Pearson Edexcel

Mark Scheme (Results)

Summer 2023

Pearson Edexcel GCSE
In Mathematics (1MA1)
Foundation (Calculator) Paper 3F

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 (eg 3.5 – 4.2) then this is inclusive of the end points (eg 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 eg 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 eg "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 eg [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: 1MA1/3F				
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1		3107	B1	cao	
2		30	B1	cao	
3		4m	B1		
4		4	B1	cao	
5		–5, –2, 3, 7, 9	B1	cao	Accept in reverse order
6	(a)	14	B1	cao	
	(b)	18	B1	cao	
7	(a)	evens	C1	oe	
	(b)	certain	C1	oe	
	(c)	0.6	B1	oe	Accept 60% or an equivalent fraction eg $\dfrac{6}{10}$
8	(a)	Square	C1	for statement of shape	Accept unambiguous misspellings.
	(b)	Cuboid	C1	for statement of solid	Accept unambiguous misspellings. Accept square based prism

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	6	M1	for ordering the numbers or showing a complete method of (5+7) ÷ 2	
		A1	cao	
(b)	8	B1	cao	
(c)	Bar chart	B1	for correct person labels or a linear scale	Accept key in place of labels Accept unambiguous abbreviations eg Frequency or Number, X,M,K,T Condone bars of varying widths Condone no gaps or inconsistent gaps
		M1	for correct bars showing information for at least 2 people	
		A1	for a fully correct bar chart with linear scale of numbers on the vertical axis and a set of person labels on the horizontal axis	
10	Yes (supported)	P1	for starting a process of working with time eg for undertaking some time conversion eg 85 mins is 1 hr 25 mins, 1 hr 45 min is 105 mins **or** for recognition that 1 h = 60 min (eg 85 = 60 + 25)	Time conversion may be implied by a correct addition over the hour eg 8.30 + 1h 45m = 10.15, 10.30 + 85 = 11.55 Can be shown at any stage.
		P1	for a correct addition of at least two times eg 15 + 85 =100 **or** a correct duration eg 8 30 + 1 h 45 m = 10 15 **or** a correct subtraction eg 12 (noon) − 15 = 11 45	A correct duration can be shown using their times for any of the stages. Subtraction of any of the time durations
		P1	for a complete process to justify the decision eg 8 30 + 1 hr 45 min + 85 + 15 (= 11 55) **or** 105 + 15 + 85 (=205 min) **and** 12 (noon) − 8 30 (= 210 min)	Accept their figures for 1 hr 45 min, 85 etc as long as it is clear they are related.
		C1	Yes **and** accurate figures eg 11 55 **or** 205 **and** 210	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
11	13	P1	for beginning to process problem eg $72 - 7$ $(= 65)$ **or** writing $5x + 7 = 72$ oe	
		P1	for a complete process eg "65" $\div$ 5 oe **or** writes $5x = 65$ oe	
		A1	cao	
12 (a)	Merit	B1	cao	
(b)	24	M1	for beginning to work with proportion eg $105 \div 7$ $(= 15)$ or $7 \div 105$ $(= 0.07$ or $0.06....)$ or 360×7 $(= 2520)$ **or** $\dfrac{360}{105}$ $(= 3.4…)$ **or** works out a quantity for one sector eg $\dfrac{7}{105} \times 30$ $(= 2)$, $\dfrac{7}{105} \times 75$ $(= 5)$, $\dfrac{7}{105} \times 150$ $(= 10)$,	
		M1	for a complete method eg $\dfrac{360}{105} \times 7$ oe or "3.4…" $\times$ 7 **or** $360 \div$ "15" or $360 \times$ "0.06.." **or** "2520" $\div$ 105 **or** $7 +$ "2" $+$ "5" $+$ "10"	
		A1	cao	

Paper: 1MA1/3F

Question		Answer	Mark	Mark scheme	Additional guidance
13	(a)(i)	30	B1	cao	
	(ii)	10	B1	cao	
	(b)	Drawn	M1	for a line from (1330 , 35) to (1500 , 35) **or** a line to the *x* axis from a point on *y* = 35 to 1600 on the *x* axis	
			A1	fully correct graph	
	(c)	35	B1	for 35 or ft their graph	ft must be 35 ÷ time duration for their line
14		1.3	M1	for working with boxes or bags eg 600 ÷ 120 (= 5) or 1000 ÷ 270 (= 3.7(037..)) 6 ÷ 120 (=0.05) or 10 ÷ 270 (= 0.037(037..))	Cost ÷ quantity For the M marks allow working in £ instead of p.
			M1	for working with bags and boxes where they are working to the same quantities of boxes and bags eg 600 ÷ 120 (= 5) **and** 1000 ÷ 270 (= 3.7(037..)) 6 ÷ 120 (=0.05) **and** 10 ÷ 270 (= 0.037(037..))	Other values are possible where they are using alternative quantities of boxes and bags, but these must be the same quantities of each.
			M1	for finding the difference eg "5" – "3.7(037..)" (= 1.29.. to 1.3) or "0.05" − "0.037(037..))" (= 0.0129.. to 0.013)	Must have consistent units for this mark.
			A1	for answer in the range 1.29 to 1.3	If an answer is given in the range in working and then rounded incorrectly award full marks.

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
15	175	M1	for a complete method eg $35 \times (4 + 1)$ oe	
		A1	cao	
16	Rotation of 90(°), centre (0,0)	B2	Rotation of 90 about (0,0) **or** Rotation of 270, clockwise about centre (0,0)	Accept "origin" or "O" for (0,0)
		(B1	Rotation and 90 **or** Rotation and 270, clockwise **or** Rotation about (0,0))	
17	Drawing	B1	for drawing point R from T at a distance of 5.5 cm.	Unless ambiguous point R can be indicated by a cross, dot, or interpreted as the end of a line drawn from T.
		B1	for drawing point R from T on a bearing of 65º	
18	4	M1	for a correct first step eg shows $4 \times 2x - 4 \times 3$ or $8x - 12$ or $2x - 3 = \dfrac{20}{4}$	
		M1	for isolating terms in x eg $2x = 5 + 3$	
		A1	cao	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	2.5	P1	for $450 \div 6 \ (= 75)$ **or** statement $450 = \dfrac{3000 \times 6 \times y}{100}$ oe **or** $\dfrac{450}{3000} \ (= 0.15)$ or $\dfrac{450 \times 100}{3000} \ (= 15)$	
		P1	for "75" $\div 3000 \ (= 0.025)$ **or** $(y =) \ \dfrac{450 \times 100}{3000 \times 6}$ oe **or** $\dfrac{"0.15"}{6} \ (= 0.025)$ or $\dfrac{"15"}{6}$ **or** $\dfrac{3000 + "75"}{3000} \ (= 1.025)$	
		A1	cao	
20 (a)	m^6	B1	cao	
(b)	x^{13}	B1	cao	
(c)	$4p^3 + 12p^2$	B2	for $4p^3 + 12p^2$	
		(B1	for expanding the bracket to get $p^3 + 3p^2$ **or** $4p^3$ **or** $12p^2$)	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
21 (a)	11533	P1	for working with 68%, eg 800 × 0.68 (= 544 people) oe or "16960" × 0.68 oe	Percentage calculation could be done at any stage
		P1	for a correct process, other than that of finding a %, eg "544" × 2 (= 1088) or 10.6 × 2 (= 21.2) or 800 × 2 (= 1600) or "544" × 10.6 (= 5766.4) or 800 × 10.6 (= 8480)	
		P1	for full process to find amount of coffee required eg "1088" × 10.6 or "544" × "21.2" or "5766.4" × 2 (= 11532.8) or for an answer of 11532	
		A1	for answer in the range 11532.5 to 11533	If a correct answer within the range is shown in working but incorrectly rounded award full marks.
(b)	Statement	C1	for a correct statement **Acceptable examples** the amount will be more; he will need more coffee it is an underestimate my answer in part (a) means there would not be enough for everyone he will need 12211(.2); needs 678(.4) more **Not acceptable examples** amount will decrease, amount of coffee will change	If figures are given as part of the answer they must be correct, but can allow ft.

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
22	Shown with reasons	M1	for method to find *ACD* using parallel lines eg *BCA* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *BCF* = 180 – 125 (= 55) = *ACD* **or** *FCD* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *CFG* = 180 – 125 (= 55) = *ACD*	Angles must be clearly labelled on the diagram or otherwise identified. Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		M1	for method to find *ADC* eg 180 – 110 (= 70) **or** for method to find *CAD* eg 180 – ("70" + "55") (= 55) or 110 – "55" (= 55)	
		A1	for *ACD* = 55 **and** *CAD* = 55	
		C1	for one correct parallel lines reason linked to their method eg <u>Corresponding</u> angles are equal <u>Allied</u> angles / <u>Co-interior</u> angles add up to 180 <u>Alternate</u> angles are equal	Underlined words need to be shown; reasons need to be linked to their method, which can be implied from correctly identified angles (stated or written on the diagram).
		C1	for one other reason stated linked to their method eg <u>Angles</u> on a straight <u>line</u> add up to 180 <u>Angles</u> in a <u>triangle</u> add up to 180 Vertically <u>opposite angles</u> are equal OR <u>Vertically opposite</u> angles are equal The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u>. <u>Angles</u> in a <u>quadrilateral</u> add up to 360. Accept "4-sided shape"	
23	17.5	P1	for a first step, eg 5 × 14 (= 70) or 14 ÷ 4 (= 3.5) or 5 ÷ 4 (= 1.25) or 4 ÷ 5 (= 0.8)	Could be done algebraically. 11.2 as answer scores no marks.
		A1	oe	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
24 (a)	63	B1	for 63, accept $3 \times 3 \times 7$ or $3^2 \times 7$	
(b)	15 876	M1	for at least two of 2^2, 3^4, 7^2 **or** shows at least 3 multiples of 2268, eg 2268, 4536, 6804 and at least 3 multiples of 441, eg 441, 882, 1323	(A =) $2^2 \times 3^4 \times 7$ scores 0 marks
		A1	for 15 876 or $2^2 \times 3^4 \times 7^2$ oe	
25	65	P1	for a correct process to find the number of seconds, eg 67 205 600 ÷ 11.9 (= 5 647 529.4...) **or** for a correct process to convert between seconds and days, eg $24 \times 60 \times 60$ (= 86 400) oe, may be seen in stages or $11.9 \times 60 \times 60 \times 24$ (= 1 028 160)	Note that this mark may be awarded at any stage in the working.
		P1	for a complete process, eg "5 647 529.4..." ÷ "86 400" or 67 205 600 ÷ "1 028 160"	
		A1	accept answers in the range 65 to 65.4 or 66	If a correct answer within the range is shown in working but incorrectly rounded award full marks.
26 (a)	(1, –3)	B1	cao	
(b)	−0.7 or 2.7	B1	for an answer in the range –0.8 to –0.6 **or** 2.6 to 2.8	

Paper: 1MA1/3F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
27	648	M1	for substitution into density formula eg 9×72 or $9 = \dfrac{m}{72}$	
		A1	cao	
28 (a)	1 : 50	M1	for an equivalent ratio eg 9 : 450 **or** $9 : 4.5 \times 10^2$ **or** 90000 : 4500000 oe **or** for $4500000 \div 90000$ or $\dfrac{4500000}{90000}$ (=50)	
		A1	For 1 : 50, accept $n = 50$	
(b)	56250×10^{-3} 0.005625×10^5 5625 5.625×10^4	M1	for writing numbers correctly in a common format eg 56250, 56.25, 562.5 **or** a correct list with one error **or** correct list but in reverse order	Count an omission as one error.
		A1	for correct list	Accept alternative indications of the correct order.

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. Notes apply to both MLP papers and Braille papers unless otherwise stated.

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

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
6		Wording added 'Look at the diagram for Question 6 in the Diagram Booklet. It shows a shape on a square grid. Each square on the grid represents a 1 cm square.' Wording removed 'The diagram shows a shape on a centimetre grid.' Shading changed. Diagram enlarged with fewer squares around the shape. Wording added 'Remember each square on the grid represents a 1 cm square.'	Standard mark scheme
7		Wording added 'Look at the diagram for Question 7 in the Diagram Booklet. It shows'. Wording removed 'Here is'. Diagram enlarged and straightened. Spike removed. Centre dot added. In (a) and (b) wording added 'from the list below'. Braille: in (a) and (b) frame removed; add (i) impossible, (ii) unlikely, (iii) evens, (iv) likely, and (v) certain	Standard mark scheme
8	(b)	Wording added 'Look at the diagram for Question 8(b) in the Diagram Booklet. You may be provided with a model. They are NOT accurate. They show'. Wording removed 'The diagram shows'. Diagram enlarged. Dashed lines made longer and thicker.	Standard mark scheme
9		Wording added 'below'. Table enlarged. Wording added to the table '(X)', '(M)', '(K)', and '(T)'. In part (c) wording added 'Look at the diagram for Question 9(c) in the Diagram Booklet. It shows a blank grid.'; Grid enlarged.	Standard mark scheme
12		Wording added 'Look at the diagram for Question 12 in the Diagram Booklet. It shows a pie chart.' Diagram enlarged. Angle arcs removed. Segment labels rearranged.	Standard mark scheme
13		Wording added 'Look at the diagram for Question 13 in the Diagram Booklet. It shows a graph.' Wording 'Here is a' removed and replaced with 'A'. Wording added 'is shown in the Diagram Booklet.' Diagram enlarged. Axes labels moved to above the vertical axes and left of the horizontal axes. Right axis labelled. Open headed arrows.	Standard mark scheme
16		Wording added 'Look at the diagram for Question 16 in the Diagram Booklet. It shows shape A and shape B on a grid. A cut out shape may be available if you wish to use it.' Shading changed. Diagram enlarged. Grid cut. Shapes labelled 'shape A' and 'shape B'. One unlabelled cut out shape provided.	Standard mark scheme

PAPER: 1MA1_3F			
Question		**Modification**	**Mark scheme notes**
17		Wording added 'Look at the diagram for Question 17 in the Diagram Booklet. It'. Wording removed 'The diagram'. North line made 9 cm to allow for specialist equipment. Open headed arrows. Wording 'with a cross (x).' removed and replaced with 'on the diagram.' Value '55 km' changed to '75 km'.	B1 if the distance of point R from T is in the range 7 to 8 cm B1 if the bearing of point R from T is in the range 60º to 70º
20	(b)	Letter '*x*' changed to '*y*'.	Standard mark scheme but note change of letter.
21	(a)	Letter '*g*' at end of answer line changed to 'grams'	Standard mark scheme
22		Wording added 'Look at the diagram for Question 22 in the Diagram Booklet. It shows triangle AGF and two straight lines ACF and ADG.' Wording removed 'ACF and ADG are straight lines.' Wording added 'Angle CDG = 110°; Angle EFC = 125°' Diagram enlarged. Angles moved outside of angle arcs. Angle arcs made smaller.	Standard mark scheme
24	(b)	Wording added 'Remember: A = $2^2 \times 3^4 \times 7$ B = $3^2 \times 7^2$'	Standard mark scheme
26		Wording added 'Look at the diagram for Question 26 in the Diagram Booklet. It shows'. Wording 'Here is' removed. Diagram enlarged. Axes labels moved to above the vertical axes and right of the horizontal axes.	Standard mark scheme
27		Letter '*g*' at end of answer line changed to 'grams'	Standard mark scheme