Mark Scheme (Results)

Summer 2018

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. 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 × 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" × 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] × 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

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		0.9	B1	cao	Accept with trailing 0s eg 0.90
2		30	B1	cao	Accept 30.0
3		2500	B1	cao	
4	(a)(i)	30	B1	cao	
	(ii)	Explanation	C1	for explanation, eg increase by 7, add 7, states $7n - 5$	
	(b)	65	B1	cao	
5	(a)	974	B1	cao	
	(b)	16,28 or 18,26	B1	for fully correct pair of numbers	
6		1, 2, 3, 5, 6, 10, 15, 30	B2	cao	Numbers may be shown in any order eg paired; Accept numbers repeated
			(B1	for at least 3 correct factors with no more than one incorrect answer)	
7		24	M1	for a complete method eg $6 \times 2 \times 2$ or sight of 6, 2, 2 ready for calculation, or with the wrong operation	Could be seen as two separate calculations
			A1	cao	SC:B1 for a answer of 1.5 oe
8	(a)	2.28	B1	cao	
	(b)	2.5604	B2	cao	If the correct answer is shown and then rounded, award full marks.
			(B1	for 6.6564 seen, or for 2.56 or for digits 25604)	

Paper: 1MA1/3F					
Question		Answer	Mark	Mark scheme	Additional guidance
9 (a)		40	B1	cao	
(b)		Yes (supported)	P1	for process shown to add a time to departure time eg 8.45 + 0.17 or 8.45 + 0.15 or 8.45 + 0.15 + 0.17 **OR** for process to work out time at work after arrival at Manchester bus stop eg "9.35" + 15 **OR** finds accumulated additional time eg 17 + 15 (= 32) **OR** start to work backwards eg 10.00 − 0.15	There must be some attempt to add but not necessarily complete or correct (eg 8.62). "9.35" must be a given time ie from 0905, 0935, 0955, 1010, 1025, or 1048. Process must be shown.
			P1	for process to use a bus time from Whitefield to Manchester with other times eg 0904 to 0935 with use of 17 or 15	Do not award in cases of ambiguity.
			C1	for conclusion of "Yes" supported by correct figures eg states 9.50 **or** comparable figures eg 9.35 and 25 (spare)	There needs to be a conclusion eg Yes or equivalent words supported by correct figures; if C mark fully evidenced award 3 marks.
			P1	**Alternative scheme** for process shown to find a duration of time using given figures eg 8.45 to 10.00, 8.34 to 9.05, 10.14 to 10.48	There must be some attempt to find a duration of time but not necessarily complete or correct. Process must be shown.
			P1	for process to find the total travelling time eg 17 + 31 + 15 or 17 + 2 + 31 + 15	31 can come from any bus apart from the last bus which is 34
			C1	for conclusion of "Yes" supported by correct figures eg comparable figures eg 65 < 75 **or** 75 – 65 (= 10)	There needs to be a conclusion eg Yes or equivalent words supported by correct figures; if C mark fully evidenced award 3 marks.

Question	Answer	Mark	Mark scheme	Additional guidance
10	Shows earnings	M1	for a method to start to work out earnings eg 11.2×8 (= 89.6) **or** $20 - 8$ (= 12) **or** 8.4×12 (= 100.8)	Accept calculations in pence, or £ written in decimal form.
		M1	for a complete method eg $11.2 \times 8 + 8.4 \times (20 - 8)$ **or** "89.6" + "100.8" **or** $200 - $ "89.6" $- $ "100.8" (= 9.6)	
		C1	Shows earnings eg 190.4(0) **or** 9.6(0) with fully correct arithmetic	Conclusion in figures; ignore written conclusion.
11	$\dfrac{40}{560}$ oe	M1	for correct start to method eg $600 - 560$ (= 40) **or** $\dfrac{600}{560}$ oe (= 1.07(14…)) **OR** correct answer but not a fraction eg 0.07(14…)	
		A1	for any equivalent fraction to $\dfrac{40}{560}$ eg $\dfrac{1}{14}$	
12	69.2	B1	for a correct measurement of either length or width, eg 11.5 (cm) **or** 5.8 (cm)	Allow measurements 11.3 to 11.7 cm and 5.6 to 6.0 cm NB: could work in mm
		P1	for process to find actual dimensions, eg [length] $\times 200$ (= 2300) **or** [width] $\times 200$ (= 1160)	[length] in the range 11.0 to 12.0 [width] in the range 5.0 to 6.5 NB: could work in mm
		P1	(indep) for process to convert to metres [length in cm] $\div 100$ eg "2300" $\div 100$ (= 23) **or** "1160" $\div 100$ (= 11.6)	This mark can be awarded for the conversion of any amount in cm to m (ie not from an area)
		P1	(indep) for process to find the perimeter, eg"23" $\times 2 + $ "11.6" $\times 2$ (= 69.2) **or** "11.5" $\times 2 + $ "5.8" $\times 2$ (= 34.6)	calculations could be in cm or in m and could be scaled or unscaled figures
		A1	for an answer in the range 67.6 to 70.8	SC: award 3 marks for an answer in the range 67.6 to 70.8 using measurements outside the above ranges

Question		Answer	Mark	Mark scheme	Additional guidance
13		D, F, A	C2	for all 3 correct	
			(C1	for 1 or 2 correct)	
14	(a)	6 |4799 7 |0015667 8 |0011247 9 |14	B2	for correct ordered stem and leaf	
			(B1	for fully correct unordered or ordered with one error or omission)	
			B1	(indep) for key (units not required but must be correct if stated) eg 6 | 4 = 64 (marks)	
	(b)	Explanation	C1	for identifying "6" students failed (ft their diagram) **OR** for 20 ÷ 4 (= 5)	Explanation does not need to state that Omar is wrong, but just needs to provide two comparable values (that are not the same) unless ft values show that Omar is not wrong in which case a statement is needed.
			C1	for comparing $\dfrac{1}{4}$ with $\dfrac{6}{20}$ or $\dfrac{3}{10}$ (ft their diagram) **OR** for comparing "6" with 5	
15	(a)	Incorrect order of operation	C1	for identifying an incorrect order of operation, eg should be 12 – 8 **or** "should multiply first"	Showing that 12 – 2 × 4 is 4 (and not 40) is insufficient for this mark; the explanation should focus on what Jenny has done wrong.
	(b)	Statement	C1	for stating that the range is the difference between the greatest and least values, oe **or** stating that he didn't put numbers in order	Stating the correct calculation for the range (8 – 1) or stating the (correct) range as 7 is sufficient for this mark.

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 (a)	10	M1	for a start of method to find Bispah's share, eg $2.50 \times 8\ (= 20)$ **or** $\dfrac{1}{2} \div \dfrac{1}{8}\ (= 4)$	
		A1	cao	Accept 10.00
(b)	1 : 3	P1	for a process to find Chan's share, eg "20" − 2.5 − [Bispah's money] (=7.5) **or** $1 - \dfrac{1}{8} - \dfrac{1}{2}\ (= \dfrac{3}{8})$	Accept working in pence, or in £ given as a decimal oe NB: award this mark if the working is seen in part (a)
		P1	for a correct ratio eg 2.5 : "7.5" **or** $\dfrac{1}{8}$: "$\dfrac{3}{8}$" **or** 3 : 1 oe	Accept 3:1 (correct answer in reverse order) which can also be an equivalent ratio to 3:1
		A1	for 1 : 3 oe eg 5 : 15	Award full marks for 1 : 3 or an equivalent ratio. If an equivalent ratio to 1:3 is shown and then simplified incorrectly award full marks.
17	6	P1	for a process to set up an equation in x, eg $\dfrac{1}{2} \times 3x \times 3x = 162$	Must be a complete equation
		P1	for a process to simplify to x^2 eg $x^2 = 162 \times 2 \div 9$ or $x^2 = 36$	Can ft their equation if a quadratic
		A1	cao	
18	2.3×10^6	M1	for 2.3×10^n where $n \neq 6$ **or** 23×10^5 or 2300000 **or** 2645000000 and 1150 seen	2300000 could be written as 2.3 million
		A1	cao	

Question		Answer	Mark	Mark scheme	Additional guidance
19	(a)	negative	B1	cao	Ignore any description of a relationship and any reference to strength of correlation

	(b)	Explanation	C1	for a correct explanation,
				eg "not in line with the trend of the other points"
				   "does not fit in with the correlation"
				   "is far away from the other points or line of best fit"	

	(c)	Comment	C1	for an explanation eg "point would be outside of the range of the scatter diagram"	
20		$9p + 13$	M1	for method to expand one bracket, eg $5 \times p + 5 \times 3 \ (= 5p + 15)$ or $2 \times 1 - 2 \times 2p \ (= 2 - 4p)$ or $-2 \times 1 - 2 \times -2p \ (= -2 + 4p)$	If an attempt is made to multiply by -2 in the second brackets then it must be done consistently.
			A1	cao	
21		Triangle of area 18	M1	for a complete method to find area of trapezium eg $\frac{1}{2}(2 + 7) \times 4 \ (= 18)$ **OR** for a triangle drawn of area 36 **OR** for a triangle that would give an area ft their area of trapezium	The value for the area of the trapezium must be clear for the ft to be checked.
			A1	for a triangle drawn of area 18 eg base = 6, height = 6 or base = 9, height = 4	Accept use of dimensions that are not whole numbers as long as the intention is clear

Question	Answer	Mark	Mark scheme	Additional guidance
22	Probabilities should sum to 1	C1	for stating that the probabilities should total 1 eg 0.25 should be 0.35	
	0.35 and 0.65 reversed	C1	for recognising that the 0.35 and 0.65 in the first branches for the 2nd throw should be reversed eg, "for the second throw, the probability it lands on 4 should be 0.65"	Can be shown on the diagram
23 (a)	50.5	M1	for cos $ABC = \dfrac{7}{11}$ (0.63…) oe	Must be a complete statement for cos, sin or tan with all three elements present.
		A1	for answer in the range 50.4 to 50.51	If an answer is in the range 50.4 to 50.51 is given in the working space then incorrectly rounded, award full marks.

(b)	Increase (supported)	C1	States increase with supporting reason
			eg " $\dfrac{7}{10}$ is greater than $\dfrac{7}{11}$ "
			   " 0.636 is less than 0.7"
			….."cos increases as angle decreases"
			   "decreasing the denominator increases the value of the fraction"
			   "angle is now 45.6" (accept 45.5 – 45.6)
				If figures are given they must be correct (truncated or rounded).

Question		Answer	Mark	Mark scheme	Additional guidance
24	(a)	8	P1	for process to find sum of unknown probabilities, eg $1 - 0.45 - 0.25 \ (= 0.3)$ **OR** to find the total number of counters in the bag, eg $\frac{18}{0.45} \ (= 40)$ **OR** to find the number of yellow counters, eg $\frac{0.25}{0.45} \times 18 \ (= 10)$	Award mark for any two probabilities given that sum to 0.3 eg given in the table.
			P1	for process to find P(red) = 0.2 oe **or** P(white) = 0.1 oe **OR** for process to find the total number of red and white counters, eg "40" – 18 – "10" (=12) **OR** for process to derive an equation in x, eg $2x + x = 1 - 0.45 - 0.25$ or $2x + x =$ "0.3" or $x = 0.1$	Award P2 for P(red) or P(white) (could be shown in table) Equations could be given as written statements or working but must be fully equivalent.
			P1	for a complete process to find the number of red counters, eg $\frac{2 \times 0.1}{0.45} \times 18$ or $\frac{2}{3} \times$ "12" or $0.2 \times$ "40" or $\frac{0.2}{0.025}$	
			A1	cao	
	(b)	Explanation	C1	for explanation eg 0.5 multiplied by an odd number will never be a whole number, for half of a number to be an integer that number must be even, you can't have half a marble	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
25	3.8	M1	for a correct first step, eg $5 - x = 2(2x - 7)$ or $5 - x = 4x - 14$ or $\frac{5}{2} - \frac{x}{2} = 2x - 7$	Method must show LHS ×2 and both terms on RHS ×2 or $5 - x$ and both terms on RHS ×2
		M1	(dep) for isolating terms in x eg $4x + x = 14 + 5$ or $-\frac{x}{2} - 2x = -7 - \frac{5}{2}$	eg $-4x$ both sides with -5 both sides or $+x$ both sides with $+14$ both sides
		A1	oe	Accept $\frac{19}{5}$, $3\frac{4}{5}$ oe but not $\frac{-19}{-5}$ oe

Question	Answer	Mark	Mark scheme	Additional guidance
26	140	P1	for complete process to find sum of the interior angles of a pentagon eg $(5 – 2) \times 180$ or exterior $360 \div 5 = 72$, interior $180 – 72 = 108$, 108×5 **OR** for complete process to find sum of the exterior angles of the pentagon eg $(180 – x) + (180 – 2x) + (180 – 125) + (180 – 115) + (180 – 90)$	Must be a complete process that could lead to a figure of 540 if that process is evaluated incorrectly
		A1	for sum of interior angles is 540 **OR** for sum of exterior angles is 360	360 must be identified as the sum of the exterior angles
		P1	for start to process to find angle *ABC* eg [angles in a pentagon] $– 115 – 125 – 90 (= 210)$ or $115 + 125 + 90 + x + 2x =$ [angles in a pentagon] **OR** $(180 – x) + (180 – 2x) + (180 – 125) + (180 – 115) + (180 – 90)$ $= 360$	Award provided [angles in a pentagon] is greater than 400 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified
		P1	for process to find angle *ABC* eg "210" $\div 3 (= 70)$, "210" divided in the ratio 2 : 1 **or** for process to find angle *BCD* eg $\frac{2}{3} \times$ "210" **or** for $3x =$ "210" or $–3x = –$"210"	Award if 70 is given for either *ABC* or *BCD* on the diagram
		A1	cao	Award marks for 140 on the diagram with working and not contradicted by the answer line. Award 0 marks for 140 without working.

Question	Answer	Mark	Mark scheme	Additional guidance
27 (a)	9.6	M1	for a correct ratio, eg $\dfrac{12.6}{8.4}$ (= 1.5) **or** $\dfrac{8.4}{12.6}$ (= 0.66..) **or** $\dfrac{6.4}{8.4}$ (= 0.76..) **or** $\dfrac{8.4}{6.4}$ (= 1.31) oe	Decimal equivalents can be truncated or rounded to 2 dp Accept equivalent methods to use a sf eg $\dfrac{6.4}{2}$ + 6.4 (indicative of 1.5)
		A1	cao	
(b)	10	M1	for 15 ÷ "1.5" **or** 15 × "0.66.." or ft their ratio from part (a) oe	Award the method mark for any (equivalent) complete method shown.
		A1	cao	
28	$g = 2T^2 - 6$	M1	for $T^2 = \dfrac{g+6}{2}$ **or** $\sqrt{2} \times T = \sqrt{g+6}$	
		M1	(dep) for $T^2 \times 2 = g + 6$ **or** $\left(\sqrt{2} \times T\right)^2 = g + 6$ oe	Can only award this mark if the first M mark has been awarded.
		A1	for $g = 2T^2 - 6$ oe	

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:
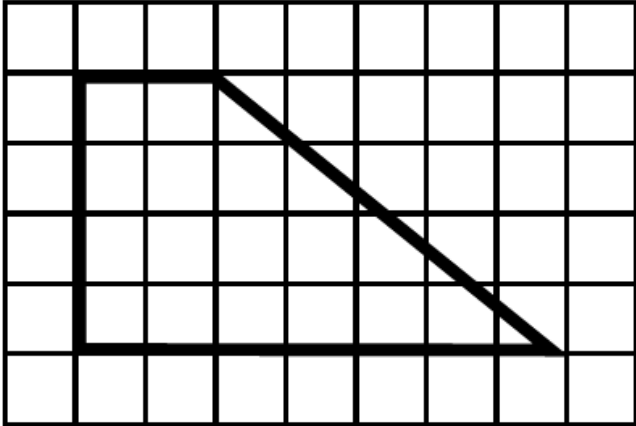Angles: ±5°
Measurements of length: ±5 mm

Paper: 1MA1/3F		
Question	**Modification**	**Mark scheme notes**
9	Last two columns have been removed from the table.	Standard mark scheme but ignore references to "34" since this bus no longer exists.
12	The height of the diagram has changed to 5.5 cm allow for use of specialist equipment.	B1 for a correct measurement of either length or width, eg. 11.5 (cm) or 5.5 (cm); allow measurements 11.0 to 12.0 and 5.0 to 6.0 P1 for process to find actual dimensions, eg. [length] × 200 (= 2300) or [width] × 200 (= 1100) – [length] in the range 11.0 to 12.0; [width] in the range 5.0 to 6.0 P1 (indep) for process to convert to metres, [length in cm] ÷ 100 eg. "2300" ÷ 100 (= 23) or "1100" ÷ 100 (= 11) P1 (indep) for complete process to find the perimeter, eg. "23" × 2 + "11" × 2 (= 68) A1 for an answer in the range 64 to 72

Question		Modification	Mark scheme notes
13		Diagrams enlarged. Diagram labels moved above the diagrams. Wording added 'There are three spaces to fill.'	Standard mark scheme
14		List of numbers stacked in 4 rows. Horizontal line added to the bottom row of the stem and leaf diagram	Standard mark scheme
17		Diagram enlarged. Wording added 'AB = $3x$ cm, BC = $3x$ cm, Angle ABC is a right angle.'	Standard mark scheme
19		Diagram enlarged. Axes labels moved to the left of the horizontal axis and above the vertical axis. Crosses changed to solid dots. Right axis has been labelled.	Standard mark scheme

Question	Modification	Mark scheme notes
21	Shape changed but the area is still the same. Wording changed to 'Look at the diagram for Question 21 in the Diagram Book. It shows a trapezium drawn on a grid of squares. Each square on the grid represents a 1 cm square. A triangle is going to be drawn that is equal in area to the trapezium. Write down the length of the base and the vertical height of a triangle that is equal in area to the trapezium.' Two answer lines have been provided. **Each square on the grid represents a 1 cm square.** 	M1 for a method to find area of trapezium, eg. $\frac{1}{2}(2+7) \times 4$ (=18) or $(2 \times 4) + (0.5 \times 5 \times 4)$ or $8 + 10$ (=18) or for two answers that would give a triangle of area ft their area of trapezium (if not 18) or for two answers that would give a triangle of area 36 or for a triangle that would give an area ft their area of trapezium A1 for two answers given that would give a triangle of area 18, eg. base = 6, height = 6 or base = 9, height = 4 oe Accept use of dimensions that are not whole numbers as long as the intention is clear
22	Diagram enlarged. Wording added 'It shows a probability tree diagram	Standard mark scheme
23	Diagram enlarged. Wording added 'AB = 11cm CB = 7cm Angle ACB is a right angle. Angle ABC is marked.'	Standard mark scheme
24	Table has been turned to vertical format. Order of the table changed round so it reads: blue, yellow, red and white.	Standard mark scheme

Paper: 1MA1/3F			
Question		**Modification**	**Mark scheme notes**
26		Diagram enlarged. Angles moved outside of the angle arcs, with smaller arcs. Wording added 'Angle EAB = 125° Angle AED = 115° Angle EDC is a right angle.'	Standard mark scheme
27		Diagram enlarged. Wording added 'In triangle ABC AB = 8.4 cm, AC = 6.4 cm In triangle DEF DE = 12.6 cm FE = 15 cm.' Braille have added wording 'Angle A = angle D, Angle B = angle E Angle C = angle F.'	Standard mark scheme
28		Braille only: *g* changed to *m*.	Standard mark scheme with *g* changed to *m*.