

Mark Scheme (Results)

November 2017

Pearson Edexcel GCSE (9 – 1)
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.

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. (e.g.. 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 (e.g.. 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.

Guidance on the use of abbreviations within this mark scheme

M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
1		4000	B1	for 4000
2		2y	B1	for 2y
3		1, 2, 3, 6, 9, 18	B2 [B1]	for all 6 factors with no incorrect for at least 3 factors with no more than one error]
4 (a)	$5.80 \times 3 + 7.80 = 25.20$	90p or £0.90	M1 M1 A1	for a correct first step from which a complete method could be developed, eg. $5.8(0) \times 3 (= 17.4(0))$ or $24.3(0) - 7.8(0) (= 16.5(0))$ for complete method, eg. $7.8(0) + 5.8(0) \times 3 - 24.3(0) (= 0.9(0))$ for answer in correct notation with correct units, eg. 90p or £0.90 (accept £0.90p and £0.9) [SC: B1 for an answer of £2.90]
(b)		8.27pm	M1 A1	for using 60 mins = 1 hour in the conversion of 102 minutes, eg. 1 h 42 mins or 1.42 or 1.7 or (60 + 42) mins or 102 – 60 or 102 ÷ 60 or for an answer of 8.27am or 08.27 for 8.27(pm) oe
5		13	M1 M1 A1	for the start of a method, eg. $2 \times 1000 (= 2000)$ or $150 \div 1000 (= 0.15)$ or $1000 \div 150 (= 6.66\dots)$ for a fully correct method, eg. $2000 \div 150$ or $2 \div 0.150$ or 13.3(...) cao

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
6		Correct pictogram with key	C3 [C2 [C1	for a fully correct pictogram, including key for 2 circles drawn for Friday or $3\frac{3}{4}$ circles (or equivalent) drawn for Saturday] for deducing that one circle represents 4 cycles (or $20 \div 5$) or $\frac{1}{2}$ circle represents 2 cycles or $\frac{1}{4}$ circle represents 1 cycle]
7		shown	M1 M1 C2 [C1 OR M1 M1 C2	for (angle BCA) = $180 - 117$ (= 63) for (angle CAB) = $180 - "63" - 54$ (= 63) or (angle CAB) = $117 - 54$ (= 63) for statement, eg. isosceles since angle BCA = angle CAB = 63 with fully correct reasons, from: <u>angles on a straight line</u> add up to 180° <u>angles in a triangle</u> add up to 180° <u>exterior angle of a triangle</u> is equal to sum of interior opposite angles for angle BCA = 63 and angle CAB = 63 and one of the above reasons] OR for $\frac{(180-54)}{2}$ (= 63) for identification of two angles in triangle ABC being "63" for statement, eg. isosceles since angle BCA = angle CAB = 63 and <u>angles on a straight line</u> add up to 180° and fully correct reasons: base angles of an <u>isosceles triangle</u> are equal and <u>angles in a triangle</u> add up to 180°

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
			[C1]	for angle $BCA = 63$ and angle $CAB = 63$ and one reason from: base angles of an <u>isosceles triangle</u> are equal <u>angles</u> in a <u>triangle</u> add up to 180°]
8		30	M1 A1	for $12\text{ m} = 1.9$ to 2 cm or for a scale factor of 2.25 to 2.75 (comparing length of bus with height of the building) or a complete method using the height of the bus to compare with the height of the building. answer in range 27 to 33
9		2, 7 or 3, 13 or 5, 11 or 2, 23	M1 A1	for identifying two different prime numbers or two numbers which add up to give a square number or for a list of at least 3 prime numbers with no errors and a list of 3 square numbers with no errors. for two correct prime numbers
10		60	M1 A1	for method to find the number, eg. $48 \times \frac{3}{2}$ ($=72$) or to find $\frac{1}{6}$ th of the number, eg. $48 \div 4$ ($=12$) cao

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
11		Offer 1	P1	for a process to find the cost of a number of lessons in Offer 1, eg. $24 \times (12 - 1)$ (= 264) or for a process to find 5% (or 95%) of an appropriate amount, eg. 24×0.05 (= 1.20) or 24×0.95 (= 22.80) in Offer 2
		(supported)	P1	for a complete process leading to values to be used for comparison, eg. $24 \times (12 - 1)$ (= 264) and $24 \times 0.95 \times 12$ (= 273.60)
			C1	Offer 1 and correct values, eg. (£)264 and (£)273.6(0) used for comparison
12	Complete methods $3.60 \div 2.5 \times 3.5$ or $3.60 \div 5 \times 7$ or $3.5 \div (2.5 \div 3.6)$ or $\frac{3.5}{2.5} \times 3.6$ or $3.6 \div \frac{2.5}{3.5}$	5.04	M1	for a correct first step to find the cost of a unit of weight (eg. 1 kg or 0.5 kg) eg $3.60 \div 2.5$ (= 1.44) or $3.60 \div 5$ (= 0.72) or a complete alternative method
			A1	for 5.04 (accept £5.04p)
13 (a)		(-2) -1.5 -1 -0.5 (0) 0.5	B2 [B1]	for a fully correct table for 2 or 3 correct entries]
(b)		Correct line	M1 A1	for correctly plotting at least 5 of their points (provided B1 scored in part (a)) or for a straight line with gradient 0.5 or for a straight line through (0,-1) with a positive gradient for a correct line between $x = -2$ and $x = 3$
(c)		2.6	B1	for answer in the range 2.5 to 2.7 or ft a single straight line with positive gradient

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
14		Reflection	B1	for reflection
		in the x -axis (or $y = 0$)	B1	for x -axis (or $y = 0$) NB: award no marks if more than one transformation is given
15		(£6), 18, 24, 27	M1	demonstrates a proportional method to find at least one cost for cotton, eg. $£6 \div 2 \times 9$ (= (£)27) or a correct entry in the table.
		15, 45, 60, 67.50	M1	demonstrates a proportional method to find at least one cost for silk, eg. $£6 \div 2 \times 5$ (= (£)15) or a correct entry in the table.
			A1	for a fully correct table (accept 67.5(0))

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
16 (a)		40	P1	for the start of a process to find the number of boxes that will fit along one edge, eg. $240 \div 40 (= 6)$ or $150 \div 30 (= 5)$ or $140 \div 35 (= 4)$ or $240 \div 30 (= 8)$ or $240 \div 35 (= 6.85\dots)$ ie 6 boxes), etc. or for a process to find a volume, eg. $40 \times 30 \times 35 (= 42000)$ or $0.4 \times 0.3 \times 0.35 (= 0.042)$ or $240 \times 150 \times 140 (= 5040000)$ or $2.4 \times 1.5 \times 1.4 (= 5.04)$ NB: condone incorrect or no conversion between m and cm
			P1	for a complete process to find the maximum number of boxes, eg. $"6" \times "5" \times "4" (= 120)$ or $"5040000" \div "42000" (= 120)$ or $"5.04" \div "0.042" (= 120)$
			P1	(dep on P1) for (their number of boxes) $\div 3$, eg. $120 \div 3 (= 40)$
			A1	cao
(b)		explanation	C1	for explaining that it could take more time or it could take less time with an appropriate reason, eg. "less space means less number of boxes which will take less time" or "it will take more time since a different arrangement would be required"
17 (a)		$4(m + 3)$	B1	for $4(m + 3)$ or $2(2m + 6)$
(b)		term, expression	B1	for 'term' in the 1 st space
			B1	for 'expression' in the 2 nd space

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
18 (a)		$3n + 1$	M1	for a method to deduce the n th term, eg. $3n + k$, where k is an integer or k is omitted
			A1	or for $n = 3n + 1$ for $3n + 1$ oe (accept n replaced by another letter)
(b)		No (supported)	C1	for using (their expression in (a)) = 90 or shows that 88 or 91 is in the sequence
			C1	for an answer of “No” and a convincing argument eg. pattern number 30 has 91 counters or $(90 - 1) \div 3 (= 29.66\dots)$ or shows that the next term after 88 is 91 Note: no ft from (a)
19 (a)		$160 < h \leq 170$	B1	correct class interval
(b)		Line segments joining the points (135, 4), (145, 11), (155, 24), (165, 22) and (175, 19)	C2 [C1	for fully correct frequency polygon for points plotted correctly at midpoints of intervals OR joining points with line segments at the correct heights and consistent within the intervals (including end values) OR correct frequency polygon with one point incorrect OR correct frequency polygon with first and last point joined] NB: ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
20		New York (supported)	P1	for changing between £ and \$, eg $1.089 \times 1.46 (= 1.58(9.))$ or $2.83 \div 1.46 (= 1.93(8.))$ or between litres and gallons, eg $1.089 \times 3.785 (= 4.12(1.))$ or $2.83 \div 3.785 (= 0.74(7.))$
			P1	for a complete process to give values that can be used for comparison, eg “ $1.938\dots \div 3.785 (= 0.51(2.))$ ” or “ $1.589\dots \times 3.785 (= 6.01(7.))$ ” or $1.089 \times 3.785 = (4.12(1.))$ and $2.83 \div 1.46 (= 1.93(8.))$
			C1	for New York and correct comparative values.
21		648	M2	a complete method, eg $12.5 \times 1000 \div 19.3$
			[M1	for using volume = mass/density, eg $12500 \div 19.3$ (condone inconsistent units or incorrect conversions) may be implied by digits 647... or 648...]
			A1	for answer in range 647 to 648
22		15	P1	strategy to start the problem, eg 8 : 20 and 20 : 5
			P1	process to solve the problem, eg $\frac{5}{33} \times 100$ or 24 : 60 : 15
			A1	cao
23 (a)		0.625	B1	cao
			B2	$9.75 \leq x < 9.85$
			[B1	for 9.75 or 9.85 (or 9.849)]
(b)		$9.75 \leq x < 9.85$		

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
24		147	P1 P1 P1 A1 B1	starts process, eg uses x and $x + 7$ starts to work with at least 6 correct sides, may be on the diagram or in an expression (dep on previous P1) gives a correct expression for the perimeter, eg $x + x + 7 + x + 7 + x + 7 + x + x + 7 + x + 7 + x + 7$ or adds at least 6 correct sides and equates to 70 for width = 3.5 oe and length = 10.5 oe ft (dep P2) for correct area for their x
25		0.000 745 2	M1 A1	for digits 7452 seen cao
26 (a)		Mel (supported)	B1	Mel with reference to greatest number of throws
(b)		$\frac{2}{9}$	M1 A1	selects overall total and multiplies P(point up)×P(point down) eg $\frac{50}{150} \times \frac{100}{150}$ oe (accept $\frac{14}{45} \times \frac{31}{45}$ or $\frac{27}{80} \times \frac{53}{80}$ or $\frac{9}{25} \times \frac{16}{25}$) for $\frac{2}{9}$ oe

Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
27		$x = 1.5, y = 3.5$	M1	for correct method to eliminate one variable (condone one arithmetic error)
			M1	(dep) for substituting found value in one of the equations or correct method after starting again (condone one arithmetic error)
			A1	for both $x = 1.5$ and $y = 3.5$

Question 20

London	$1.089 \times 1.46 = \$1.58(9..)$ per litre $\rightarrow$ $1.589... \times 3.785 = \$6.01(7..)$ per gallon
	$1.089 \times 3.785 = £4.12(1..)$ per gallon $\rightarrow$ $4.121... \times 1.46 = \$6.01(7..)$ per gallon
New York	$2.83 \div 1.46 = £1.93(8..)$ per gallon $\rightarrow$ $1.938... \div 3.785 = £0.51(2..)$ per litre
	$2.83 \div 3.785 = \$0.74(7..)$ per litre $\rightarrow$ $0.747... \div 1.46 = £0.51(2..)$ per litre

The table shows the most commonly used approaches. There are of course other approaches that can be used.

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

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

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

Angles: $\pm 5^\circ$

Measurements of length: ± 5 mm

PAPER: 1MA1_3F		
Question	Modification	Mark scheme notes
6	Diagram enlarged. Key moved above and to the left of the diagram. Question wording changed: 15 changed to 14 so that candidates only have to draw half a circle instead of three quarters of a circle. The bike wheels have been replaced by a circle. Braille only: will have one horizontal line and one vertical line separating the circle into 4 sections. Braille will also add one whole circle in the key.	Standard mark scheme but now 3 ½ circles for Saturday. Note the simplification of the key for Braille. Accept a key drawn with quarter circles instead of the full bicycle wheel
7	Diagram enlarged. Angles moved outside of the angle arcs and the angle arcs made smaller. Braille only: will add information about the diagram.	Standard mark scheme
8	Diagram enlarged x3 exactly and simplified	Standard mark scheme
13	(a) Wording added 'There are four spaces to fill.' Table turned to vertical format. Wording added 'below.'	Standard mark scheme
	(c) Diagram enlarged.	Standard mark scheme with additional tolerance on reading off.

PAPER: 1MA1_3F			
Question		Modification	Mark scheme notes
14		Diagram enlarged. Wording added 'It shows shape A and shape B given on a grid.' x axis changed to go from -2 to 8. Shape A moved to (2, 3) (2, 1) (6, 3) (6, 2). Shape B move to (2, -1) (2, -3) (6, -2) (6, -3).	Standard mark scheme
15		Wording added 'There are seven spaces to fill.' Table turned to vertical format. Braille: will label the answer spaces: <div style="display: flex; justify-content: space-around;"> <div>Cotton fabric</div> <div>Silk fabric</div> </div> <div style="display: flex; justify-content: space-around;"> <div>2m £6</div> <div>(i)</div> </div> <div style="display: flex; justify-content: space-around;"> <div>6m (ii)</div> <div>(iii)</div> </div> <div style="display: flex; justify-content: space-around;"> <div>8m (iv)</div> <div>(v)</div> </div> <div style="display: flex; justify-content: space-around;"> <div>9m (vi)</div> <div>(vii)</div> </div>	Standard mark scheme
16		Model provided for all candidates. Diagram enlarged and also provided for MLP. Information left aligned.	Standard mark scheme
18		Diagram enlarged. Diagram labels moved to the left of the diagrams. Diagrams have been stacked vertically.	Standard mark scheme
19		Numbers in the table have changed to: 130-140: 5 ; 140-150: 10 ; 150-160: 20 ; 160-170: 30 ; 170-180: 15 In part (b) Diagram enlarged. Right axis has been labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis. Vertical axis extended so it goes up to 35.	Standard mark scheme with the amendment: Line segments joining the points (135, 5), (145, 10), (155, 20), (165, 30) and (175, 15)
24		Diagram enlarged. Wording added 'Diagram (i) shows'. Shape labelled as 'Diagram (i)'. Wording added 'Diagram (ii)' after '8-sided shape,' Shape labelled as 'Diagram (ii)'.	Standard mark scheme

