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Mark Scheme (Results)

November 2022

Pearson Edexcel GCSE  
In Mathematics (1MA1)  
Foundation (Calculator) Paper 3F

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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 (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  $2 \times 6 (=12)$  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 eg "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 eg [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: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	0.408, 0.41, 0.46, 0.5	B1	for 0.408, 0.41, 0.46, 0.5	Accept written in reverse order
2	2000	B1	cao	Accept two (2) thousand(s) or just thousand(s)
3	0.8	B1	cao	
4	19	B1	cao	
5	18	B1	cao	
6	(a) 6	B1	cao	
	(b) May, October	B1	cao	
7	145.60	P1  P1  A1	for a process to work out the value of the large bars eg $208 \div 4$ (=52 or 5200)  for a process to work out the value of the small bars eg $(208 - "52") \times 60$ or $(1 - \frac{1}{4}) \times 208 \times 60$ (=9360 or 93.6(0)) <b>or</b> for 145.6  for 145.60 cao (must be correct money notation)	units may be ignored for the process marks  work could be in pence or £
8	(a) 102	B1	cao	
	(b) 82	M1  A1	for a method of extracting the correct 4 numbers from the table, adding all 4 numbers and then dividing by 4 eg $(143+121+45+19) \div 4$ or "328" $\div 4$  cao	

Paper: 1MA1/3F					
Question	Answer	Mark	Mark scheme	Additional guidance	
9	(a)	(-1,2)	B1	cao	
	(b)	(1,4) marked	B1	for the point (1, 4) unambiguously marked on the grid	need not be labelled if clear
	(c)	$y = -3$ shown	B1	for correct line unambiguously marked	need not be labelled if clear accept a line drawn freehand
10	(i)	terms given	B1	states two terms eg 11, 10 or 9, 6	May be written on the sequence with no contradiction elsewhere
	(ii)	explanation	C1	<p>explanation</p> <p><b>Acceptable examples</b>            Take away 2 then 1; take away 4 then 3            The difference goes down by 1 each time            -4, -3; -2, -1            The differences are 4 and 3; the differences are 2 and 1</p> <p><b>Not acceptable examples</b>            It goes down by 1 each time            An algebraic rule</p>	
11		160	M1	for $8 \times 5 \times 4$	
			A1	cao	
12		1 : 6 : 3	M1	for any two algebraic statements from $x$ , $6x$ , $6x/2$ oe <b>or</b> any two numbers as a correct ratio eg 1 : 6 or 6 : 3 or 1 : 3 oe <b>or</b> any 3-term ratio using the numbers 1, 6 and 3	For any equivalent ratio.
			A1	oe	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
13	(a)(i) 40	B1	cao	Underlined words need to be shown.
	(ii) Reason	C1	Reason given <u>Angles</u> in a <u>quadrilateral</u> add up to 360. Accept "4-sided shape"	
	(b) Explanation	C1	Explanation  <b>Acceptable examples</b> 190 > 180 It does not add up to 180 80+60+50=190 Angles in a triangle add up to 180  <b>Not acceptable examples</b> One of the angles needs to be less You cannot draw this triangle	
14	(a) 30	B1	cao	Condone some inaccuracy in reading from the graph, which should be given to within the nearest 50g
	(b) 2238 to 2296	M1  A1	for a complete method eg attempts to read from the graph at a factor of 80 <b>and</b> scales up to 80 using a correct scale <b>or</b> attempts to read from the graph using numbers that sum to 80 <b>and</b> finds the sum of their readings <b>or</b> attempts to read from the graph a number that they then go on to scale up to 80 using a correct scaling factor  for an answer in the range 2238 to 2296	





Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
16	Comments	C1	<p>makes some comment about the labels</p> <p><b>Acceptable examples</b>  states what labels should be (not angles)  labels are missing  The label in the table does not match the label with the pie chart</p> <p><b>Not acceptable examples</b>  angles not marked on the pie chart</p>	
		C1	<p>comments about the inaccuracy of the angles in the pie chart</p> <p><b>Acceptable examples</b>  pie chart is not accurate / should be 108, 126,126  angles drawn inaccurately  They haven't converted the number of potatoes to angles  Need to scale the numbers in the table</p> <p><b>Not acceptable examples</b>  pie chart is wrong/ sectors are the wrong size  (the angles) do not add up to 360</p>	
17	(a) 87 600	B1	cao	
	(b) 13.524	M1	for 33.81 or 2.5 or $\frac{3381}{250}$ or digits 13524	
		A1	cao	
18	Rotation drawn	B2	correct shape drawn at (2,-1), (2,-4), (4,-2), (4,-1)	
		(B1)	for a correct shape drawn clockwise 90° about (0,0) or a shape drawn in the correct quadrant with the correct orientation or a shape with at least 3 vertices correct	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
19	(a) 15 (b) 4.6 (c) 12	B1 B1 M1 A1	cao for an answer in the range 4.4 to 4.8 for a method to calculate speed eg distance $\div$ time (could be implied from figures used) eg $4 \div 20 (= 0.2)$ oe, $4 \div 0.33(\dots)$ oe or $4 \div 1/3$ oe cao	Accept readings from the graph as an indication at this stage
20	100g butter 25g sugar 1 egg	P1 P1 P1 C1	for process to find the amount needed of one ingredient for 25 scones for process to find the amount needed for at least three ingredients for 25 scones <b>or</b> for process to find the correct amount more for at least two of butter, sugar, eggs for complete process to find amount more for each of butter, sugar, eggs for correct amounts more shown for butter, sugar, eggs	amount needed: 200g butter 875 flour 75 sugar 5 eggs  Flour can be excluded, but no incorrect information about flour should be given.
21	$a = \frac{p+9}{3}$	M1 A1	for correct first step to rearrange eg $p + 9 = 3a - 9 + 9$ or $\frac{p}{3} = \frac{3a-9}{3}$ oe <b>or</b> answer ambiguously shown eg $a = p + 9 \div 3$ or given as $\frac{p+9}{3}$ oe oe	May be seen in different equivalent forms but must be carried out, not just intention seen.

Paper: 1MA1/3F																									
Question	Answer	Mark	Mark scheme		Additional guidance																				
22	Description	C1	<p>Identifies a mistake in the working</p> <p><b>Acceptable examples</b>            Rob should divide by 8            He should have added the 3 and 5 first            He divided 120 by 3 and 5 instead of 8</p> <p>He did not do it as <math>120 \times \frac{3}{8}</math> and <math>120 \times \frac{5}{8}</math></p> <p>He did not add the two ratios first</p> <p><b>Not acceptable examples</b>            He has done it in two parts but he should do it in one            The answer should be 45 : 75            They do not add up to 120            He is supposed to add his numbers            40 + 24 does not equal 120</p>																						
23	22	P1  P1  A1	<p>for process to find total choosing German eg <math>200 - 104 - 70 (=26)</math></p> <p>for complete process to find boys choosing Spanish eg <math>90 - (60 + ("26" - 18))</math></p> <p>cao</p>	<p>for process to find girls choosing French (44) or total number of girls (110)</p> <p>for complete process to find boys choosing Spanish eg <math>70 - ("110" - "44" - 18)</math></p>	<table border="1"> <thead> <tr> <th></th> <th>F</th> <th>S</th> <th>G</th> <th>total</th> </tr> </thead> <tbody> <tr> <td>girls</td> <td><b>44</b></td> <td><b>48</b></td> <td>18</td> <td><b>110</b></td> </tr> <tr> <td>boys</td> <td>60</td> <td><b>22</b></td> <td><b>8</b></td> <td>90</td> </tr> <tr> <td>total</td> <td>104</td> <td>70</td> <td><b>26</b></td> <td>200</td> </tr> </tbody> </table>		F	S	G	total	girls	<b>44</b>	<b>48</b>	18	<b>110</b>	boys	60	<b>22</b>	<b>8</b>	90	total	104	70	<b>26</b>	200
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total	104	70	<b>26</b>	200																					

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
24	Yes (supported)	P1  P1  P1  C1	<p>for a process to find the volume of 1 tank eg <math>\pi \times 40^2 \times 160</math> (= 804247.7... or 804.2...or 256000<math>\pi</math>)</p> <p>for complete process to find the volume of 4 tanks, [volume of tank] <math>\times</math> 4 eg <math>\pi \times 40^2 \times 160 \times 4</math> (= 3216990.8... or 3216.9... or 1024000<math>\pi</math>) <b>or</b> for process to find volume of fertiliser available per tank eg <math>32 \times 1000 \div 4</math> (= 8000)</p> <p>for a process to find the amount of mixture for 1 tank eg [volume of tank] <math>\div</math> 101 (= 7962.8...) or 4 tanks (= 31851.3...) <b>OR</b> for a process to find volume of mixture that 32 litres of fertiliser will make eg <math>32000 \times 101</math> (= 3232000) or <math>32 \times 101</math> (= 3232)</p> <p>for Yes supported by correct figures shown eg a comparable figure in the range 31.8 to 31.9 (litres) <b>or</b> in the range 31800 to 31900 with 32000 (cm<sup>3</sup>) <b>or</b> in the range 3216 to 3217 with 3232 (litres) <b>or</b> in the range 3216000 to 3217000 with 3232000 (cm<sup>3</sup>) <b>or</b> in the range 7958 to 7963 with 8000 (cm<sup>3</sup>)</p>	<p>Could be truncated or rounded</p> <p>For this mark [volume of tank] must come from a calculation involving <math>\pi</math>, <math>r^2</math>, <math>h</math></p> <p>For this mark [volume of tank] must come from a calculation involving <math>\pi</math>, <math>r^2</math>, <math>h</math> <b>or</b> be stated as their volume</p> <p>There are other possible pairs of values which can be used in the comparison</p>
25	(a) 16  (b) 5.5	M1  A1  M1  A1	<p>for a ratio of <math>\frac{20}{5}</math> or <math>\frac{5}{20}</math> or 4 or 0.25 or <math>\frac{5}{4}</math> or <math>\frac{4}{5}</math> or 1.25 or 0.8 oe</p> <p>cao</p> <p>for <math>22 \times</math> “0.25” or <math>22 \div</math> “4” oe</p> <p>oe</p>	

Paper: 1MA1/3F						
Question	Answer	Mark	Mark scheme	Additional guidance		
26 (a)	0.7	B1	for 0.7 on the first branch	Accept equivalent fractions or percentages for probabilities		
	0.65, 0.65	B1	for 0.65, 0.65 on the second branches			
	(b)	0.105	M1		for $0.3 \times 0.35$	
			A1		oe	
27 (a)	0.008	B1	for 0.008 or $8 \times 10^{-3}$	May be awarded at any stage		
		(b)	50		M1	for conversion from km to m eg $180 \times 1000 (= 180\ 000)$ <b>or</b> for conversion from hours to seconds eg $180 \div (60 \times 60) (= 0.05)$ <b>or</b> for conversion from km per hour to metres per second, eg $1000 \div (60 \times 60) (= 0.277\dots)$ (Accept $(60 \times 60) \div 1000 (= 3.6)$ )
					M1	for a complete process eg $180 \times 1000 \div 3600$
					A1	cao
28	158	P1	for a first step in the process eg $50 \times 167.6 (=8380)$ or $20 \times 182 (=3640)$			
		P1	for a complete process eg $(50 \times 167.6 - 20 \times 182) \div 30$ or $\frac{8380 - 3640}{30}$ or $4740 \div 30$			
		A1	cao			

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
29	(a) 0.000675	B1	cao	If the answer (for 2 marks) is seen in working and then rounded or truncated, award full marks.
	(b) $6.592 \times 10^5$	M1	for $10.5472 \times 10^3$ oe or $1.6 \times 10^8$ oe or $2.575 \times 10^{-1}$ oe or for $6.592 \times 10^n$ where $n \neq 5$ or for $6.59 \times 10^5$ or for $6.6 \times 10^5$ or for 659200 oe	
		A1	cao	
30	(a)(i) $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$	B1	for $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$	Need not be shown in brackets at this stage
	(ii) $\begin{pmatrix} 0 \\ 5 \end{pmatrix}$	M1	for substitution of values eg $\begin{pmatrix} 2 \times 2 - 4 \\ 3 \times 2 - 1 \end{pmatrix}$ oe  <b>OR</b> for $\begin{pmatrix} 0 \\ b \end{pmatrix}$ or $\begin{pmatrix} a \\ 5 \end{pmatrix}$ where $a, b$ are integer values.	
		A1	for $\begin{pmatrix} 0 \\ 5 \end{pmatrix}$	
	(b) correct vector drawn	C1	for a correct vector drawn from point P	Need not be labelled but do not award if there is any ambiguity.

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

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:  $\pm 5^\circ$

Measurements of length:  $\pm 5$  mm

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PAPER: 1MA1_3F		
Question	Modification	Mark scheme notes
1	Word added 'four'. Numbers left aligned.	Standard mark scheme
5	The wording 'Here is a list of numbers' removed and replaced with 'Below is a list of five numbers'. Numbers left aligned.	Standard mark scheme
6	Wording added 'Look at the diagram for Question 6 in the Diagram Booklet.' The wording 'The graph shows' removed and replaced with 'It shows a graph with'. Diagram enlarged. Axes labels moved to above the vertical axis and left on the horizontal axis. Crosses changed to dots. Right axis labelled. Open headed arrows. Small squares removed	Standard mark scheme
8	Wording added 'Look at the table for Question 8 in the Diagram Booklet.' Table turned vertical. Table enlarged	Standard mark scheme
9	Wording added 'Look at the diagram for Question 9 in the Diagram Booklet. The diagram shows point A on the grid.' Axes labels moved to above the vertical axis and right on the horizontal axis. Cross changed to a dot. Open headed arrows. Diagram enlarged. In part (b) the wording 'with a cross (X)' removed.	Standard mark scheme
11	Wording added 'Look at the diagram for Question 11 in the Diagram Booklet.' The wording 'Here is a cuboid' removed and replaced with 'The diagram shows a cuboid with length 8cm, width 4cm and height 5cm.' Diagram enlarged. '5cm' label moved to left side.	Standard mark scheme
12	Wording added 'Look at the information in the Diagram Booklet. It shows a ratio.' Left align the ratio.	Standard mark scheme
13	(a) Wording added 'Look at the diagram for Question 13(a) in the Diagram Booklet.' Diagram enlarged and rotated to make side CD horizontal. Wording added: 'Angle DAB = Angle ABC = 120°; Angle BCD = 80°; Angle CDA is marked x' Angles moved outside angle arcs. Angle arcs made smaller.	Standard mark scheme
13	(b) Wording added 'Look at the diagram for Question 13(b) in the Diagram Booklet.' The word 'below' removed. Wording added 'The three angles are marked 80°, 60° and 50°.' Diagram enlarged. Angles moved outside angle arcs. Angle arcs made smaller.	Standard mark scheme
14	Wording added 'Look at the diagram for Question 14 in the Diagram Booklet.' Axes labels moved to above the vertical axis and left on the horizontal axis. Open headed arrows. Diagram enlarged. Small squares removed. Right axis labelled. Graph line thickened. Part (b) changed from 80g to 75g	Standard mark scheme in (a) In (b) apply the standard mark scheme for M1 but for 75 instead of 80 A1 2000 to 2250

PAPER: 1MA1_3F		
Question	Modification	Mark scheme notes
16	Wording added 'Look at the table and the diagram for Question 16 in the Diagram Booklet.' Wording added 'in the Diagram Booklet'. Table enlarged. Diagram enlarged. The word 'this' removed and replaced with 'the' twice. Wording added 'in the Diagram Booklet' twice.	Standard mark scheme
18	Shape labelled 'shape A' and another 'shape B' added. Shading changed. The wording 'Rotate the shaded shape 90° anticlockwise about (0,0)' removed and replaced with 'Describe fully the single transformation that maps shape A onto shape B.'	<b>B2</b> for (i) rotation (ii) 90 (iii) anticlockwise (iv) (0,0)  Accept 270 AND clockwise for (ii) & (iii) and "origin" for (0,0)  <b>(B1</b> for two of the above aspects) If there is any indication of any other transformation award 0 marks.
19	Wording added 'Look at the diagram for Question 19 in the Diagram Booklet.' Wording added 'In the Diagram Booklet'. Diagram enlarged. Small squares removed. Axes labels moved above the vertical axis and left on the horizontal axis. Right axis labelled. Open headed arrows. Graph line thickened.	Standard mark scheme
20	Wording added 'Look at the information for Question 20 in the Diagram Booklet.' The wording 'Here' removed and replaced with 'It shows'. Frame removed. Information left aligned	Standard mark scheme
21	Value changed: a to n	Standard mark scheme but note change of letter.
22	Equations stacked vertically and moved left with equals symbols aligned.	Standard mark scheme
24	Wording added 'Look at the diagram for Question 24 in the Diagram Booklet. You may be provided with a model. It is not accurate.' Diagram enlarged. Model provided. '160cm' label moved to left side.	Standard mark scheme
25	Wording added 'Look at the diagram for Question 25 in the DB.' Diagrams stack vertically and enlarged. Angle arcs made smaller. Arcs at C and F separated more. Wording added: AC = 5 cm; BC = 4 cm; DE = 20 cm; DF = 22 cm; 'Angle ABC = Angle DEF' ; 'Angle ACB = DFE'	Standard mark scheme
26	Wording added 'Look at the diagram for Question 26 in the DB.' Diagram enlarged.	Standard mark scheme
30	(b) Wording added 'Look at the diagram for Question 30(b) in the DB.' Diagram enlarged. Cross changed to a dot.	Standard mark scheme

