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## Mark Scheme (Results)

November 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.  $2 \times 6 (=12)$  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	Two correct factors	B1	for 2 correct factors from 1, 2, 3, 4, 6, 12 and no incorrect factors	Accept one correct product
2	10	B1	cao	
3	$\frac{7}{10}$	B1	for $\frac{7}{10}$ or for any other equivalent fraction	Eg $\frac{70}{100}$
4	18	B1	cao	
5	4000	B1	cao	
6	3 : 5	B1	for 3 : 5 or for any other equivalent ratio	
7	35	M1 A1	for $4 \times 8 (=32)$ cao	Award this mark if used ambiguously eg $4 \times 8 + 3 = 4 \times 11$ as long as $4 \times 8$ is stated
8	21, 28	B2  (B1	both correct  one correct in the correct position <b>or</b> for $15 + 6 (= a)$ or $a + 7 (= b)$ where $a \neq 21$ and $b \neq 28$ )	May be written alongside the given sequence but if contradiction accept the answer line. If both correct, accept in either order.  May be seen as “+6” next to the sequence

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
9	(a)	B2	all frequencies correct	Correct tallies alone scores B1 Correct frequencies with no tallies scores B2
		(B1	Starts to work with tallies, eg 2 tallies fully correct, or 2 frequencies fully correct)	Tallies need not be crossed
	(b)	Bar chart	M1	for labelling pet names on the horizontal axis or bars <b>OR</b> a linear scale on the vertical axis.
		M1	for at least two correct bars ft their table in (a)	Condone bars of unequal width Condone no gaps or inconsistent gaps
		A1	for a fully correct bar graph ft from their frequencies or tallies in (a).	Bars must be unambiguously correct for their scale All four bars must be correct with labels, ft, to award this mark. Vertical axis must have a suitable label, accept unambiguous abbreviations, eg freq or number Condone no gaps, or inconsistent gaps. Condone bars of unequal width Horizontal axis does not need “pet” label
(c)	dog	B1	cao or ft from frequencies in (a) <b>or</b> chart in (b)	Mark to the benefit of the candidate if table and graph are different.

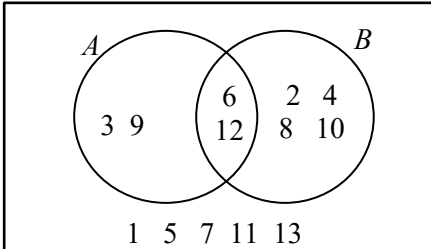
Paper: 1MA1/3F					
Question	Answer	Mark	Mark scheme	Additional guidance	
10	(a)	Diameter drawn	B1	diameter drawn	Accept hand drawn, intention through centre and from edge to edge. Ruler not required but intention clear.
	(b)	Segment shaded	B1	segment drawn unambiguously	Line must go edge to edge (condone extending outside the circle). Freehand acceptable. Can also draw a diameter here (as semi-circle).
11	(a)	2.5(0)	P1 P1 A1	for $13 \times 7.5(0)$ (=97.5(0)) <b>or</b> $5 \times 20$ (=100) for “100” – “97.5(0)” cao	
	(b)	96	M1 A1	for $\frac{1}{5} \times 120$ (= 24) oe <b>or</b> $\frac{4}{5} \times 120$ oe cao	
12	6	P1 P1 A1	process to find the weight of small boxes eg $3 \times 450$ (=1350) complete process to find the number of large boxes, eg $(5850 - “1350”) \div 750$ <b>or</b> $5850 - “1350”$ (=4500) <b>and</b> $6 \times 750$ (=4500) cao	Cannot award this mark if 6 comes from a rounded value due to error in calculating	
13	43	M1 A1	for identifying 74 and 31 as the key numbers cao	It is insufficient to identify these on the diagram (eg as 1, 4) –43 as an answer implies M1	



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
14 (a)	Explanation	C1	<p>for a correct explanation, eg that he has found the area not perimeter</p> <p><b>Acceptable examples</b>            He has found the area (not perimeter)            He should have added            The perimeter is <math>7+3+7+3 (=20)</math> oe            He did base<math>\times</math>height            He has timesed (not added)</p> <p><b>Not acceptable examples</b>            He has worked it out wrong            He should have squared it            He should have done <math>14\times 6</math> or <math>7\times 3\times 7\times 3</math> or <math>7\times 3</math> twice then add them            He didn't include the top or the other side            He should have doubled it            It should be <math>P=7\times 3</math> or he has done the sum not found the answer</p>	Any incorrect statement as part of a correct response can be ignored unless it contradicts the statement, eg, he found area but perimeter equals 10
(b)	Explanation	C1	<p>for correct explanation, eg that you cannot have a length of <math>-2</math></p> <p><b>Acceptable examples</b>  <math>x</math> cannot be negative            Cannot have a negative length            Has to be positive            It is impossible            Can't have <math>-2(\text{cm})</math> (as a measurement)            It has to be more than 0</p> <p><b>Not acceptable examples</b>            You can have <math>-2</math>            Won't add to 180            He has a minus sign and the other sides have add signs            It has to be a whole number or decimal            there are no negative numbers to get a negative answer            there is no cm after his answer            It should be <math>+2</math></p>	Any incorrect statement as part of a correct response can be ignored unless it contradicts the statement.

Paper: 1MA1/3F																				
Question	Answer	Mark	Mark scheme	Additional guidance																
15	72	P1	for a correct process to find the number of boys or girls, eg boys = $0.55 \times 800$ (=440) <b>or</b> girls = $0.45 \times 800$ (=360)	<table border="1"> <thead> <tr> <th></th> <th>PL</th> <th>SD</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>176</td> <td>264</td> <td>440</td> </tr> <tr> <td>Girls</td> <td>72</td> <td>288</td> <td>360</td> </tr> <tr> <td>Total</td> <td>248</td> <td>552</td> <td>800</td> </tr> </tbody> </table>		PL	SD	Total	Boys	176	264	440	Girls	72	288	360	Total	248	552	800
			PL		SD	Total														
		Boys	176		264	440														
		Girls	72		288	360														
Total	248	552	800																	
<b>or</b> process to find proportion that are boys having packed lunch, eg $0.55 \times 0.4$ (=0.22)																				
P1	for a correct process to find the total number of school dinners or packed lunches, eg SD = $800 \times 0.69$ (=552) <b>or</b> PL = $800 \times 0.31$ (=248)																			
<b>or</b> process to find proportion that are girls having packed lunch, eg $0.31 - "0.22"$ (=0.09)																				
P1	<b>or</b> process to find the number of boys having school dinner, eg "440" $\times 0.6$ (= 264)																			
<b>or</b> number of boys having packed lunch, eg "440" $\times 0.4$ (=176)																				
P1	for a correct process to find the number of girls having packed lunches, eg "800" $\times$ "0.31" – (440 $\times$ 0.4)																			
<b>or</b> "0.45" $\times$ "800" – ("800" $\times$ "0.69" – "440" $\times$ 0.6) <b>or</b> "0.09" $\times$ 800																				
A1	cao																			

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
16	blue 0.15 green 0.2	P1  P1  P1  A1	for $1 - 0.4 - 0.25 (=0.35)$ oe  for using the ratio, eg " $0.35 \div (3 + 4) (=0.05)$ <b>or</b> " $0.35 \times \frac{3}{7} (=0.15)$ <b>or</b> " $0.35 \times \frac{4}{7} (=0.2)$  for a complete process $3 \times "0.05" (=0.15)$ <b>and</b> $4 \times "0.05" (=0.2)$ <b>or</b> " $0.35 - "0.15" (=0.2)$ <b>or</b> " $0.35 - "0.2" (=0.15)$ <b>or</b> green 0.15, blue 0.2	May work in percentages, condone missing % sign If the two numbers in the table sum to 0.35 that implies P1 One correct value in the table implies P2 7 can come from 3+4  Accept answers given in decimals, fractions or percentages.
17	(a) $-10, -6, 2, 6$  (b) Graph drawn	B2  (B1)  M1  A1	for 4 values correct $-10, -6, (-2), 2, 6, (10)$  for 2 or 3 values correct)  (ft from (a) if B1 awarded) for at least 5 points correctly plotted.  correct graph drawn from $x = -1$ to 4	
18	Correct reflection	B2  (B1)	correct triangle drawn with vertices $(1, 2) (2, 2) (1, -1)$  for a correct reflection in the line $y = a$ <b>or</b> a correct reflection in the line $x = 3$ , <b>or</b> triangle in correct orientation with 2 of 3 vertices correct)	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
19	17	M1  A1	for correctly expanding the bracket, as part of an equation to get $4x - 24 = 44$ <b>or</b> for dividing both sides of the equation by 4 as a first step, eg $\frac{4(x-6)}{4} = \frac{44}{4}$ oe  cao	Award M1 for an embedded value of 17 if not identified as the answer
20	Venn Diagram	B1  M1 M1 A1	for labelling diagram, accept “multiples of 3” and “even numbers” for labels  for correct numbers in at least one region  for correct numbers in at least two regions  for all regions correct	Ignore all entries except the region you are marking for each method mark  
21	8	M1  M1  A1	for $158220 - 146500 (=11720)$ <b>or</b> $158220 \div 146500 (=1.08)$  for complete method, eg $(158220 - 146500) \div 146500 \times 100$ oe <b>or</b> $1.08 \times 100 - 100$  cao	0.08 as an answer implies M1

Paper: 1MA1/3F					
Question	Answer	Mark	Mark scheme		Additional guidance
22	(a)	$x^2 - 4x - 45$	M1	for 3 of 4 terms correct <b>or</b> 4 terms correct ignoring signs	3 terms correct can be implied, eg $x^2 - 4x + c$
			A1	cao	
	(b)	$3x(3x + 2)$	B2	for $3x(3x + 2)$	
			(B1)	for $3(3x^2 + 2x)$ <b>or</b> $x(9x + 6)$ <b>or</b> $3x(ax + b)$ where $a$ and $b$ are integers <b>or</b> $(3x + 2)$ as a factor	
23	(a)	157.668(255)	M1	for 836.4 <b>or</b> 5.304(809139) <b>or</b> 28.141 <b>or</b> a truncated or rounded version of 157.668255 to no less than 3 sf	Answer must be given to at least 3 decimal places rounded or truncated Accept a clear indication of the decimal point. Check first 3 decimal places only
			A1	for 157.668(255)	
	(b)	157.7	B1	ft from part (a) provided answer to (a) has at least 5 sf	
24		35 to 42	M1	for drawing a suitable line of best fit <b>or</b> for a line from $x = 34$ <b>or</b> for a point marked on the grid at $(34, y)$ , $y$ in the range 33 to 44	Line at $x = 34$ does not have to be full length of grid but should be in or reach the data set. Acceptable values for the data set are $y = 33$ to $y = 44$
			A1	answer in the range 35 to 42	

Paper: 1MA1/3F														
Question	Answer	Mark	Mark scheme	Additional guidance										
25	18.6	M1	for finding 4 products within intervals (including end points)	<table border="1"> <thead> <tr> <th>Min <math>fx</math></th> <th>Max <math>fx</math></th> </tr> </thead> <tbody> <tr> <td>5</td> <td>10</td> </tr> <tr> <td>20</td> <td>30</td> </tr> <tr> <td>105</td> <td>140</td> </tr> <tr> <td>160</td> <td>200</td> </tr> </tbody> </table>	Min $fx$	Max $fx$	5	10	20	30	105	140	160	200
Min $fx$	Max $fx$													
5	10													
20	30													
105	140													
160	200													
		M1	for $\Sigma“fx” \div (1+2+7+8)$ <b>or</b> $(7.5 \times 1 + 12.5 \times 2 + 17.5 \times 7 + 22.5 \times 8) \div (1+2+7+8)$ <b>or</b> $(“7.5” + “25” + “122.5” + “180”) \div “18”$ <b>or</b> $“335” \div “18”$	$\Sigma“fx”$ <b>must</b> come from 4 products $fx$ within intervals (including end points)										
		A1	for 18.6(111...)											
26	37 000	B1	cao											
27	50	B1	for finding the time difference, eg, 1hr 18 mins or 78 mins oe	Allow 1.18 for this mark 118 scores B0										
		P1	for correct process to convert minutes to hours, eg $18 \div 60 (=0.3)$ <b>or</b> $78 \div 60 (=1.3)$ <b>or</b> for a correct process to convert speed in miles per minute to mph eg $“0.833...” \times 60$	For a conversion of time or speed										
		P1	for using speed = distance $\div$ time eg, $65 \div [\text{time}]$ <b>or</b> $65 \div 78 (=0.833...)$	$[\text{time}]$ is what the candidate clearly indicates as time difference										
		A1	cao  SCB2 for 83(.333...) seen as the answer											



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
29	45	P1	for $180 - 117 (=63)$ <b>or</b> states, or uses, exterior angle $+ x = 117$	Angles may be shown on the diagram.
		P1	for process to find the exterior or the interior angle of the pentagon, eg $360 \div 5 (=72)$ <b>or</b> $180 - (360 \div 5) (=108)$ <b>or</b> $((5-2) \times 180) \div 5 (=108)$	Any angle labelled correctly as 63 and not contradicted scores this mark
		P1	for a complete process to find $x$ , eg $180 - "72" - "63"$ <b>or</b> $"108" - "63"$ <b>or</b> $117 - "72"$	Exterior = 108 or interior = 72 does not score the mark
		A1	cao	An answer of 45 with no supporting working scores 0
30	Result shown	M1	for finding the area of <b>A</b> <b>or</b> the area of <b>B</b> , eg $(\pi \times 15^2) \div 4 (=56.25\pi = 176.(7\dots)$ or 177) <b>or</b> $\pi \times 2.5^2 (=6.25\pi = 19.6(3\dots))$	May work without $\pi$ or with an approximation of $\pi$ Values may be rounded or truncated
		M1	for finding the area of <b>A</b> <b>and</b> the area of <b>B</b> , eg $(\pi \times 15^2) \div 4$ <b>or</b> $"6.25\pi" \times 9 (=56.25\pi = 176.(7\dots)$ or 177) <b>AND</b> $\pi \times 2.5^2$ <b>or</b> $"56.25\pi" \div 9 (=6.25\pi = 19.6(3\dots))$	
		C1	for conclusion eg, $\sqrt{56.25\pi \div 9 \div \pi} = 2.5$ oe <b>or</b> $\sqrt{\frac{6.25\pi \times 9 \times 4}{\pi}} = 15$ oe <b>or</b> $56.25\pi \div 9 = 19.6(3\dots)$ <b>and</b> $\pi \times 2.5^2 = 19.6(3\dots)$ oe <b>or</b> $6.25\pi \times 9 = 176.(7\dots)$ or 177 <b>and</b> $(\pi \times 15^2) \div 4 = 176.(7\dots)$ or 177 oe <b>or</b> for $((\pi \times 15^2) \div 4) \div (\pi \times 2.5^2) = 9$ oe	



**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:  $\pm 5^\circ$

Measurements of length:  $\pm 5$  mm

<b>PAPER: 1MA1/3F</b>		
<b>Question</b>	<b>Modification</b>	<b>Mark scheme notes</b>
2	Question changed to "Find $\frac{1}{4}$ of 30"	Mark scheme is B1 for 7.5 oe Accept $\frac{15}{2}$
4	Wording added 'six'.	Standard mark scheme
6	Diagram enlarged. Shading changed to dotted shading.	Standard mark scheme
7	Wording changed as follows: 'Find the value of w when u = 8 given that w = 4u + 3'	Standard mark scheme
9	Wording added 'Her results are shown in the Diagram Book.' Information stacked in 6 rows. Tally column enlarged. Braille only: key added: 'd = dog r = rabbit c = cat h = hamster' Part (a): Diagram enlarged. Wording 'below' removed. Braille only: labels provided as follows: dog rabbit cat hamster and numbers 1 – 10	Standard mark scheme, but see notes for Braille
10	(a) Diagrams enlarged. Wording 'above' removed	Standard mark scheme

PAPER: 1MA1/3F			
Question	Modification	Mark scheme notes	
10	(b)	Diagrams enlarged. Wording 'below' removed.	Standard mark scheme
13		Diagram enlarged. Key moved above the diagram.	Standard mark scheme
14	(a)	Wording changed 'It shows a rectangle with length 7 cm and width 3 cm.' Diagram enlarged. Dimensions moved to the top and the left of the diagram.	Standard mark scheme
14	(b)	Wording changed 'It shows a triangle. The sides of the triangle are $(y + 7)$ cm, $(y + 8)$ cm, $y$ cm	Standard mark scheme, but see the letter change
16		Table turned to vertical format and left aligned. Braille only- spaces labelled (i) and (ii). Wording added 'There are two spaces to fill.'	Standard mark scheme
17		Table turned to vertical format and left aligned. Braille only – spaces labelled (i) to (iv). Wording added 'There are four spaces to fill.' Part (b) Diagram enlarged. Grid cut at 12 on the y axis.	Standard mark scheme
18		Diagram enlarged. Shape P moved to (1,5) (1,8) (2,5). Grid extended to 9 on the y axis. Shape labelled as shape P. Shading changed to dotted shading. Wording added 'It shows shape P on a coordinate grid.' Unlabelled cut out shape may be provided. 'A cut out shape may be available if you wish to use it.'	For B2 the correct triangle drawn with vertices (1, 1) (1, -2) (2, 1) For B1 apply standard mark scheme
20		Diagram enlarged. 'Set A' and 'Set B' labelled. Braille only – spaces labelled (i) to (iv). Wording added 'It shows an incomplete Venn diagram.'	Standard mark scheme

PAPER: 1MA1/3F		
Question	Modification	Mark scheme notes
22	MLP only: $x$ changed to $y$ .	Standard mark scheme but note the letter change.
24	Diagram enlarged. Crosses changed to solid circles. Right axis labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis. Question wording changed to 'Jamie got a mark of 35 in the Science test.'	M1 for drawing a suitable line of best fit <b>or</b> for a line from $x = 35$ to a point at $(35, y)$ , $y$ in the range 30 – 45 <b>or</b> for a point marked on the grid at $(35, y)$ , $y$ in the range 30 – 45 A1 for an answer in the range 30 to 45
25	Frequency column widened.	Standard mark scheme
27	Wording changed to 'The table shows the information on his Sat Nav at 13 30.'	Standard mark scheme
29	Diagram enlarged. Angles moved outside angle arcs and angle arcs made smaller. Wording added 'Two angles are marked $117^\circ$ and $x^\circ$ '	Standard mark scheme
30	Diagram enlarged. Shapes labelled as 'shape A' and 'shape B'. Wording added 'It shows two shapes.', 'shape' added before 'A' and 'B'.	Standard mark scheme





