Mark Scheme (Results)

November 2019

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

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

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

Question		Answer	Mark	Mark scheme	Additional guidance
1		–7, –4, –2, 1, 8	B1	for –7, –4, –2, 1, 8	Accept reverse order 8, 1 –2, –4, –7
2		8000	B1	cao	
3		23	B1	cao	
4		4.2	B1	for 4.2 **or** $\frac{21}{5}$ oe	
5		7776	B1	cao	
6		14	P1	for making a start to the process eg 14×15 (= 210) **or** $14 \times 15 \times 6.50$ (= 1365) **or** $1274 \div 6.50$ (= 196) **or** $14 \times 15 \times 6.50 - 1274$ (= 91)	
			P1	for a complete process eg $(14 \times 15 \times 6.50 - 1274) \div 6.50$ **or** $14 \times 15 - (1274 \div 6.50)$	
			A1	cao	
7		$\frac{13}{20}$	M1	for $20 - 7$ (= 13) **or** $\frac{7}{20}$ oe **or** 0.65 **or** 65%	
			A1	for $\frac{13}{20}$ or equivalent fraction	
8	(a)	43	B1	cao	
	(b)	– 20 or ÷ 3	B1	for ÷ 3 **or** – 20 **or** $\times \frac{1}{3}$ **or** + –20	

Question		Answer	Mark	Mark scheme	Additional guidance
9	(a)	5	M1	for listing numbers in order, eg 3 4 4 6 8 9	Condone one error or additional number
				or answer of 4, 6	
				or answer of 8.5	
			A1	cao	
	(b)	$\dfrac{2}{6}$	M1	for $\dfrac{2}{x}$ with $x > 2$ **or** for $\dfrac{y}{6}$ with $y < 6$	Incorrect notation can imply a correct method. Award M1 for eg 2 out of 6 **or** 2 in 6 **or** 2 : 6
			A1	for $\dfrac{2}{6}$ oe	Accept any equivalent fraction, decimal form 0.33(33..) or percentage form 33(.33..)%
	(c)	3, 6	P1	for at least one 3 **or** 5×5 (= 25)	Numbers may be seen on the cards (but the answer line takes precedence)
			A1	for 3, 6 or 6, 3	
10		16 35	P1	for process to find length of time in car park eg 8.40 ÷ 0.024 (= 350) **or** 0.024 × 60 (= 1.44) **and** 8.40 ÷ "1.44" (= 5.833...)	
			P1	for process to add "350" minutes to 10 45 eg 10 45 + 60 + 60 + 60 + 60 + 60 + 50 **or** 10 45 + "5 hours 50 minutes" **OR** for 4 35	Do not accept incorrect interpretation of time, eg 5.83 = 5 hours 83 minutes
			A1	for 16 35 **or** 4 35 pm	Accept 16 35 pm

Question		Answer	Mark	Mark scheme	Additional guidance
11	(a)	19	B1	cao	
	(b)	12.4 to 12.8	M1	for a complete method, eg attempts to read from the graph at a factor of 80 **and** scales up to 80 **or** attempts to read from the graph at two numbers that sum to 80 **and** finds the sum of their readings **or** 1 stone = "6"kg **and** 80 ÷ "6"	
			A1	for an answer in the range 12.4 to 12.8 **or** ft correct reading from graph	
12		0.35	P1	for $\left(\dfrac{1}{10}+\dfrac{3}{5}\right)\div 2$ **or** 0.1 **and** 0.6 **or** 10(%) **and** 60(%) **or** 35(%) **or** for converting to equivalent fractions with a common denominator eg $\dfrac{1}{10}$ **and** $\dfrac{6}{10}$	
			A1	for $\dfrac{7}{20}$ oe **or** 0.35	

Question	Answer	Mark	Mark scheme	Additional guidance
13	enlargement	B2	for correct enlargement	Any orientation
		(B1	for any two sides correct **or** a correct enlargement with scale factor other than 3 or 1)	
14	40 litres (supported)	P1	for finding a cost linked to the correct volume for one offer eg 120 litres = 3 × 3.50 (= (£)10.5(0)) **or** 120 litres = (£)9 **OR** for finding cost per litre or litres per £ for one offer eg 3.50 ÷ 40 (= 0.0875) **or** 9 ÷ 120 (= 0.075) **or** 40 ÷ 3.50 (= 11.4…) **or** 120 ÷ 9 (= 13.3…) **OR** for working with bags in the ratio 2 : 1	<table><tr><td>120 *l*</td><td>£10.50</td><td>£9</td></tr><tr><td>80 *l*</td><td>£7</td><td>£6</td></tr><tr><td>40 *l*</td><td>£3.50</td><td>£3</td></tr><tr><td>20 *l*</td><td>£1.75</td><td>£1.50</td></tr></table>
		P1	for finding costs linked to the same volume for both offers eg 120 litres = 3 × 3.50 (= (£)10.5(0)) **and** 120 litres = (£)9 **OR** for finding cost per litre or litres per £ for both offers eg 3.50 ÷ 40 (= 0.0875) **and** 9 ÷ 120 (= 0.075) **or** 40 ÷ 3.50 (= 11.4…) **and** 120 ÷ 9 (= 13.3…) **OR** for a complete process to inform decision	
		C1	'40 litre bags' supported by correct comparable values	Clear indication that the 40 litre bags are better value for money supported by correct values for comparison
15	80	M1	for converting to cm	Can be done at any stage of the problem eg 19.2 × 100 (=1920) or 0.8 × 100
		M1	for use of scale eg 19.2 ÷ 24 (= 0.8) **or** 1920 ÷ 24 **or** [length] ÷ 24	[length] must come from an attempt to change 19.2 metres into cm
		A1	cao	

Question		Answer	Mark	Mark scheme	Additional guidance
16		243	M1	for $1.8 \div 100 \times 4500$ oe (= 81) **or** for a complete method eg $4500 \times 1.8 \times 3 \div 100$ oe **or** for 4743 **or** 4257	Award M1 for 4500×1.018^n
			A1	cao	
17		26	M1	for $ADB = 64$ **or** $ABD = 52$	May be shown on the diagram
			M1	for complete method, eg $(180 - 64 - 64) \div 2$ oe	Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
			A1	for 26	
			C1	(dep on first M1) for two correct reasons appropriate to their method from base <u>angles</u> of <u>isosceles triangle</u> are equal sum of <u>angles</u> in a <u>triangle</u> = 180 sum of <u>angles</u> on a straight <u>line</u> = 180 the <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u>	Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.
18	(a)	$T = 4n - 5$	M1	for $2n$ **or** $n - 5$ **or** $T = $ a linear expression in n	Allow variables other than n
			M1	for $n + 2n + n - 5$ oe **OR** for $T = $ an expression in n with 2 of 3 ages correct eg $T = n + n^2 + n - 5$	Each age must be an expression in n
			A1	for $T = 4n - 5$ oe eg $T = n + 2n + n - 5$	
	(b)	$5m - 3m = 2m$	B1	for $5m - 3m = 2m$ indicated	

Question	Answer	Mark	Mark scheme	Additional guidance
19	40	P1	for a process to find the maximum number of batches for one ingredient, eg $500 \div 175 \ (= 2.85...)$ **or** $300 \div 75 \ (= 4)$ **or** $625 \div 250 \ (= 2.5)$ **OR** for a process to find the amount of one ingredient for 1 biscuit, eg $175 \div 16 \ (= 10.9375)$ **or** $75 \div 16 \ (= 4.6875)$ **or** $250 \div 16 \ (= 15.625)$ **OR** for multiples of $175 : 75 : 250$, eg $175 \times 2 \ (= 350)$ **and** $75 \times 2 \ (= 150)$ **and** $250 \times 2 \ (= 500)$	Figures may be truncated or rounded

		P1	(dep P1) identifies flour as the limiting factor
			
			OR for a process to find the maximum number of biscuits for one ingredient, eg
			  butter: "2.85" $\times$ 16 **or** $500 \div$ "10.9.." oe $(= 45.7...)$
			  sugar: "4" $\times$ 16 **or** $300 \div$ "4.6.." oe $(= 64)$
			  flour: "2.5" $\times$ 16 **or** $625 \div$ "15.625" oe $(= 40)$	

		A1	cao SCB2 for answer of 32	

Question	Answer	Mark	Mark scheme	Additional guidance
20	Shown (supported)	M1	for substitution eg $4 \times 110 + 12$	
		A1	for 452	
		M1	(dep M1) for method to find value(s) needed for comparison eg $\dfrac{"452" - 442}{442} \times 100$ **OR** $\dfrac{5}{100} \times 442$ oe (= 22.1) **and** "452" − 442 (= 10) **OR** $\dfrac{5}{100} \times 442 + 442$ oe (= 464.1) **and** "452"	
		C1	shown with correct comparable values eg 2.2(6...)(%) **OR** 22.1 **and** 10 **OR** 452 **and** 464.1	

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
21	Two statements	C2	Two different statements **Acceptable** There is no 'frequency' label / *y*-axis is not labelled / no title for the *y*-axis The polygon should not be closed / have a line at the bottom / have first and last points connected (15, 6) has been plotted incorrectly / at (15, 8) / (The first point is at) 8 rather than 6 / First point is on an incorrect frequency **Not acceptable** There is no title / Points should be joined with a curve *x*-axis doesn't start at 0 There is no label The axes have not been labelled (*x* and *y*) The points haven't (all) been plotted correctly $10 < w \le 20$ and $30 < w \le 40$ have been plotted wrong The first point is plotted incorrectly, its at (15, 7) not (15, 6) The points have been joined up wrong / Points should not be joined in the shape of a triangle / They've connected all the points Done the midpoints rather than the numbers on the right side / The points are in the middle	Ignore additional statements provided no contradiction
		(C1	for one statement eg from those above)	
22	127.5 and 128.5	B1	for 127.5 in the correct position	
		B1	for 128.5 in the correct position	Accept $128.4\dot{9}$ or 128.499...

Question		Answer	Mark	Mark scheme	Additional guidance
23		18	P1	for 240 ÷ 10 (= 24) **or** 240 ÷ 8 (= 30)	Accept 3 + 7 for 10, 3 + 5 for 8
			P1	for 3 × "24" (= 72) **or** 7 × "24" (= 168) **or** 3 × "30" (= 90) or 5 × "30" (= 150)	
			P1	for 3 × "24" (= 72) **and** 3 × "30" (= 90) **or** 7 × "24" (= 168) **and** 5 × "30" (= 150)	
			A1	cao	
24	(i)	238	P1	for working with proportion eg $\frac{17}{50} \times 700$ oe	
			A1	cao	
	(ii)	statement	C1	for statement **Acceptable** Sample is representative (otherwise answer wrong) Random sample (otherwise answer will be different) The 50 people are from the 700 (otherwise not accurate) 17 out of **every** 50 want a sports bag (otherwise answer will be different / wrong) There is no bias That the other 650 will want the same gifts as the 50 **Not acceptable** There would be more than 17 people who want the sports bag I rounded my answer 17 out of 50 want a sports bag A repeat of the calculation done in (i) Most of the people would want a sports bag References as what might change in the future (eg a change in membership) That all 700 people wanted a type of gift rather than no gift (otherwise would have changed my answer)	

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
25 (a)	F	B1	cao	
(b)	D	B1	cao	
26	Shown (supported)	M1	for method to find at least two terms, eg $2 \times 4^2 - 1$ (= 31) **and** $40 - 3^2$ (= 31)	1 7 17 31 49 71 97 127 161 199 39 36 31 24 15 4 –9
		M1	for generating at least three correct terms of each sequence	
		A1	for generating at least the terms 1, 7, 17, 31, 49 of the first sequence **and** at least the terms 39, 36, 31, 24, 15, 4 of the second sequence	
27	4.56×10^{-2}	M1	for $0.000000342 \div 0.0000075$ **OR** for 0.0456 oe eg 0.456×10^{-1} **or** 45.6×10^{-3} **or** $\dfrac{57}{1250}$ **OR** for an answer of 4.56×10^{n}	
		A1	cao	
28	6	M1	for $720 \div 40$ (= 18) **or** $720 \div 30$ (= 24)	
		M1	for a complete process eg $(720 \div 30) - (720 \div 40)$ **or** "18" $\times$ 4/3 – "18" **or** "24" – "24" $\times$ 3/4	
		A1	cao	

Question	Answer	Mark	Mark scheme		Additional guidance
29	No (supported)	P1	for finding the area of 3 or more faces of the cuboid **and** adding eg $(6 \times 8) + (8 \times 18) + (6 \times 18)$ … or "48" + "144" + "108" … (= 300)		Could be an addition of *any* three faces eg 48 + 48 + 144 etc.
		P1	complete process to find surface area of cuboid, eg $6 \times 8 \times 2 + 6 \times 18 \times 2 + 8 \times 18 \times 2$ (= 600)		
		P1	for process to find side length of cube, eg [surface area] ÷ 6 **and** square rooting (= 10)	for a process to find the volume of the cuboid $6 \times 8 \times 18$ (= 864) **and** cube rooting (= 9.52…) to find a side length	[surface area] must come from the addition of at least three attempts at area, but not from volume.
		P1	(dep on previous P1) for processes to find volume of cube **and** volume of cuboid, eg [side length]^3 (= 1000) **and** $6 \times 8 \times 18$ (= 864)	(dep on previous P1) for process to find surface area of cube, eg. ("9.52…")$^2 \times 6$ (= 544.28…)	
		A1	No with 1000 **and** 864 **OR** No with 600 **and** 544(.28…)		

Question	Answer	Mark	Mark scheme	Additional guidance
30	Vector drawn	M1	for $5 - 2 \times 3 \ (= -1)$ **or** $2 - 2 \times -1 \ (= 4)$ seen as a calculation **OR** for $\begin{pmatrix} 5 \\ 2 \end{pmatrix} - \begin{pmatrix} 2 \times 3 \\ 2 \times -1 \end{pmatrix}$ **OR** for $\begin{pmatrix} -1 \\ b \end{pmatrix}$ **or** $\begin{pmatrix} a \\ 4 \end{pmatrix}$ **OR** for $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$ **or** $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$ **or** $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$ drawn	May be in a column vector Condone missing arrows
		M1	for $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ **OR** for $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ drawn with no arrow or incorrect arrow **OR** for $\begin{pmatrix} -1 \\ b \end{pmatrix}$ **or** $\begin{pmatrix} a \\ 4 \end{pmatrix}$ drawn with arrow, where $b \neq 4$ and $a \neq -1$	
		A1	cao	For this mark the drawn vector must include an arrow showing direction.

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.
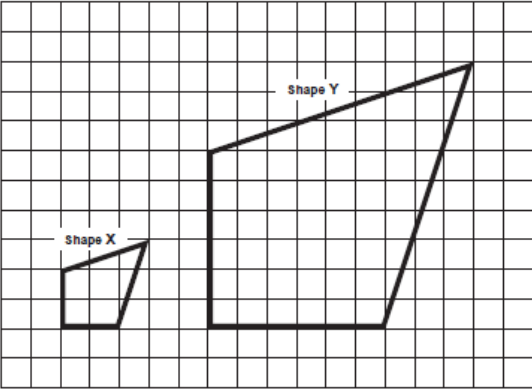
The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
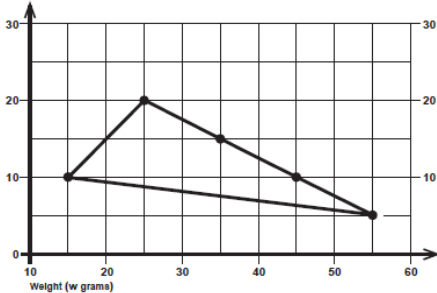Measurements of length: ±5 mm

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
1		Wording added 'five'.	Standard mark scheme
8		Braille only – answer space labelled (i).	Standard mark scheme
9		Wording added 'six'.	Standard mark scheme
10		Wording changed to 'The charge for a car park in Spain is 0.024 euros per minute.' Information box removed.	Standard mark scheme
11		Diagram enlarged. Right axis labelled. Graph line made thicker. Axes labels moved to the left of the horizontal axis and above the vertical axis. Wording added 'It shows a graph used to change between stones and kilos.' Part (a) wording changed to 'Change 4 stones to kilograms.'	Standard mark scheme but apply the greater tolerance described above for taking readings.

PAPER: 1MA1/2F			
Question		**Modification**	**Mark scheme notes**
13		Diagram enlarged and changed: Wording added 'It shows shape X and shape Y on a grid of squares. 'Question changed to 'Describe fully the single transformation that maps shape X to shape Y.' Three answer lines provided.	Mark scheme: B1 for "enlargement" B1 for "scale factor 3" Do not award any marks for a description that mentions other transformations (other than enlargement)
14		Diagram removed. Wording changed to 'Special offer 1 20 litres: 2 bags for £3.50 Special offer 2 40 litres: 3 bags for £9.	Standard mark scheme
17		Diagram enlarged. Wording added 'It shows triangle *ADC*.' ; Angle *DCA* is marked *x*.' Angles moved outside of the angle arc and angle arc made smaller.	Standard mark scheme
18	(b)	MLP only: *x* changed to *y*. MLP and Braille: *a*, *b*, *c* changed to *r*, *s*, *t*. Braille only – expressions labelled (i) to (v) and tick boxes removed.	Standard mark scheme
19		Information box moved to Diagram Book.	Standard mark scheme

Question	Modification	Mark scheme notes
21	Diagram enlarged and changed: Crosses changed to solid circles. Axes label moved to the left of the horizontal axis. Frequency changed as follows: $10 < w \le 20$ 5 $20 < w \le 30$ 20 $30 < w \le 40$ 15 $40 < w \le 50$ 10 $50 < w \le 60$ 5 Question wording changed from '50 potatoes' to '55 potatoes'.	Standard mark scheme, but reference to the first point is now "(15,5) has been incorrectly plotted at (15,10)"
23	Wording added 'Tom and Adam have some stamps.' Information moved to Diagram Book.	Standard mark scheme
25	Diagram enlarged. Graphs labelled as 'Graph A, graph B etc'.	Standard mark scheme
29	Diagrams enlarged; models should be provided for all candidates. Wording added 'The cuboid has length 18 cm, width 8 cm and height 6 cm.'	Standard mark scheme.
30	Diagram enlarged. Wording added 'It shows a grid.' Braille only - sticky label provided a-2b Question wording changed to 'On the grid, draw the vector a-2b. Label the vector.'	Standard mark scheme