



Mark Scheme (Results)

Summer 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	$\frac{35}{100}$	B1	for $\frac{35}{100}$ oe	
2	7	B1	cao	
3	Two from 1, 2, 3, 4, 6, 12	B1	for any two correct factors from 1, 2, 3, 4, 6, 12	Do not allow any incorrect numbers
4	$6m$	B1	for $6m$	
5	1.3	B1	cao	
6	drawing of a parallelogram	B2 (B1)	for an accurate drawing of a parallelogram that is not a rectangle or a rhombus for a quadrilateral drawn with no lines of symmetry or for a quadrilateral drawn with rotational symmetry of order 2)	Accept freehand drawings with some inaccuracy if the intention is clear
7	29	P1 P1 A1	for a start to a process, eg. (total apples =) $86 + 75 + 92 (= 253)$ or (total oranges =) $68 + 80 + 76 (= 224)$ or differences each week, eg. (week 1) $86 - 68 (= 18)$ or (week 2) $75 - 80 (= -5)$ or (week 3) $92 - 76 (= 16)$ for complete process, eg “253” – “224” or “18” + “– 5” + “16” cao	

Paper: 1MA1/3F					
Question		Answer	Mark	Mark scheme	Additional guidance
8	(a)	28 33	B1	cao	One correct, one incorrect statement gets C1 as long as they are not contradictory.
	(b)	Explanation	C1	<p>for explanation</p> <p>Acceptable examples</p> <p>all terms end in 3 or 8</p> <p>there are no terms that end in 0</p> <p>50 does not end in 3 or 8</p> <p>48 and 53 are both in the sequence (could be shown)</p> <p>48 is in the sequence and 50 is 2 more</p> <p>$5n-2=50$ so n is not a whole number.</p> <p>if it started at 0 then it would but it starts at 3 so it never will</p> <p>or shows sequence continuing up to and beyond 50</p> <p>Not acceptable examples</p> <p>adding 5 each time will not lead to 50 (insufficient)</p> <p>it goes past 50</p> <p>the closest number to 50 is 48</p>	
9	(a)	5	B1	cao	
	(b)	9	B1	cao	
10	(a)	cross at 0	B1	cao	<p>To fit “5” the “5” needs to be clearly stated as being the number of even numbers; otherwise accept 5 only; could be indicated alongside the given numbers.</p> <p>Could be written as a decimal (0.62, 0.625 or 0.63) or equivalent percentages to these</p>
	(b)	cross at $\frac{1}{2}$	B1	cao	
	(c)	$\frac{5}{8}$	M1	<p>for $\frac{5}{a}$ where $a > 5$ or $\frac{b}{8}$ where $b < 8$</p> <p>or for identifying all the even numbers, 2, 6 and 8</p> <p>or for writing the correct probability using the wrong notation eg 5 : 8</p>	
			A1	<p>for $\frac{5}{8}$ oe</p>	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
11	Yes (supported)	M1 M1 C1	for $48 \times 3 (=144)$ or $35 \times 4 (= 140)$ or $48 \div 4 (=12)$ for $48 \times 3 (=144)$ and $35 \times 4 (= 140)$ or “140” $\div 48 (=2.9\dots)$ or “140” $\div 3 (=46.6\dots)$ or “12” $\times 3 (=36)$ or “144” $\div 4 (=36)$ or “144” $\div 35 (=4.1\dots)$ for Yes with 144 and 140 OR 36 OR 2.9... OR 4 (spare) OR 4.1... (each frame) OR 46.6... (in each box)	
12	$\frac{3}{50}$	M1 A1	for $\frac{60}{1000}$ or equivalent fraction cao	
13 (a)	300	M1 M1 A1	for a correct method to measure and convert one line to a distance in metres, eg. ($AB =$) $5 \times 150 (= 750)$ or in the range 720 to 780 or ($BC =$) $4 \times 150 (= 600)$ or in the range 570 to 630 or ($AC =$) $7 \times 150 (= 1050)$ or in the range 1020 to 1080 or for $5 + 4 - 7 (=2)$ or in the range 1.4 to 2.6 for a complete method, eg. “750” + “600” – “1050” or “2” $\times 150$ for answer in the range 210 to 390	Accept measurements given in mm instead of cm for the first mark. Accept measurements given to a tolerance of $\pm 2\text{mm}$
(b)	288	B1	for answer in the range 286 to 290	Where “750”, “600”, “1050” and “2” have come from their measurements

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
14 (a)	7	B1	cao	Simply quoting values for median, range is insufficient; they must be compared.
(b)	5	B1	cao	
(c)		C2 (C1)	ft for correct comparison of both medians and ranges, eg. median of boys shoe sizes is greater than the median of the girls shoe sizes and the range of the boys shoe sizes is greater than the range of the girls shoe sizes. ft for a correct comparison of either medians or ranges)	
15	5	M1 A1	for 40.15 or 8.03 seen in working cao	
16	Triangle drawn	B2 (B1)	for an isosceles triangle drawn with the product of the base and perpendicular height being 24, eg. 6×4 or 4×6 or 8×3 or 3×8 for any isosceles triangle drawn or for any triangle with 24 as the product of the base and the perpendicular height)	Accept triangle drawn in any orientation or drawn freehand.
17 (a)	$12 - 6x$	B1	for $12 - 6x$ (accept $-6x + 12$)	Do not accept ambiguous algebraic expressions Do not accept equivalent expressions not fully factorised
(b)	16	M1 A1	for a correct first step, eg. $3y = 12 \times 4 (= 48)$ or $\frac{y}{4} = \frac{12}{3}$ cao	
(c)	$2(2p + 3)$	B1	cao	
18 (a)	2500	B1	cao	
(b)	0.09	B1	cao	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
19	42	<p>P1</p> <p>P1</p> <p>P1</p> <p>A1</p>	<p>for process to find number of red counters, eg. $400 \div 8 \times 3 (= 150)$ or process to convert both to percentages: $3/8$ as 37.5 and $82/400$ as 20.5 or process to convert both to fractions with common denominator: eg $3/8$ as $75/200$ and $82/400$ as $41/200$ oe</p> <p>for process to find number of green counters, eg $400 - "150" - 82 (=168)$</p> <p>or process to find the percentage of red and yellow counters eg $"37.5" + "20.5" (=58)$ or $("150" + 82) \div 400 \times 100 (=58)$</p> <p>for complete process to find the percentage of counters that are green, eg $"168" \div 400 \times 100$ or $100 - (37.5 + 20.5)$ or $100 - "58"$</p> <p>cao</p>	<p>NB could use other decimals eg 0.375, 0.205 or % or fractions</p>
20	118 with reasons	<p>M1</p> <p>M1</p> <p>C1</p> <p>C1</p> <p>A1</p>	<p>for angle $QPR = 56$ or $CQP = 56$</p> <p>for angle $PQR = (180 - 56) \div 2 (= 62)$</p> <p>(dep on a previous M1) for giving a reason relating to parallel lines: angle $CQR = 180 - "62"$ (<u>Allied angles</u> / <u>Co-interior</u> angles add up to 180) or angle $CQP = 56$ (<u>corresponding angles</u> are equal) or use "angle QPR" (<u>alternate angles</u> are equal)</p> <p>(dep on a previous M1) for at least one reason given from: vertically <u>opposite angles</u> are equal OR <u>vertically opposite</u> angles are equal or base angles of an <u>isosceles triangle</u> are equal or <u>Angles</u> in a <u>triangle</u> add up to 180</p> <p>for 118</p>	<p>Angles must be clearly labelled on the diagram or otherwise identified. Full solution must be seen. Correct method can be implied from angles on the diagram if no ambiguity or contradiction.</p> <p>When reasons are given the key words underlined must be present. Reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.</p>

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
21	168	M1 A1	for a list of at least 3 multiples of each number or for factors 3,2,2,2 oe and 7,2,2,2 oe (could be shown in a factor tree or Venn diagram or table) cao	Condone the use of 1 as a factor
22	7.5	M1 A1	for correct use of Pythagoras, eg. $8.5^2 - 4^2 (= 56.25)$ or $4^2 + x^2 = 8.5^2$ for 7.5 or $7\frac{1}{2}$ or $\frac{15}{2}$	Must have values substituted Trigonometry may be used but M1 only awarded when complete method shown.
23 (a)	25	M1 A1	for $(T =) 4 \times (-3)^2 - 11$ or $4 \times (-3)^2 = 36$ cao	Can accept missing brackets
(b)	$p = \frac{d-4}{3}$ oe	M1 A1	for a correct first step, eg. $d - 4 = 3p$ or $\frac{d}{3} = p + \frac{4}{3}$ or for $\frac{d-4}{3}$ as answer for $p = \frac{d-4}{3}$ oe	May be in unsimplified form, eg $d - 4 = 3p + 4 - 4$

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
24	1.5	<p>P1</p> <p>P1</p> <p>P1</p> <p>P1</p> <p>A1</p>	<p>for process to develop 3 algebraic expressions, eg. (R =) n, (S =) $2n$, (T =) $2n - 6$, oe, at least two must be correct. or for selecting 3 values satisfying the given criteria, eg. (R =) 10, (S =) 20, (T =) 14</p> <p>for process to sum 3 algebraic expressions and equating to 54, eg. $n + "2n" + "2n - 6" = 54$ or for finding the correct sum of their values eg. $"10" + "20" + "14" = 44$</p> <p>for start of process to solve the correct linear equation, eg. $5n = 54 + 6$ ($n = 12$) or for 12, 24, 18</p> <p>for $"12" : 2 \times "12" - 6$ oe eg 12 : 18 oe or 18 : 12 linked to T, R</p> <p>for 1.5 or $\frac{3}{2}$ or $1\frac{1}{2}$</p>	Accept 1 : 1.5 etc as answer

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
25	Chic Decor (supported)	P1	<p>for process to find cost of 15 rolls from Chic Decor, eg $\frac{15}{3} \times 36 (= 180)$</p> <p>or</p> <p>for process to find cost of 15 rolls from Style Papers at normal price, eg $\frac{15}{5} \times 70 (= 210)$</p> <p>or</p> <p>for process to find cost of 1 roll from Chic Decor, eg $36 \div 3 (= 12)$</p> <p>or</p> <p>for process to find cost of 1 roll from Style Papers, eg $70 \div 5 (= 14)$</p> <p>or</p> <p>for process to find the cost of 5 rolls from Chic Decor, eg $\frac{36}{3} \times 5 (= 60)$</p>	Could compare the costs for any number of rolls
		P1	<p>for any first step in using the discount at Style Papers, eg $0.12 \times "210" (= 25.2(0))$ or $0.12 \times "14" (= 1.68)$ or $0.12 \times 70 (= 8.4(0))$</p> <p>or $1 - 0.12 (= 0.88)$</p>	
		P1	<p>for full process to find cost from Style Papers, eg. $"210" - "25.2" \text{ oe } (=184.8(0))$ or $"0.88" \times "210"$</p> <p>or for $"14" - "1.68" \text{ oe } (= 12.32)$ or $"0.88" \times "14"$</p> <p>or for $70 - "8.4(0)" \text{ oe } (= 61.6(0))$ or $"0.88" \times 70$</p>	
		C1	<p>for Chic Decor with fully correct figures</p> <p>eg 180 and 184.8(0)</p> <p>or 12 and 12.32</p> <p>or 60 and 61.6(0)</p>	

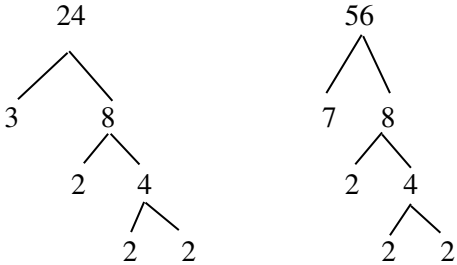
Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
28	Complete chain of reasoning	M1	for (area of trapezium $TQRS = 0.5 \times 4x \times (2x + 3x)$ or for (area of rectangle $TUVS = 4x \times (3x + 5) (= 12x^2 + 20x)$	Evidence for the award of marks may be seen on the diagram Alternative methods may be seen. Accept x for $(3x - 2x)$
		M1	for (area of trapezium $QUVR = 4x(3x + 5) - 0.5 \times 4x \times (2x + 3x)$	
		C1	for correct algebraic processing and simplification to the given form	
		M1	Alternative 1 for ($QU = 3x + 5 - 2x (= x + 5)$	
		M1	for (area of trapezium $QUVR = 0.5 \times 4x \times ((x + 5) + 5)$ or $0.5 \times 4x \times (x + 10)$	
		C1	for correct algebraic processing and simplification to the given form	
		M1	Alternative 2 for (area of triangle $= 0.5 \times (3x - 2x) \times 4x$ or for (area of rectangle $= 4x \times 5$	
		M1	for (area of trapezium $QUVR = 0.5 \times (3x - 2x) \times 4x + 4x \times 5$	
29	108	M1	for $30 \times 60 \times 60$ (108000 metres per hour) or $30 \div 1000 (= 0.03$ kilometres per second) or $60 \times 60 \div 1000 (= 3.6$ scale factor)	
		A1	cao	
30	16 000	M1	for $13600 \div 0.85 (= 16000)$ oe	
		A1	cao	

Notes for question 21.

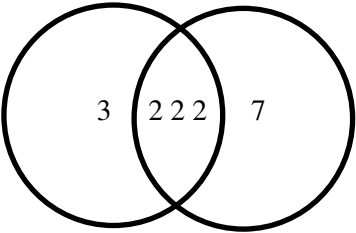
Multiples of 24: 24, 48, 72, 96, 120, 144, 168, 192...

Multiples of 56: 56, 112, 168, 224...

Factor trees:



Venn Diagram



Condone display of 1 as a factor

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: ± 5 mm

PAPER: 1MA1_3F			
Question		Modification	Mark scheme notes
6		Wording added ‘Look at the diagram for Question 6 in the Diagram Booklet. It shows a blank grid.’ Diagram enlarged.	Standard mark scheme
7		Wording added ‘Look at the table for Question 7 in the Diagram Booklet. It shows...’ Braille: Add “The table below shows ...”; the table turned vertical	Standard mark scheme
8		Wording added ‘Below are the...’. Braille: Sentence changed to “Look at the list of numbers below. The list shows the first five terms of a number sequence.”	Standard mark scheme
9		Wording added ‘Look at the diagram for Question 9 in the Diagram Booklet. You may be provided with a model. They show a...’. Diagram enlarged. Dashed lines made longer and thicker. Model may be provided. Braille: Sentence changed to “ The model represents a solid triangular prism.”	Standard mark scheme
10		Wording added ‘Below is a list...’. In part (a) wording added ‘Look at the diagram for Question 10(a) in the Diagram Booklet. It shows a probability scale. On the probability scale, mark the probability...’. Diagram enlarged. The numbers moved above the scale. In part (b) wording added ‘Look at the diagram for Question 10(b) in the Diagram Booklet. It shows a probability scale. On the probability scale, mark the probability...’. Diagram enlarged. The numbers moved above the scale.	Standard mark scheme

PAPER: 1MA1_3F		
Question	Modification	Mark scheme notes
13	<p>Wording added 'Look at the diagram for Question 13 in the Diagram Booklet. It is an accurately drawn map which shows...'. The north lines made 9 cm and the line AC made 14 cm so that specialist equipment can be used. The distance between AB made 10 cm and BC made 8 cm so that they can be measured accurately. The angle between AC and the north line on the right made 70° so that it can be measured accurately. Open headed arrows. Frame removed. Scale moved above the diagram and changed from 150 metres to 75 metres. Dashed lines added between each of the points AC, AB and BC.</p>	<p>M1 for a correct method to measure and convert one line to a distance in metres, eg. (AB =) 10×75 (= 750 or in the range 735 to 765) or (BC =) 8×75 (= 600 or in the range 585 to 615) or (AC =) 14×75 (= 1050 or in the range 1035 to 1065) or for $10 + 8 - 14$ (=4) or figures in the ranges 9.5 to 10.5, 7.5 to 8.5, 13.5 to 14.5, 3.5 to 4.5 M1 for a complete method, eg. "750" + "600" – "1050" or ("10" + "8" – "14") \times 75 A1 for answer in the range 225 to 375 (b) B1 for answer in the range 285 to 295</p>
14	<p>Wording added 'Below is the shoe size...'. </p>	Standard mark scheme
16	<p>Wording added 'Look at the diagram for Question 16 in the Diagram Booklet. It shows a blank grid. On the grid, draw...'; Diagram enlarged. Wording '1 square length on the grid represents 1 cm.' added to the Question Paper and the Diagram. Braille: Add "The diagram is a grid of squares. Each square represents a 1 cm square." Remove the word 'centimetre'</p>	Standard mark scheme
20	<p>Wording added 'Look at the diagram for Question 20 in the Diagram Booklet.' Diagram enlarged. Open headed arrows. The angle moved outside of the angle arc and the angle arc made smaller.</p>	Standard mark scheme
22	<p>Wording added 'Look at the diagram for Question 22 in the Diagram Booklet. It shows a right-angled triangle, ABC.' Diagram enlarged. The diagram labelled ABC. Wording added: 'AB = 4 cm AC = 8.5 cm BC = x cm'. Wording added 'Angle ABC is a right angle.' The right angle made more obvious.</p>	Standard mark scheme

PAPER: 1MA1_3F			
Question		Modification	Mark scheme notes
23	(b)	The letter 'd' changed to 'n'	Standard mark scheme but note the change of letter
24		Wording added 'Look at the information for Question 24 in the Diagram Booklet.' Wording added 'as shown in the ratio.'	Standard mark scheme
25		Wording added 'Look at the information for Question 25 in the Diagram Booklet.' Wording added 'The information in the Diagram Booklet shows the cost...'. Diagram enlarged. The information stacked vertically.	Standard mark scheme
26		Wording added 'Look at the diagram for Question 26 in the Diagram Booklet. It shows a frequency polygon.' Wording added 'The table below...'. Wording added 'Amos draws the frequency polygon in the Diagram Booklet...'. Diagram enlarged. Open headed arrows. Change the crosses to dots. The axes labels moved to the top of the vertical axis and to the left of the horizontal axis.	Standard mark scheme
28		The letter x changed to y. Wording added 'Look at the diagram for Question 28 in the Diagram Booklet. It shows...'. Wording added: 'TQ = 2y cm, TS = 4y cm, SR = 3y cm, RV = 5 cm' Wording added 'The trapezium QUVR is shaded.' Diagram enlarged. Open headed arrows. The text moved out of the arrows. Shading changed.	Standard mark scheme

