Mark Scheme (Results)

November 2019

Pearson Edexcel GCSE (9 – 1)
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 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.

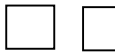
13 Word in square brackets

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 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	70 or 7 tens	B1	for 70 (or seventy) or 7 tens (or seven tens)	Condone any incorrect spelling provided the intention is clear
2	4.6	B1	cao	
3	3170	B1	cao	
4	$\frac{2}{5}$	B1	cao	
5	0.15	B1	cao	
6 (a)	24	B1	cao	
(b)		C1	for showing diagrams that represent 12 pictorially	Shapes can come from a combination of shapes, but must sum to 12. Any orientation.
(c)	84	M1	for a complete method to find the total number eg $3 \times 8 + 3.5 \times 8 + 2.5 \times 8 + 12$ or $(3 + 3\frac{1}{2} + 2\frac{1}{2} + 1\frac{1}{2}) \times 8$ or $24 + 28 + 20 + 12$ or $9 \times 8 + 3 \times 4$ NB ft from (b)	Accept one error in the totals for each month, eg 24 + 28 + 18 + 12 for the award of this mark. Do not award for omission of figure for April. If work in (a) or (b) consistently shows a misinterpretation of the scale the M mark can still be awarded if also consistent
		A1	cao	
7	10	M1	for converting $1\frac{1}{4}$ hours or $\frac{1}{4}$ hour to minutes eg. $1\frac{1}{4}$ hours = 60 + 15 (= 75) or $\frac{1}{4}$ hour = 15 minutes or for converting 1 hour 25 minutes to minutes eg 60 + 25 (= 85)	Condone absence of units in the working
		A1	cao	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
8	400	P1	for finding the total weight of 4 blocks, eg 650 × 4 (= 2600) or 0.65 × 4 (= 2.6) **or** for using 1 kg = 1000g eg 650 ÷ 1000 (= 0.65) or 3 × 1000 (= 3000)	Writing 1 kg as 1000g is insufficient without it being used in a calculation
		P1	for subtraction, eg. 3 × 1000 – "2600" or 3 – "2.6" (= 0.4)	
		A1	cao	
			SC B1 for 2350	
9	45	M1	for 180 – (100 + 35) oe	
		A1	cao	Answer may be written on the diagram.
10 (a)	*A* plotted at (3, 2)	B1	cao	Accept a cross or dot or A written at (3, 2) with or without labelling provided not ambiguous
(b)	(–1, 0)	B1	cao	Could be shown on the diagram
11	HHH HHT HTH HTT THH THT	M1	for at least 4 correct different combinations	Accept words or unambiguous abbreviations For M1 ignore extras or repeats;
	TTH TTT	A1	for fully correct list with no extras or repeats	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12 (a)	No from correct figures	P1	for first step in process to solve the problem, eg find cost of 3 T-shirts, 25 × 3 (= 75) **or** eg find remaining money after just one purchase, eg 200 – 60 (= 140) or 200 – 25 (= 175)	Award this mark for addition of 2 or more items or for subtraction of one item or more from 200 eg 200 – 50 (= 150) etc.
		P1	for process to find total cost of trainers and T-shirts, eg 60 + "75" (= 135) **or** find total cost including cost of jacket, eg. 60 + "75" + 80 (= 215) **or** find the change after buying all 4 items, eg. 200 – 60 – 3 × 25 (= 65) oe	
		C1	for No from correct figures **Acceptable examples** No, needs 215 No, only has 65 left No, needs 15 more **Not acceptable examples** Yes ….	Figures can be given without units ($)
(b)	Explanation	P1	for a start to a method, eg. approximating 0.749 to 0.7, 0.74, 0.75 or 0.8	
		C1	for explanation **Acceptable examples** 0.7 × 60 = 42 [is an underestimate] 0.74 × 60 = 44.4(0) [is an underestimate] . **Not acceptable examples** 0.75 × 60 = 45 [is an overestimate] 0.8 × 60 = 48 [is an overestimate]	For full marks, any calculations must be correct. No statement in words is needed.

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13 (a)	$10ab$	B1	cao	
(b)	$8x + y$	M1	for $8x$ or y	Accept $1y$ for 1 or 2 marks
		A1	for $8x + y$	
14	345	M1	for complete method with relative place value correct including addition of all the appropriate elements of the calculation. 2 3 0 1 1 5 3 4 5 **2** **3** 0 2 | 0 3 **1** 3 1 0 | 1 5 **5** 4 5 | | 20 | 3 | | 10 | 200 | 30 | | 5 | 100 | 15 | **200 + 30 + 100 + 15 = 345** 23 + 23 + 23 + 23 + 23 = 115; 115 + 115 + 115 = 345	Accept all equivalent methods if complete. Partitioning methods may show a complete method which has been broken down into multiple stages. Multiple addition of 23 (or 15) acceptable if the correct number added is shown, and an attempt at addition is clear.
		A1	cao	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15 (a)	16 45 29 75 14 61	C1	starts to interpret information eg 75 or 29 in the correct place	May be seen as numerators of fractions for the first 2 marks.
		C1	for 120 – 75 (= 45) and "45" – 29 (= 16)	Could be seen in working or on the diagram
		C1	Complete and correct frequency tree	
(b)	$\frac{29}{120}$	B1	for $\frac{29}{120}$ or ft "29" from part (a)	Accept any equivalent fraction, decimal form 0.24(166…) or percentage form 24(.166..) Ignore subsequent incorrect attempts to write the correct answer in a different form.
16 (a)	45	B1	cao	
(b)	50	M1	for an attempt to find the gradient eg "25" ÷ "0.5" ft their readings from the travel graph; use of speed-time formula eg 25 ÷ 30 (ignore units if shown)	could be shown in working or on the graph using any acceptable triangle; could be shown by multiples of 25, 0.5 or multiples of ft figures
		A1	cao	
17	18	P1	for process to solve $x - 1 = 2$, eg. $x = 2 + 1$ (= 3) or for $2x = 6$	Can award mark for 3 – 1 = 2
		P1	for 2 × 9	
		A1	cao	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
18	No with fully correct figures	M1	for (360 – 60) ÷ 2 (= 150) or $\frac{60}{360} \times 480$ (= 80) oe	Angle of 150° may be seen on diagram
		M1	(dep) for method to find required number of students in School **A** eg $\frac{"150"}{360} \times 480$ (= 200) or (480 – "80") ÷ 2 (= 200)	
		M1	for method to find required number of students in School **B**, eg $\frac{"90"}{360} \times 760$ (= 190) or 760 ÷ 4 (= 190)	ft the angle of 90 eg from 360 – 160 – 110 calculated incorrectly, or measured incorrectly from the diagram within the range 88 to 92
		C1	for No with correct figures **Acceptable examples** No, 200 and 190 He is wrong, School A has 10 more **Not acceptable examples** Yes …. No, School A had 20 more [incorrect figures]	
19	$-3 \leq p < 1$	C2	for $-3 \leq p < 1$ or $p \geq -3, p < 1$ oe	Accept use of a letter other than p.
		(C1	for $-3 \leq p$ or for $p < 1$ or for $-3 < p \leq 1$ oe)	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	1080	M1	for method to write one number as a product of prime factors (condone one division error in method chosen), eg. one complete factor tree or 2, 2, 3, 3, 3 or 2, 2 , 2, 3, 5 or for listing at least 5 multiples of either number (condone one error) or for any common multiple (≠ 1080), eg. 12960 (= 108 × 120)	Accept first 5 multiples if all correct or one error in first 6 multiples
		M1	for method to write both numbers as a product of prime factors (condone a total of one division error) eg. two complete factor trees or 2, 2, 3, 3, 3 **and** 2, 2, 2, 3, 5 or lists of multiples of the two numbers, at least 5 of each, one of which includes 1080	For the list not containing 1080, accept first 5 multiples if all correct or one error in first 6 multiples
		A1	cao SC B2 for any product that would lead to 1080, eg $2^3 \times 3^3 \times 5$ or 12 × 9 × 10	

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
21	2 (supported)	P1 P1 P1 A1	for a process to find the number of men, eg. (60 ÷ 2) ÷ 3 (= 10) for a process to find the number of children, eg. 60 – "30" – "10" (= 20) for a start of a process to find the value of *n*, eg. ("20" : "10") ÷ 5 or 20 : 10 = 10 : 5 or "20" ÷ "10" for 2 with supportive working	 60 ÷ 3 = 20 scores no marks. Any ratio must come from correct processes to find the number of children and the number of men Award 0 marks for 2 with no correct supportive working Award full marks for 2 : 1 given as final answer from correct supportive working
22	$2\frac{1}{3}$	M1 M1 A1	for either $\frac{7}{4}$ oe or $\frac{4}{3}$ oe for method to find the product, eg $\frac{7\times4}{4\times3}$ or $\frac{21\times16}{12\times12}$ oe or for $\frac{28}{12}$ or $\frac{7}{3}$ oe for $2\frac{1}{3}$ or an equivalent mixed number	
23	perpendicular line constructed	C2 (C1	for a fully correct construction with all relevant arcs drawn for a perpendicular line drawn from *P* to the line *CD* or all relevant arcs drawn)	Perpendicular line segment between *P* and *CD* must be within guidelines Accept dotted lines.

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
24	93	M1 M1 M1 A1	for method to find angle *ACB*, eg 180 – 75 – 51 (= 54) (dep M1) for method to use the ratio, eg "54" ÷ (2 + 1) (= 18) for complete method, eg 180 – 51 – "18" × 2 or 75 + "18" oe cao	Angles may be shown on diagram but must not be ambiguous eg. M0 for angle of 54° shown in the wrong place
25	No (supported)	P1 P1 C1	for process to find total weight of the 4 red bricks, eg. 5 × 4 (= 20) **or** for process to find total weight of the 5 blue bricks, eg. 9 × 5 (= 45) for process to find total weight of all 10 bricks, eg. "20" + "45" + 6 (= 71) No with correct supporting evidence **Acceptable examples** No, it is 7.1 She is wrong, it is 0.1 more No, (the total weight is) 71 not 70 **Not acceptable examples** Yes …. No, it is 71	May be seen next to statements 20 must be clearly referenced to the red bricks. 5 + 9 + 6 = 20 scores no marks Candidates working in grams will need to give 7100 and 7000 for example as comparable figures.

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
26 (a)	p^{10}	B1	cao	
(b)	$2x^4y^2$	M1	for any two of $12 \div 6$ (= 2), x^{7-3} (= x^4), y^{3-1} (= y^2) in a product or written as a fraction with complete and correct cancelling of at least two terms	
		A1	cao	
27 (i)	Distance in the range 20 to 23	P1	for a process to draw a bearing of 070°, eg. a line drawn 70° from the North line at *P*	Accept a line of any length as long as the intention is clear.
(ii)	Bearing in the range 317 to 330	P1	for a process to work out the distance *PQ*, eg. 12×1.5 (= 18)	
		P1	(dep previous P1) for the process to use the given scale eg. "18" ÷ 4 (= 4.5 cm)	Award P3 for Q shown in the correct place on the diagram. 4.5 scores 2 marks provided there is a link to 12×1.5 (= 18)
		A1	(dep P3) for distance in the range 20 to 23	Award no marks if no supportive processes
		A1	(dep P3) for bearing in the range 317 to 330	Award no marks if no supportive processes Award A0A0 if *Q* is not in the correct place

Paper: 1MA1/1F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
28	16	P1	for process to formulate an equation or inequality, eg $2x + 3x + 10 * 90$ **or** for $90 - 10$	*denotes an equality or inequality symbol Accept equivalent forms
		P1	for a process to solve the equation or inequality by isolating terms in x, eg $5x * 90 - 10$ **or** for $(90 - 10) \div 5$	Award P2 for an embedded answer of 16, which could be shown on the diagram as 32, 48, (10) or written as x embedded in working in an equation.
		A1	cao SC B1 for $x = 34$ or for a value in the range $15 \leq x < 16$	
29 (a)	6	M1	for stating a similar triangle relationship eg $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{CB}{RQ}$ or equivalent set of similar triangle expressions or for substitution giving a fraction form for a scale factor eg $\frac{10}{15}\left(=\frac{2}{3}\right)$ or $\frac{15}{10}\left(=\frac{3}{2}\right)$ or $\frac{9}{15}\left(=\frac{3}{5}\right)$ or $\frac{15}{9}\left(=\frac{5}{3}\right)$	Accept any equivalent fractions or decimal equivalents given to at least 2 dp truncated or rounded
		A1	cao	
(b)	2	P1	for showing understanding of the properties of congruent triangles by finding an unknown length using matching of two sides, eg EG, KG and 6, or HG, FG and 4 **or** matching corresponding angles eg HEG with FKG **and** EHG with KFG	Can be shown by any complete statements that are unambiguous Can be shown in working using algebraic statements, or given by unambiguous marking on the diagram to confirm the relationship.
		A1	cao	

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.

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**
6		Diagram enlarged. Key moved above and to the left of the diagram. Squares divided into four sections. Wording 'incomplete' added.	Standard mark scheme
9		Diagram enlarged. Wording added 'There are three angles marked 100°, 35° and x' Wording added 'marked'. Angles moved outside of the angle arcs and angle arcs made smaller.	Standard mark scheme
10		Diagram enlarged. Crosses changed to solid circles. Zero moved above the x axis. Wording added 'It shows the line BC on a coordinate grid.'	Standard mark scheme
13		In part (a) Braille only - change *a* and *b* to *m* and *n*. In part (b) MLP only - change *x* and *y* to *e* and *f*.	Standard mark scheme except for the letter changes indicated.
15		Diagram enlarged. Wording added 'It shows an incomplete frequency tree.' Braille only- label spaces (i) to (vi). In part (a) wording added 'There are six spaces to fill.'	Standard mark scheme

PAPER: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
16		Diagram enlarged. Right axis labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis	Standard mark scheme
17		Question wording changed to 'When $x-1 = 2$ work out the value of 2x2.'	Standard mark scheme
18		Diagram enlarged. Angles moved outside of the angle arcs and angle arcs made smaller. Description of diagram added below the diagram. 'There are 480 students at school A. In the school A pie chart, 60° represents monkeys, x° represents tigers an x° represents lions.' 'There are 760 students at school B. In the school B pie chart, 90° represents tigers, 110° represents lions and 160° represents monkeys.'	Standard mark scheme
19		Diagram enlarged.	Standard mark scheme
21		Wording changed to 'Using the information work out the value of n.'	Standard mark scheme
23		P moved 1 cm to the left.	Standard mark scheme
24		Diagram enlarged. Wording added 'Angle BAC = 75° Angle ABC =51°.' Angles moved outside of the angle arcs and angle arcs made smaller.	Standard mark scheme

PAPER: 1MA1/1F			
Question		**Modification**	**Mark scheme notes**
27		North lines made 9 cm. Scale moved above the diagram. Changed the scale from '1 cm represents 4 km' to '1 cm represents 2 km.'	Standard mark scheme but note the scale change P1 for a process to work out the distance *PQ*, eg. 12 × 1.5 (= 18) P1 for the process to use the given scale eg. "18" ÷ 2 (= 9 cm) Award P3 for Q shown in the correct place on the diagram. A1 for distance in the range 20 to 23 A1 for bearing in the range 317 to 330
28		Diagram enlarged. Angles moved outside of the angle arcs and angle arcs made smaller. Wording added 'Three angles are marked $(2x)°$, $(3x)°$, 10°'	Standard mark scheme
29	(a)	Diagram enlarged. Wording added 'AC = 9 cm RQ = 10 cm.' Braille only - wording added 'Angle ACB is a right angle' and 'Angle PRQ is a right angle.'	Standard mark scheme
29	(b)	Diagram enlarged. Labels added to diagram: HG labelled as '4 cm' and HK labelled as '10 cm'. Wording added, 'HGE is a right angle, FGK is a right angle.'	Standard mark scheme

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