 in the Diagram Booklet. It shows a sequence of patterns made from shaded square tiles.'	
9	(a)	Wording added 'In the space below Pattern number 4, complete Pattern number 5.' The patterns stacked vertically. The labels moved to the left of the patterns. Diagram enlarged. Dotty shading. Pattern 4 repeated and labelled 'Pattern 5 (not completed)'. The candidate then needs to complete this pattern.	Standard mark scheme
9	(b)	Wording added 'Complete the table below.'; 'There are two spaces to fill.' Table turned vertical. For Braille: add (i) and (ii) in the blank spaces and add "Ans: (i) __ (ii) __"	Standard mark scheme
17		Wording added 'Look at the diagram for Question 17 in the Diagram Booklet. It shows an incomplete frequency tree.' In part (a) wording added 'in the Diagram Booklet.'; wording added 'There are seven spaces to fill.' Diagram enlarged. The labels moved above or below the circles. For Braille add (i), (ii), (iii), (iv), (v), (vi) & (vii) in the blank spaces, then add "Ans: (i) __ (ii) __ (iii) __ (iv) __ (v) __ (vi) __ (vii) __"	Standard mark scheme
18		Wording added 'Look at the information for Question 18 in the Diagram Booklet. It shows a…'. Frame removed. Racking lines have been added.	Standard mark scheme
20		Wording added 'Look at the diagram for Question 20 in the Diagram Booklet. It shows…'. Diagram enlarged. The labels moved above the diagrams. The dashed lines made longer and thicker. Shading changed.	Standard mark scheme

PAPER: 1MA1_1F		
Question	**Modification**	**Mark scheme notes**
21	Wording added 'Look at the diagram for Question 21 in the Diagram Booklet. It shows an incomplete stem and leaf diagram.' Wording added 'Below are the ages…'. Wording added 'Show this information in the stem and leaf diagram in the Diagram Booklet.' Diagram enlarged. The key moved above the diagram. A horizontal line added to the bottom of the stem and leaf diagram to help them track along. For Braille: Sentence changed to "The list below shows the ages, in years, of 15 people." No diagram for Braille. Instead, add the sentence "You must include a key."	Standard mark scheme
22	A model may be provided. Wording added 'Look at the diagram for Question 22 in the Diagram Booklet. You may be provided with a model. The model is a cylinder. The diagram shows the plan and the side elevation of a cylinder on a grid.'; '1 square length on the grid represents 1 cm.' added to the Question Paper and the Diagram Booklet. Diagram enlarged. The labels moved above the diagram. 'height' labelled beside the side elevation. Braile wording as follows: "Ask for the model for Question 22. The model is NOT accurate. The model is a cylinder. Look at the diagram for Question 22 in the separate Diagram Booklet. The diagram is a grid of squares showing the plan and side elevation of a cylinder that has been placed on one of its flat faces. Each square on the grid represents a one centimetre square. Work out the …"	Standard mark scheme
27	Wording added 'Look at the diagram for Question 27 in the Diagram Booklet. It shows a regular hexagon and a regular pentagon which share a common side.'. Diagram enlarged. The angle moved outside of the angle arc and the angle arc made smaller. For Braille the diagram has hexagon ABCDEF and pentagon GHICB with x outside the angle arc. Wording now "The diagram is a regular hexagon, ABCDEF, and a regular pentagon, GHICB, joined at the common side, BC." "In the diagram, angle DCI is marked x."	Standard mark scheme

PAPER: 1MA1_1F			
Question		**Modification**	**Mark scheme notes**
28	(a)	Wording added 'Complete the table below…'. The table turned vertical. Wording added 'There are four spaces to fill.' For Braille Add (i), (ii), (iii) & (iv) in the blank spaces and "Ans: (i) __ (ii) __ (iii) __ (iv) __"	Standard mark scheme
28	(b)	Wording added 'Look at the diagram for Question 28(b) in the Diagram Booklet. It shows a grid.' Diagram enlarged. Open headed arrows. Small squares removed. The axes labels moved to the top of the vertical axis and to the right of the horizontal axis.	Standard mark scheme
29		Wording added 'Look at the diagram for Question 29 in the Diagram Booklet. It shows cube A and cube B.' Wording added 'Cube A has sides of length 3 cm'; 'Cube B has sides of length 4 cm.' Diagram enlarged. The diagrams relabelled as 'cube A' and 'cube B'. Braille: have a model with the words "The models represent two cubes, A and B."	Standard mark scheme