Mark Scheme (Results)

Summer 2019

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Calculator) Paper 2F

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: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1	$\dfrac{3}{4}$	B1	for $\dfrac{3}{4}$ or any other equivalent fraction	
2	−3, −1, 0, 2, 4	B1	for −3, −1, 0, 2, 4	Accept reverse order
3	At least **two** of 1, 3, 5, 15	B1	for at least two of 1, 3, 5, 15 with no incorrect values	Accept 3 × 5 etc.
4	1.756	B1	cao	
5	2 000 000	B1	for 2 000 000 or 2×10^6	
6	Yes and statement	P1	for a first step towards solution, eg. 2 × 2.75 (= 5.5) or 2.75 + 2.9 (= 5.65) **OR** 10 − 1.5 (= 8.5) or 10 − 2.9 (= 7.1) or 10 − 2.75 (= 7.25)	
		P1	for a complete process to find figures to compare eg. 2 × 2.75 + 2.9 + 1.5 (= 9.90) or 10 − (2 × 2.75 + 2.9) (=1.60) **OR** 2 × 2.75 + 2.9 (=8.40) **and** 10 − 1.5 (= 8.5)	
		C1	for correct conclusion with accurate figure(s) eg. Yes and (£)1.6(0) **or** Yes and (£)9.9(0) **or** Yes and (£)8.4(0) **and** (£)8.5(0)	
7	$7y$	B1	for $7y$ oe	Accept $7 \times y$ oe Accept a formula, eg. $P = 7y$ but **not** $y = 7y$

Question		Answer	Mark	Mark scheme	Additional guidance
8	(a)	$7ab$	B1	for $7ab$	
	(b)	y^3	B1	cao	
	(c)	$\dfrac{e}{f}$	M1	for a correct first step, eg. numerator of $e^3 \times f$ or denominator of $e^2 \times f^2$ **OR** $e \div f$ or $e \times f^{-1}$ **OR** relevant crossings out for all the e's **and** all the f's	
			A1	for $\dfrac{e}{f}$ or ef^{-1}	
9	(a)(i)	24	B1	cao	
	(ii)	18	B1	cao	
	(b)	Diagram	M1	for $36 \div 9$ or for using ratio 1 : 8 or setting up $w + 8w$ (=36)	Fully correct diagram with no method shown gets all 3 marks
			A1	for 4 and 32	
			C1	for correct diagram or ft (dep on M1) for drawing "4" and "32"	SC: B2 for 4 full circles for Wed **and** half a circle for Thursday SC: B1 for either Wed correct or for Thurs correct in the diagram if M0 scored
10		$14 < 21$ $4+7 = 103 - 92$ $2^2 = 2 \times 2$ $-3 > -5$	B2	for all 4 correct	
			(B1	for 2 or 3 correct)	

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
11	23	M1	for substitution eg. 7×5 and 3×−4 or 7(5) + 3(−4)	7×5 (= 35) and 3×−4 (= −12) may be seen separately but both must be seen for the award of M1
		A1	cao	
12 (a)	7	B1	cao	
(b)	1 hr 38 mins	M1	for a complete method to find the time difference eg. 9 00 – 7 22 **OR** a calculation on a number line, may be seen in any time format **OR** work in parts eg hours and minutes, may work in any units, eg. 60 – 22 (= 38) + 1 hour **OR** a clear build up method from 07 22 to 09 00 **OR** for correct values seen in an incorrect format, eg. 1.38 or 1:38 or 98 without units	
		A1	1 hr 38 (mins) or 98 minutes or 1.6$\dot{3}$ hrs	
13	10	P1	for starting the problem, 12 ÷ 6 (=2)	The square of side 2 cm may be just seen on the diagram
		P1	for a complete process to find width "2" × 5	
		A1	cao	
14	2 : 1	B1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
15	3240	P1	for 90 × 60 (= 5400) **OR** 40 ÷ 100 × 90 (= 36) **OR** 40 ÷ 100 ×60 (= 24)	
		P1	for a process to work out area that is flowers eg. 40 ÷ 100 × "5400" (= 2160) **OR** "36" × 60 (= 2160) **OR** 90 × "24" (= 2160)	
		P1	for a full process to find the area that is grass eg. "5400" – "2160" (=3240)	
		A1	cao	
			ALTERNATIVE	
		P1	for 100 – 40 (= 60)	
		P1	(indep) for 90 × 60 (=5400) **OR** 90 × 60 ÷ 100 (= 54) or 60 × 60 ÷ 100 (= 36)	
		P1	for a full process to find the area that is grass eg. "60" ÷ 100 × "5400" (=3240) **OR** "54" × 60 (= 3240) or "36" × 90 (= 3240)	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)(i)	B	B1	for B, accept 0.033 on the answer line	
(ii)	C	B1	for C, accept $\frac{1}{3}$ on the answer line	
(b)	Statement	C1	eg No with $\left(\frac{1}{3}\right)$ and $\frac{2}{3}$ or No, probabilities would need to be $\frac{1}{2}$ or No since $\frac{1}{3} + \frac{1}{3}$ does not equal 1 or No since tails is 67% (or 0.67)	Accept rounded conversions **seen** to decimals or percentages if the reasoning is correct
(c)	132	M1	for 4000 × 0.033 **OR** $\dfrac{132}{4000}$	
		A1	cao	132 out of 4000 is an acceptable answer

Question	Answer	Mark	Mark scheme	Additional guidance
17	180.9	P1	for starting to work with proportion eg. 60 ÷ 100 (= 0.6) or 150 ÷ 100 (= 1.5) **OR** 100 ÷ 60 (= 1.66..) or 100 ÷ 150 (= 0.66..) **OR** 84 ÷ 100 (= 0.84) or 87 ÷ 100 (= 0.87) or 84 ÷ 10 (= 8.4) or 87 ÷ 10 (= 8.7) or 84 ÷ 2 (= 42) or 87 ÷ 2 (= 43.5) **OR** 100 ÷ 84 (= 1.19..) or 100 ÷ 87 (= 1.14..)	
		P1	for a complete process to work out the calories in either item eg. "0.6" × 84 (= 50.4) or "1.5" × 87 (= 130.5) **OR** 84 ÷ "1.66.." (= 50.4) or 87 ÷ "0.66.." (= 130.5) **OR** "0.84" × 60 (= 50.4) or "0.87" × 150 (= 130.5) or "8.4" × 6 (= 50.4) or "8.7" × 15 (= 130.5) or "42" × 6 ÷ 5 (= 50.4) or "43.5" × 3 (= 130.5) **OR** 60 ÷ "1.19.." (= 50.4) or 150 ÷ "1.14.." (= 130.5)	
		P1	(dep on P2) for a complete process to find total number of calories in the breakfast, eg. "50.4" + "130.5"	
		A1	for 180.9 or 181	

Question	Answer	Mark	Mark scheme	Additional guidance
18	952	P1	for starting to work with parts, eg. 6 × 60 ÷ 10 (= 36) or 10 ÷ 6 (= 1.66..) or 6 ÷ 10 (= 0.6) or 13 × 60 ÷ 15 (= 52) or 15 ÷ 13 (= 1.15..) or 13 ÷ 15 (= 0.866..) **OR** for 60 ÷ 10 × 12 (= 72) or 10 × 60 ÷ 15 (= 40)	
		P1	for a full process to find the number of parts made by machine A eg "36" × 12 (= 432) or 12 × 60 ÷ "1.66.." (= 432) or 12 × 60 × "0.6" (= 432) **OR** "72" × 6 (= 432)	
		P1	for a full process to find the number of parts made by machine B eg "52" × 10 (= 520) or 10 × 60 ÷ "1.15.." (= 520) or 10 × 60 × "0.866.." (= 520) **OR** "40" × 13 (= 520)	
		A1	for 952 or 432 **and** 520	
19	Shaded region	M1	for 180 ÷ 30 (= 6) or 150 ÷ 30 (= 5)	This may be just used in a correct locus drawn on the diagram
		M1	draws an arc of radius "6 cm" centre *A* or draws a line segment parallel to *BC* and "5 cm" away	Ignore any additional arcs or lines drawn
		M1	for an arc of radius "6 cm" centre *A* **and** a line parallel to BC and "5 cm" away with no additional arcs or lines drawn	
		A1	Answer within tolerance with region shaded	Accept shading out leaving the required region unshaded
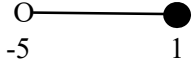
Question	Answer	Mark	Mark scheme	Additional guidance
20 (a)	$n > 2$	M1	for a method to isolate terms in n in any inequality or equation eg. $14n - 11n > 6$ or $n = 2$	Ignore incorrect inequality sign and accept "=" sign
		A1	cao	
(b)	-5 $\qquad$ 1	M1	for $-2 - 3 < x \le 4 - 3$ $(-5 < x \le 1)$	A circle around -5 and 1 implies M1
		M1	for drawing a line from -5 to 1 **or** (indep) for an open circle at either -2 or -5 **or** (indep) for a closed circle at 4 or 1	A line from -5 to 1 implies M2 if no working shown
		A1	cao	
21	Graph	B3	for a correct line between $x = -2$ and $x = 4$	
		(B2	for a correct straight line segment through at least 3 of $(-2, -7)$, $(-1, -5)$, $(0, -3)$, $(1, -1)$, $(2, 1)$, $(3, 3)$, $(4, 5)$ **or** for all of these points plotted but not joined **OR** for a line drawn with a positive gradient through $(0, -3)$ **and** clear intention to use a gradient of 2, eg line through $(0, -3)$ going across 2 squares and up 4 squares)	Ignore any incorrect points. Points need not be plotted for a correct line (segment) drawn Table of values <table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>-7</td><td>-5</td><td>-3</td><td>-1</td><td>1</td><td>3</td><td>5</td></tr></table>
		(B1	for at least 2 correct points stated or plotted **OR** for a line drawn with a positive gradient through $(0, -3)$ **OR** a line with gradient 2)	Ignore any incorrect points Coordinates may be in a table or in working

Question		Answer	Mark	Mark scheme	Additional guidance
22	(i)	65	M1	for working with proportion eg. 10 ÷ 30 × 195 (= 65)	Condone use of 200 for 195
			A1	cao	
	(ii)	statement	C1	for statement **Acceptable examples** sample is representative (otherwise answer wrong) random sample (otherwise answer will be different) the 30 students are from the 195 (otherwise not accurate) 10 out of every 30 want to go to the Theme Park (otherwise answer will be different/wrong) there is no bias **Not acceptable examples** There would be more than 10 people who want to go to the Theme Park I rounded my answer	
23		8	P1	for working with volume of the cuboid, eg 30 × 6 × 19 (= 3420) **OR** for using $\frac{2}{3}$ with one dimension, eg. 30 × 2÷ 3 (= 20)	For P marks, ignore attempts at unit conversion
			P1	for "3420" × 2 ÷ 3 (= 2280) or "3420" ÷ 3 (= 1140) **OR** "20" × 6 × 19 (= 2280) **OR** "3420" ÷ 275 (= 12.4….. = 12 cups)	
			P1	(dep on P2) for "2280" ÷ 275 (= 8.29..) **or** "1140" ÷ 275 (= 4.14..) **OR** "12" × 2 ÷ 3 **OR** for 275 × 8 (= 2200) **or** 275 × 9 (= 2475)	
			A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
24	9.85	M1	for $\sin (38) = \frac{AB}{16}$ oe **or** alternative method to find *AB*	
		A1	for an answer in the range 9.76 to 9.92	
25	8.3 and 8.4	B1	for 8.3 in the correct position	
		B1	for 8.4 in the correct position	Accept 8.3$\dot{9}$ or 8.399…
26	168	P1	for working with ratio to find the amount for C or D eg. 1.5 × 2 (=3) or (A, B, C, D =) 2 , 7 , 3 , 3 oe **OR** for suitable expressions linking A with C or D, eg. A = *x*, C = 1.5*x*	
		P1	for "2 + 3 + 3 + 7" (=15) **OR** adds 4 suitable expressions, eg. "*x* + 3.5*x* + 1.5*x* + 1.5*x*" (= 7.5*x*)	
		P1	for a complete process to find the amount of money eg. 360 ÷ "15"× 7 **OR** 360 ÷ "7.5" × 3.5	
		A1	cao	

Question		Answer	Mark	Mark scheme	Additional guidance
27	(a)	5.62×10^{-3}	B1	cao	
	(b)	1452	B1	cao	
28	(a)	24, 39	B1	cao	
	(b)	$8a$	M1	for a complete method to find the next 2 terms, eg. $a + 2a \ (= 3a)$ **and** $2a + \text{"}3a\text{"} \ (= 5a)$	
			A1	$8a$ oe	SC: B1 for 3, 5, 8 seen if M0 scored
29		$\begin{pmatrix} -2 \\ 1 \end{pmatrix}$	M1	for $4 - 2 \times 3 \ (= -2)$ or $5 - 2 \times 2 \ (=1)$ seen as a calculation $$\textbf{OR for } \begin{pmatrix} 4 \\ 5 \end{pmatrix} - \begin{pmatrix} 2 \times 3 \\ 2 \times 2 \end{pmatrix}$$ **OR** for $\begin{pmatrix} -2 \\ b \end{pmatrix}$ where $b \neq 1$ or $\begin{pmatrix} a \\ 1 \end{pmatrix}$ where $a \neq -2$	May be in a column vector
			A1	cao	

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2F

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: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
2		Wording 'five' added.	Standard mark scheme
8	(a)	Change *a* and *b* to *m* and *n* - MLP and Braille.	Standard mark scheme but *a* and *b* changed to *m* and *n*.
8	(c)	Braille only: change *e* and *f* to *r* and *s*.	Standard mark scheme but *e* and *f* changed to *r* and *s*.
9		Diagram enlarged. Key moved above the diagram. Circles divided into four sections. Wording 'incomplete' added.	Standard mark scheme
10		Symbols removed from the frame and enlarged. Boxes enlarged.	Standard mark scheme
11		Question wording changed to 'Work out the value of *P* when *r* = 5 and *q* = −4 given that *P* = 7*r* + 3*q*.'	Standard mark scheme
13		Diagram enlarged. Width label moved to the left-hand side of the diagram. Length and width lines changed to dashed lines. Shading changed to dotty shading. Wording 'shaded' added. Grid lines added.	Standard mark scheme

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
15		Diagram enlarged. Label moved to the left-hand side of the diagram.	Standard mark scheme
19		Diagram kept the same size. Scale moved above the diagram.	Standard mark scheme
20	(b)	Diagram enlarged. Wording 'below' removed.	Standard mark scheme
21		Diagram enlarged. Wording 'below' removed.	Standard mark scheme
23		Diagram enlarged. Wording changed to 'It shows a container in the shape of a cuboid with length 30 cm, width 6 cm and height 19 cm.' Second 19 cm label added on the left of the diagram. Dashed line and 'Water' added.	Standard mark scheme
24		Diagram enlarged. Angle moved outside of the angle arc and the angle arc made smaller. Wording added: 'AC = 16 cm Angle ACB = 38° Angle ABC is a right angle.'	Standard mark scheme
28	(b)	Braille only: '*a*' changed to '*m*'.	Standard mark scheme but *a* changed to *m* for Braille.