Pearson Edexcel

Mark Scheme (Results)

Summer 2019

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" $\times$ 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 E.g. [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	500	B1	cao	
2	48 or 56	B1	for 48 or 56	Accept either or both. Do not award the mark if other numbers are shown with either.
3	1500	B1	cao	
4	9, 27	B1	cao	Do not award the mark if other numbers are shown.
5	$\dfrac{19}{100}$	B1	or any other equivalent fraction.	
6	16	M1	for a complete method to find 20% of 80 eg 80 × 0.2 oe	
		A1	cao SC B1 for an answer of 64 or 96	
7	6	M1	for interpreting the table to find the number of green counters (26 + 7 (= 33)) or the number of red counters (16 + 11 (= 27)) or the difference in circles (26 – 16 (=10)) or squares (11 – 7 (=4))	33 – 27 = 6 10 – 4 = 6
		A1	cao	
8	39	M1	for finding one quarter of 52, eg 52 ÷ 4 (= 13) **OR** for finding the fraction to be filled, eg $1 - \dfrac{1}{4}\ \left(= \dfrac{3}{4}\right)$ oe	Accept equivalent decimals or percentages
		M1	for a complete method eg 52 − "13" or "13" × 3 **OR** for "$\dfrac{3}{4}$" × 52	
		A1	cao	
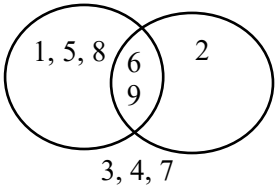
Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
9	$11e + 5f$	M1	for either $11e$ or $5f$	
		A1	for $11e + 5f$	
10	$\dfrac{3}{5}$	M1	for a start in the method eg $35 + 50 + 75$ (= 160) **or** $400 - 35 - 50 - 75$ (= 240) or $\dfrac{160}{400}$ oe	
		M1	for eg $\dfrac{400 - "160"}{400}$ or $\dfrac{2}{5}$ or $1 - \dfrac{160}{400}$ **or** for an unsimplified answer eg $\dfrac{"240"}{400}$ oe or as 60% oe	
		A1	cao	
11 (a)	241.56	P1	for difference for 1 parcel eg $35.38 - 15.25$ (= 20.13) **OR** for total cost for 12 parcels by either service eg 35.38×12 (= 424.56) **or** 15.25×12 (= 183)	
		P1	for a complete process eg "20.13" × 12 **or** "424.56" – "183"	
		A1	cao	
(b)	Explanation	C1	for explanation **Acceptable examples** both figures rounded down (refers to both figures) 20 is less than 21 and 15 is less than 15.25 **Not acceptable examples** both figures rounded (up); rounded down either 20 is less than 21 or 15 is less than 15.25 (refers to just one figure) the cost is 320.25 (more than 300); multiplying with bigger numbers	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
12	$\dfrac{9}{25}$	M1	for $\dfrac{n}{6+9+10}$ where n is an integer < 25	
		A1	for $\dfrac{9}{25}$	Or equivalent fraction
13 (a)	example	C1	example given eg 40, 80, etc.	
(b)	No with reason	C1	for No with reason **Acceptable examples** 80 and 88 are both in the sequence 80 is in the sequence and 85 is 5 more 24, 32, ….. 80, 88, …. 85 is not in the 8 times table 85 is an odd number $8n+16=85$ so n is not a whole number. **Not acceptable examples** adding 8 each time will not lead to 85 (insufficient) it goes past 85 Yes …..	No can be implied from their statement
14	2.4774(011…)	M1	for 8.77 or 3.54 or 2.477 or 2.47 or 2.48 or $\dfrac{877}{354}$	
		A1	for 2.4774(011…)	If the answer has been rounded to less than 4 dp but the figure is shown in working to 4 dp or more, award full marks. Ignore any incorrect digits after the 4th decimal place.

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	330	M1	for 4 × 70 + 50 oe	May be seen as sum of four 70s and a 50 n × (70 + 50) or ambiguous working gets 0 marks
		A1	cao	
(b)	9	M1	for use of inverse operations eg (680 – 50) ÷ 70 **OR** rearranges an equation to solve eg $70x + 50 = 680$ rearranged to isolate x term. **OR** ft (a) eg ((680 – "330") ÷ 70) + 4	Need not have brackets; can be written in an incorrect order if the intention is clear A correct but embedded answer gets 1 mark
		A1	cao or ft their (a)	
16	32	P1	for a process to work out the missing length eg 6 – 4 (=2) **or** for a process to work out the length of the base eg 4 + 6 (= 10) **OR** for finding total perimeter of 2 rectangles, eg 2(6 + 4 + 6+ 4) (= 40) **OR** for writing at least 5 figures correctly on the diagram	May be seen on the diagram
		P1	for a process to work out the perimeter eg 4 + "2" + 6 + 4 + 6 + 4 + 6 **or** 20 + 20 – 2 × 4 **or** 16 + 14 + "2"	May be seen in different forms
		A1	cao SC B1 for 30	
17	9	M1	for a method to find the scaling factor eg "10.8" ÷ "1.8" (= 6) or "1.8" ÷ 1.5 (=1.2) or 1.5 ÷ "1.8" (=0.833..) **or** a sf given from 5.5 to 6.5 or from 1.06 to 1.4 or from 0.75 to 0.94 eg used with 1.5	Could be shown on the diagram by appropriate working eg 6 steps Allow 10.6 to 11.0 and 1.6 to 2.0 for their measured lengths.
		A1	accept an answer in the range 8 to 10	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
18 (a)	2	B1	cao	
(b)	81	M1	for working with values from the table eg (0 × 4), (1 × 3), … with at least 3 products shown correct **or** (0 +), 3, 14, 15, 24, 25 with at least 3 correct	Check working space or next to the table. Zero points may not be seen so accept without 0 × 4, 0
		A1	cao SC B1 for 85	
19	$x = \dfrac{y-4}{2}$	M1	for correct first step to rearrange eg $y - 4 = 2x + 4 - 4$ or $\dfrac{y}{2} = \dfrac{2x+4}{2}$ or ambiguously shown eg $x = y - 4 \div 2$ or answer given as $\dfrac{y-4}{2}$	May be seen in different equivalent forms but must be carried out, not just intention seen. Could be shown as a flow diagram but must have correct inverse operations
		A1	oe	
20	105	M1	for evidence of understanding the angle properties of a square or equilateral triangle, eg stating angle *DBC* = 60 or angle *EBD* = 45 or angle *BAE* = 90	Accept on the diagram with no contradiction in working, or no contradiction or ambiguity on the diagram; 90 can be shown as a right angle
		A1	cao	Could be shown on the diagram or in working, but do not accept contradiction or ambiguity.
21	78	P1	for process to find the number of rand, eg 850 × 18.53 (= 15750.5) **OR** for process to find number of £, eg 200 ÷ 18.53 (= 10.79 …)	
		P1	(dep P1) for process to find the number of rand notes, eg "15750.5" ÷ 200 (= 78.7...) **OR** 850 ÷ "10.79.." (= 78.7...)	
		A1	cao	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
22	79.76	P1	process to find number of gallons eg 560 ÷ 34.5 (=16.23…) OR finding the miles per litre eg 34.5 ÷ 4.55 (=7.582…)	For P marks allow use of truncated/rounded values
		P1	process to convert from gallons to litres eg "16.23" × 4.55 (=73.855….) OR to work out the cost per gallon eg 4.55 × 1.08 (=4.914) OR finding the number of litres eg 560 ÷ "7.582…." (=73.859…)	
		P1	(dep P2) for a complete process to work out the cost using the operations (560 ÷ 34.5) × 4.55 × 1.08 eg "73.855…" × 1.08 (=79.763…) or "4.914" × "16.23…" (=79.763…) or "73.859…" × 1.08 (=79.763....)	
		A1	for 79.69 to 79.79	To 2 dp but accept 79.7
23	612	P1	Alan: for 100 − 32 − 40 (= 28) or for finding "28"% of 400 eg 400 × 0.28 (=112)	
		P1	Beryl: for $1 - \dfrac{3}{10} - \dfrac{1}{10} \left(= \dfrac{6}{10} = 60\% \right)$ or for finding "$\dfrac{6}{10}$" × 500 (=300)	
		P1	Charlie: for starting to use the ratio 3 : 4 eg 150 ÷ 3 (=50)	
		P1	for complete ratio process eg "$\dfrac{150}{3}$" × 4 (=200)	
		A1	cao	Answers only (without working) award 0 marks.

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
24 (a)	6,9	M1	for 6, 9 in the intersection only	Ignore all entries except the region you are marking for each method mark
	1,5,8 2 3, 4,7	M1	for 1, 5, 8 in set A only or 2 in set B only or 3, 4, 7 in set $(A \cup B)'$ only	
		C1	for all numbers correctly placed in the Venn Diagram	3, 4, 7
(b)	$\dfrac{2}{9}$	M1	ft for identification of 2 or 9 or ft diagram	Need not be written in correct form at this stage eg could be a ratio 2 : 9 Repeated digits in the diagram should be counted as 2 elements
		A1	$\dfrac{2}{9}$ oe or ft diagram	Accept any equivalent fraction, decimal form 0.22(22..) or percentage form 22(.22…)%
25	12272.70 12272.71 or 12272.72	M1	for evidence of using a correct first step eg 200000 × 0.015 (= 3000) or 200000 × 1.015 (= 203000)	
		M1	for evidence of a compound interest method eg 203000 × 0.015 (= 3045) or 203000 × 1.015 (= 206045) **or** 206045 × 0.015 (= 3090.675) or 206045 × 1.015 (= 209135.675) **or** 209135.675 × 0.015 (= 3137.035...) or 209135.675 × 1.015 (212272.710...) **or** $200000 × 1.015^{t}$, $t \geq 2$	values may be rounded or truncated to 2 dp
		A1	for 12272.7(0) or 12272.71 or 12272.72 SC B2 for 212272.7(0) or 212272.71 or 212272.72	

Paper: 1MA1/3F					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
26	(a)	$40 < h \leq 50$	B1	accept 40 – 50 oe	
	(b)	polygon drawn (15,7), (25,13) (35,14), (45,12) (55,16), (65,18)	B2 (B1	for fully correct polygon with points plotted at the midpoints for points plotted correctly but not joined by straight lines **or** joining points at correct heights consistently within intervals including plotting at end values **or** correct frequency polygon with one point incorrect **or** correct frequency polygon with first and last points joined directly)	Joining must be with line segments for example, at 10, 20, 30,…or at 20, 30, 40,… Ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**

27	statement	B2	Two different statements
			Acceptable
			eg should be joined with straight lines (not curve)/should use a ruler
			   1st (quarter) not shown/plotted/labelled/not all quarters labelled
			   does not show all 4 seasons
			   9.5 missing from vertical axes/not linear
			   vertical (number) axis does not start at 0/the y axis starts at 6
			   the graph does not begin at 0, it starts at 6
			   it is not clear what 2, 3, 4 on the x-axis mean
			   the scale of years doesn't make sense
			   there is lack of clarity about what the numbers on the x axis represent
			   graph is curved line
			Not acceptable
			eg no value plotted for 2 in 2016
			   it does not start at 0 (no reference to vertical axis)/missing 0
			   they should not have connected the dots like that
			   the numbers on the x axis are repeated
			   the numbers along the x axis 2, 3, 4
			   the years on the x axis have not been written properly
			   does not follow a sequence
			   it needs a discontinuity wiggle on the axis
			   no title
				Ignore additional statements provided no contradiction

	statement	(B1	One statement eg from those above.)	

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
28	162 supported	M1	for method to find sum of the interior angles of a hexagon eg $(6 - 2) \times 180$ $(= 720)$ oe **OR** for method to find sum of the interior angles of a pentagon, eg $(5 - 2) \times 180$ $(= 540)$ **OR** for method to find angle *AFC* or *BCF*, eg $(360 - 2 \times 117) \div 2$ $(= 63)$ **OR** for dropping a perpendicular from *A* or *B* to *ED* with 90° marked on *ED* and 27° at the top	Must be a complete process that would lead to a figure of 720 if evaluated correctly. For a pentagon there must be an indication that they have divided the hexagon into two halves. 63 may be shown on the diagram for angle *AFC* or angle *BCF*
		M1	for method to use ratio 2 : 1 eg marks as $2x$ and x or as x and $\frac{1}{2}x$ on diagram **OR** for ([angle sum of hexagon] $- 2 \times 117) \div 6$ $(= 81)$ oe **or** ([angle sum of hexagon] $\div 2 - 117) \div 3$ $(= 81)$ oe **or** $117 + 117 + 2x + 2x + x + x =$ [angle sum of hexagon] oe **OR** eg ([angle sum of pentagon] $- 117 - 180) \div 3$ $(= 81)$ oe **or** $117 + 180 + 2x + x =$ [angle sum of pentagon] oe	Ratio must be used correctly if awarded for diagram Award provided [angle sum of hexagon] is greater than 700 or [angle sum of pentagon] is greater than 500 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified.
		M1	for finding angle *FED* = 81 or for finding angle *CDE* = 81 **OR** for complete process to find angle *AFE* eg ([angle sum of hexagon] $- 2 \times 117) \div 6 \times 2$ oe **OR** ([angle sum of pentagon] $- 117 - 180) \div 3 \times 2$ oe	This may be shown by solving a correct equation to find the value of *x*.
		C1	for accurate working leading to angle *AFE* = 162	Award marks for 162 on the diagram with working and not contradicted by the answer line. Award 0 marks for 162 without working.

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
29	No Supported	P1	for finding the area of a circle eg $\pi \times 0.8^2$ (= 2.01...)	Must be area of circle and not part of a volume, eg $\pi r^2 h$ May be seen as $2\pi r^2$
		P1	for finding the curved surface area eg $2\pi \times 0.8 \times 1.8$ (= 9.047…)	May be seen from $2\pi rh$ or from πdh
		P1	for use of the coverage information with an area eg "2.01…" ÷ 5 (= 0.402…) or "4.02…" ÷ 5 (= 0.804…) or "9.047…" ÷ 5 (= 1.8095…) or "11.058" ÷ 5 (= 2.2116..) or "13.069…" ÷ 5 (= 2.6138…) **OR** for process to find total coverage for comparison eg 5 × 7 (= 35)	Accept numbers without working written to no less than 2dp Do not award if a volume has been used as part of the calculation. An independent mark for 5 × 7
		P1	(dep P1) for finding total surface area for 3 tanks eg [total surface area] × 3 (= 39.2…) **OR** for complete process to find the number of tins needed for total area of 3 tanks eg "13.069"....× 3 ÷ 5 (= 7.84.....) **OR** for complete process to find coverage needed from each tin eg "13.069"...× 3 ÷ 7 (= 5.6...)	[total surface area] must come from the addition of two attempts at area, but not from volume.
		C1	for conclusion "No" supported by accurate figures eg 8 tins **or** 7.84 (> 7) **or** 39.2 > 35 **or** 5.6 (>5)	Clear statement that there is **not** enough paint supported by correct figures for comparison. NB: 2.6 × 3 = 9 tins needed is inaccurate 8 or 7.84 tins is sufficient without restating the 7, 5.6 m^2 is sufficient without restating the 5 but 39.2 and 35 are needed for comparison. A statement of "No, 8 tins" alone gets 0 marks without supporting working.

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
30	$x = 1, y = -2$	M1	for a correct method to eliminate either x or y or method leading to substitution (condone one arithmetic error)	
		M1	(dep M1) for substituting found value in one of the equations **OR** correct method after starting again (condone one arithmetic error)	
		A1	cao	

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.

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**
4	Wording added 'eight'.	Standard mark scheme
7	Table turned vertical.	Standard mark scheme
8	Diagram enlarged. Labels moved above the gauge. Shading changed to dotty shading.	Standard mark scheme
9	Braille only: e changed to s, f changed to t.	Standard mark scheme, but see note for Braille
16	Diagrams enlarged, labelled as Diagram 1 and Diagram 2. Wording added 'Diagram 1 shows a rectangle with length 6 cm and width 4 cm.' Wording changed to 'Below Diagram 1, Diagram 2 shows a 6-sided shape made from two of these rectangles.'	Standard mark scheme
17	Diagram enlarged and simplified.	Standard mark scheme
20	Diagram enlarged.	Standard mark scheme
23	Information moved to Diagram Book	Standard mark scheme

PAPER: 1MA1/3F			
Question		**Modification**	**Mark scheme notes**
24		Diagram enlarged. Wording added 'It shows an incomplete Venn diagram.' Ovals made circular. Regions labelled 'Set A' and 'Set B' on the diagram. Braille only – spaces labelled (i) to (iv).	Standard mark scheme
26		Frequency column widened. The first two numbers in the table changed to 8 and 12 In part (b) diagram enlarged. Right axis labelled. Scale changed. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme but the first two points plotted in (b) should be at (15,8) and (25,12)
27		Diagram enlarged. Crosses changed to solid dots. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme
28		Wording added '*ABCDEF*'. Diagram enlarged. Angle moved outside of the angle arc and the angle arc made smaller.	Standard mark scheme
29		Diagram enlarged and labelled as Diagram1. Inside the cylinder labelled as 'Tank'. Diagram of the circular face added and labelled as Diagram 2. Wording added 'Diagram 1 shows a tank.' Wording changed to 'Each tank is in the shape of a cylinder with both a top and a bottom as shown in Diagram 2'. Model of Diagram 1 provided for Braille candidates only.	Standard mark scheme