AQA

FUNCTIONAL SKILLS CERTIFICATE
Functional Mathematics

Level 1

Mark Scheme

4367

June 2017

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Glossary for Mark Schemes

Examinations are marked to award positive achievement.

Marks are awarded for demonstrating the following interrelated **process skills**.

Representing   Selecting the mathematics and information to model a situation.

R.1	Candidates recognise that a situation has aspects that can be represented using mathematics.
R.2	Candidates make an initial model of a situation using suitable forms of representation.
R.3	Candidates decide on the methods, operations and tools, including ICT, to use in a situation.
R.4	Candidates select the mathematical information to use.

Analysing   Processing and using mathematics.

A.1	Candidates use appropriate mathematical procedures.
A.2	Candidates examine patterns and relationships.
A.3	Candidates change values and assumptions or adjust relationships to see the effects on answers in models.
A.4	Candidates find results and solutions.

Interpreting   Interpreting and communicating the results of the analysis.

I.1	Candidates interpret results and solutions.
I.2	Candidates draw conclusions in light of situations.
I.3	Candidates consider the appropriateness and accuracy of results and conclusions.
I.4	Candidates choose appropriate language and forms of presentation to communicate results and solutions.

In particular, individual marks are mapped onto the following **skills standards**.

Representing   Making sense of the situations and representing them.
A learner can:

Ra	Understand routine and non-routine problems in familiar and unfamiliar contexts and situations.	
Rb	Identify the situation or problems and identify the mathematical methods needed to solve them.	
Rc	Choose from a range of mathematics to find solutions.	

Analysing   Processing and using the mathematics.
A learner can:

Aa	Apply a range of mathematics to find solutions.
Ab	Use appropriate checking procedures and evaluate their effectiveness at each stage.

Interpreting   Interpreting and communicating the results of the analysis.
A learner can:

Ia	Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.
Ib	Draw conclusions and provide mathematical justifications.

To facilitate marking, the following categories are used:

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

Q	Answer	Mark	Comments
1(a)	$3\frac{1}{2}$	B1 *Rb*	

Q				
	Alternative method 1			
	188 – 170 or 18	M1 *Rb*		
	their 18 × 7 or 150 ÷ 7 or 21.4	M1 *Rc*	Their 18 must be from an attempt to subtract 2 calorie values from the table	
	126 **and** No or 18 **and** 21.4 **and** No	A2 *I*	A1 126 or A1 18 **and** 21.4 or A1ft Correct conclusion for their value(s) if M2 awarded	
1(b)	**Alternative method 2**			
	188 × 7 or 1316 or 170 × 7 or 1190	M1 *Rb*		
	their 1316 – their 1190 or their 1316 – 150 or 1166 or their 1190 + 150 or 1340	M1 *Rc*	their 1316 and their 1190 must be from an attempt to multiply calorie values from the table by 7 (two different values)	
	126 **and** No or 1190 **and** 1166 **and** No or 1316 **and** 1340 **and** No	A2 *I*	A1 126 or A1 1190 **and** 1166 or A1 1316 **and** 1340 or A1ft Correct conclusion for their value(s) if M2 awarded	

Q	Answer	Mark	Comments
	Additional Guidance		
1(b)	Using the incorrect calorie value(s) from the table can still gain method marks Eg 170 × 7 = 1190 219 × 7 = 1533 1533 – 1190 = 343 No The other incorrect value is 222 × 7 = 1554	M1 M1 A0A1ft	
	possible subtractions of two calorie values from the table are 222 – 170 = 52 222 – 219 = 3 222 – 188 = 34 219 – 170 = 49 219 – 188 = 31		

Q	Answer	Mark	Comments
1(c)	**Alternative method 1**		
	$\dfrac{10}{100} \times 2500$	M1 *Aa*	any correct method to find 10%
	250 **and** Yes or 250 **and** it's 10 more	A2 *I*	A1 250 A1ft Correct conclusion for their value
	Alternative method 2		
	$\dfrac{260}{2500}$ (× 100) or 0.104	M1 *Aa*	
	10.4 **and** Yes or 0.104 **and** 0.1 **and** Yes	A2 *I*	A1 10.4 or A1 0.104 **and** 0.1 A1ft Correct conclusion for their value(s)
	Additional Guidance		
	10% of 2500 is not a method (unless evaluated correctly)		

Q	Answer		Mark	Comments	
	8 × 3.5 or 8 + 8 + 8 + 4 or 28		M1 Rb	Cost of oats Ignore units	
	72 ÷ 4 or 18		M1 Ra	Cost of dried apricots Ignore units	
	their 28 + their 18 + 95 or 141		M1 Aa	Total cost (3 components)	
	2.65 – their 1.41	their 1.41 + 1.2(0)	M1 Rc	their 1.41 must be from an attempt at total of 3 costs 2.65 – their 0.28 – their 0.18 – 0.95 implies M2	
1(d)	(£)1.24 **and** Yes	(£)2.61 **and** Yes	A2 I	A1 (£)1.24 A1ft Correct conclusion for their value if 3rd and 4th M1 awarded	A1 (£)2.61 A1ft Correct conclusion for their value if 3rd and 4th M1 awarded
	Additional Guidance				
	Working can be in £ or p for all M marks				
	For the 3rd M1 their 28 and their 18 must be costs not grams but can be awarded without the first 2 method marks Example 8 + 72 + 95 = £1.75 2.65 – 1.75 = 90p No			M0M0M1M1 A0A1ft	
	Some incorrect work may lead to the shop muesli being cheaper so the 4th method mark is redundant Example 8 + 8 + 8 + 4 =28 72 × 4 = 288 28 + 288 + 95 = 411 = £4.11 No the shop muesli is actually cheaper (subtraction not needed so don't penalise but they must state that the shop muesli is cheaper)			M1 M0 M1M1 A0 A1ft	

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Q	Answer	Mark	Comments
	Alternative method 1		
	2.5 hours or 2h 30 for flight 1 or 4 hours for flight 2 or 6.5 or 6h 30	M1 Rb	condone 2.30 condone 6.30
	their 2.5 + their 4 + 29 or 35 – their 2.5 – their 4	M1 Aa	Adding both times to 29 or subtracting both times from 35
	35.5 **and** Yes or 35h 30 **and** Yes or 28.5 **and** Yes or 28h 30 **and** Yes	A2 I	A1 35.5 or 35h 30 or 28.5 or 28h 30 or A1ft correct decision for their value if 2nd M1 is awarded
2(a)	**Alternative method 2**		
	2.5 or 2h 30 hours for flight 1 or 4 hours for flight 2 or 6.5 or 6h 30 or 35 – 29 or 6	M1 Rb	condone 2.30 condone 6.30
	their 2.5 + their 4 **and** 35 – 29	M1 Aa	
	6.5 **and** 6 **and** Yes	A2 I	A1 6.5 **and** 6 6.5 can be 6h 30 A1ft correct decision for their values if 2nd M1 is awarded

Q	Answer	Mark	Comments
	Additional Guidance		
	For method marks condone poor time notation eg 2.3 but for accuracy marks the time notation must be correct.		
	Check for times for each day next to the table		
2(a)	A correct answer of 35.5 and yes with no method scores full marks M1M1A2		
	An incorrect total time with no times for each day shown is M0M0A0A0ft		
	Example		
	29 + 7.5 = 36.5 yes M0M0A0		
	but times seen next to the table can be awarded marks		
	Example 3.5 and 4 seen next to the table then 29 + 7.5 = 36.5 yes score M1M1A0A1ft		

Q	Answer	Mark	Comments

Q	Answer	Mark	Comments
2(b)	**Alternative method 1**		
	1620 ÷ 3 or 540	M1 Rc	
	their 540 × 10	M1 Aa	1620 × 10 ÷ 3 implies M2 their 540 cannot be 5000
	5400	A1 Aa	
	Alternative method 2		
	5000 ÷ 10 or 500	M1 Rc	
	their 500 × 3	M1 Aa	
	1500	A1 Aa	
	Additional Guidance		
	ignore fw eg 400 extra		
	Note –starting with 5000 but using the steps in the order of the data sheet gives 5000 ÷ 3 × 10 = 16666 This scores M0M1A0		
	ignore units		
	steps can be done in any order example 1620 × 10 or 16200 M1 their 16200 ÷ 3 M1		

Q	Answer	Mark	Comments
2(c)	3200 ÷ 4	M1 Ra	ignore units
	800	A1 Aa	
Check	Reverse or alt method eg 800 x 4 = 3200 or 3200 ÷ 800 = 4	B1 Ab	

	Additional Guidance
	Mark 'holistically' so two different methods seen in the lines for 2c can be awarded the check or method for 2c can be seen in the check Example in 2c answer only of 900 in 2c check 3200 ÷ 4 = 900 Award M1A0B0
	4 x 800 = 3200 with 800 not identified as the answer is M1A0

Q	Answer	Mark	Comments

	Alternative method 1			
2(d)	7 (months)	B1 Rb	seen or used implied by 56	
	8 × their 7 or 56	M1 Ra	number of flights their 7 must be ≤ 12 but not 4 or 8 unless months stated	Award M3 for 8 × their 7 × 4 × 145 in any order or M2 for any three of 8, their 7, 4 and 145 multiplied together or M1 for any pair of these numbers multiplied
	their 56 × 4 or 224	M1 Aa	total number of tickets	
	their 224 × 145 or 32 480	M1 Rc	total income	
	their 32 480 – 5700 – 2250 or 25 000 + 5700 + 2250	M1 Aa	their 32 480 must be from a multiplication of 145 by at least two of 8, 4 and their 7	
	24 530 **and** No or 32 480 **and** 32 950 **and** No	A2ft I	ft their 7 (must be ≤ 12 but not 4 or 8 unless months stated) A1 24 530 or A1 32 480 **and** 32 950 or A1ft correct decision for their values if 4th M1 awarded	

Q	Answer	Mark	Comments

2(d)	**Additional Guidance**
	For the first accuracy mark their 7 must be ≤ 12 but cannot be 4 or 8 (unless they clearly state 4 months etc)
	Values to look out for
	32480 scores B1 M3
	580 is 145 × 4 (M1 for one correct pair multiplied)
	1160 is 145 × 8 (M1 for one correct pair multiplied)
	4640 is 145 × 4 × 8 (M2 for three correct values multiplied)
	4060 is 145 × 4 × 7 (M2 for three correct values multiplied and B1 for 7)
	8120 is 145 × 7 × 8 (M2 for three correct values multiplied and B1 for 7)
	If their 32 480 is less than 7950 then they must state that it is a loss
	Common incorrect months used with their final answers
	6 months: income 27480 → profit 19890 and No (6 marks)
	(27480 scores M3)
	12 months: income 55680 → profit 47730 and Yes (6 marks)
	(55680 scores M3)
	5 months: income 23200 → profit 15250 and No (6 marks)
	(23200 scores M3)

Q	Answer	Mark	Comments	
2(d)	**Alternative method 2**			
	7 (months)	B1 Rb	seen or used. Implied by 56	
	8 × their 7 or 56	M1 Ra	number of flights their 7 must be ≤ 12 but not 4 or 8 unless months stated	M2 for 8 × their 7 × 4 M1 for one pair multiplied
	their 56 × 4 or 224	M1 Aa	total number of tickets	
	25 000 + 5700 + 2250 or 32 950	M1 Aa	Income needed to make at least 25000 profit	
	their 32 950 ÷ their 224 or their 32 950 ÷ 145	M1 Aa		
	147.(..) **and** No (cost that the ticket would have to be) or 227.2(…) or 228 **and** No (number of tickets she needed to sell)	A2ft I	ft their 7 ft (must be ≤ 12 but not 4 or 8 unless months stated) A1 147.(..) or 227.2(…) or 228 or A1ft correct decision for their values if 4th M1 awarded	
	Additional Guidance			
	The values can be multiplied in any order			

Q	Answer	Mark	Comments
	Alternative method 1		
	(0) + 3 + 5 + 3 + 2 + 2 + (0) + 3 + 3 + 5 + 3 + 4 + 4 + 5 + 3 + 1 + 2 + 2 + 4 + 4 or 58	M1 *Rc*	Allow one error or omission If no working then total of 56 - 60 implies addition
	their 58 ÷ 20	M1 *Aa*	
	2.9 **and** Yes or (Yes) it's increased by 0.4	A2 *l l*	A1 2.9 or A1ft Correct conclusion for their value if M2 awarded SC2 3 **and** Yes (median or mode used) For SC2 if working is shown then must be correct middle value(s) for their ordered values –allow one error or omission
3 (a)	**Alternative method 2**		
	(0)+ 3 + 5 + 3 + 2 + 2 + (0)+ 3 + 3 + 5 + 3 + 4 + 4 + 5 + 3 + 1 + 2 + 2 + 4 + 4 or 58	M1 *Rc*	Allow one error or omission If no working then total of 56 - 60 implies addition
	2.5 × 20 or 50	M1 *Aa*	
	58 **and** 50 **and** Yes	A2 *l l*	A1 58 **and** 50 or A1ft Correct conclusion for their values if M2 awarded
	Additional Guidance		
	2.9 and Yes or it's increased by 0.4 gets full marks even if no method is seen. Ignore incorrect attempts to show the increase if 2.9 seen.		
	+ signs written between the numbers on the exam paper is enough for first M1		

Q	Answer	Mark	Comments
	writing addition signs between values and then ÷ 20 at the end (no brackets round the 20 values) is M1M0A0 unless recovered to correct answer		

<table>
<tr>
<td rowspan="6">3 (b)</td>
<td colspan="3">Alternative method 1</td>
</tr>
<tr>
<td colspan="2">80 ÷ 20 or 4</td>
<td>M1
<i>Rb</i></td>
<td></td>
</tr>
<tr>
<td>E&C
or
BLT
or
CS</td>
<td>their 4 × 5 or 20
or
their 4 × 10 or 40
or
their 4 × 5 or 20</td>
<td>M1
<i>Aa</i></td>
<td>$^5/_{20}$ × 80
or
$^{10}/_{20}$ × 80
or
$^5/_{20}$ × 80</td>
</tr>
<tr>
<td colspan="2">their 20 × 2 or 40
or
their 40 × 3 or 120
or
their 20 × 3 or 60</td>
<td>M1
<i>Rc</i></td>
<td>Costs of their number of sandwiches</td>
</tr>
<tr>
<td colspan="2">their 40 + their 120 + their 60</td>
<td>M1
<i>Aa</i></td>
<td>must add 3 values
not 2 + 3 + 3 or 5 + 10 + 5</td>
</tr>
<tr>
<td colspan="2">(£)220 and Yes
or
(£) 20 more</td>
<td>A2
<i>I I</i></td>
<td>A1   (£)220
or
A1ft   correct conclusion for their value
if 3rd and 4th M1 awarded</td>
</tr>
</table>

Q	Answer	Mark	Comments
	Alternative method 2		
	5 × 2 or 10 or 10 × 3 or 30 or 5 × 3 or 15	M1 *Rc*	
	their 10 + their 30 + their 15 or 55	M1 *Aa*	not 2 + 3 + 3 or 5 + 10 + 5
3 (b)	80 ÷ 20 or 4	M1 *Rb*	
	their 55 × their 4	M1 *Aa*	their 4 must be from attempt at multiplying up the ratio
	(£)220 **and** Yes or (£)20 more	A2 *I I*	A1 (£)220 or A1ft correct conclusion for their value if 1st and 2nd M1 awarded
	Additional Guidance		

Q	Answer	Mark	Comments
3 (c)	**Alternative method 1** (bar chart)		
	Axes labelled S,V,T,N oe and number (of people) or frequency	B1 *I*	May be horizontal or vertical bar chart
	Frequency scales shown from 0 to at least 7	B1 *Ra*	0 need not be labelled For a freehand chart(ie not on the grid) condone unequal gaps between numbers For a chart on the grid do **not** condone labelling the middle of a block
	Equal width bars drawn to correct height (3,7,4,6) with equal gap between them	B1 *Aa*	Condone no gaps Must be a consecutive scale but allow heights of 3, 7, 4 and 6 squares if scale is not labelled
	Alternative method 2 (pictogram)		
	Chooses appropriate symbol and describes in key	B1 *I*	A consistent symbol that can be split into smaller parts
	Correct number of symbols for one item (horizontal or vertical)	B1 *Ra*	
	Correct number of symbols for all items, approximately equally spaced (horizontal or vertical) with items correctly labelled	B1 *Aa*	For spacing if they have drawn the correct number of symbols then veg must be the longest, then none, tuna, salmon
	Additional Guidance		
	If there are 2 charts/diagrams mark the best attempt		
	Mark 'intention' for heights		
	For the 2nd and 3rd B1 the symbols for each type of sushi may be different but must represent the same value		
	A vertical line graph can score B1B1 B0		
	A pie chart scores B0B0B0		
	non-consecutive scale can score maximum of first B1 eg just labelling 3,4,6,7		

Q	Answer	Mark	Comments
	Alternative method 1		
	3 + 2 + 3 + 2 or 2 × 3 + 2 × 2	M1 *Rc*	
	10	A1 *Aa*	
	Alternative method 2		
4 (a)	10.6 – (3 + 3) **and** 2 + 2 or 10.6 – (2 + 2) **and** 3 + 3	M1 *Rc*	Works out amount for long sides and checks enough for short sides or Works out amount for short sides and checks enough for long sides
	4.6 **and** 4 or 6.6 **and** 6	A1 *Aa*	
	Alternative method 3		
	10.6 – 3 – 3 – 2 – 2	M1 *Rc*	
	0.6	A1 *Aa*	
	Additional Guidance		
	Ignore units		

Q	Answer	Mark	Comments	
4 (b)	3 × 2 or 6	M1 *Ra*	step 1	3 × 2 × 2.5 in any order is M2
	their 6 × 2.5 or 15	M1 *Aa*	step 2	
	their 15 × 141	M1 *Rb*	step 3 their 15 cannot be 2, 3 or 2.5	
	2115 (BTU per hour)	A1 *Aa*		
	600 mm	B1ft *I*	ft correct size for their value but must have multiplied by a room factor	
	Additional Guidance			
	To award the final B1 working must be seen to show that some value has been multiplied by a room factor (unless correct answer of 2115 seen) eg 3 × 2 = 6 6 × 177 = 1062 needs 500 mm radiator		M1M0M0A0B1ft	
	If their final BTU is greater than 3536 there is no possible radiator so B0ft			
	Steps could be done in a different order			

Q	Answer	Mark	Comments
4 (c)	**Alternative method 1**		
	2 × 3 or 6	M1 *Ra*	
	their 6 × 3.99 or 23.94	M1 *Aa*	23.94 implies M1M1 their 6 >1
	their 23.94 + 95 + 5.79	M1 *Rc*	3 costs totalled
	(£)124.73 **and** Yes	A2 *I*	A1 (£)124.73 or A1 ft correct conclusion for their value if 3rd M1 awarded
	Alternative method 2		
	2 × 3 or 6	M1 *Ra*	
	their 6 × 3.99 or 23.94	M1 *Aa*	23.94 implies M1M1 their 6 >1
	125 – 95 – 5.79 or 24.21	M1 *Rc*	
	24.21 **and** 23.94 **and** Yes	A2 *I*	A1 24.21 **and** 23.94 or A1 ft correct conclusion for their values if 3rd M1 awarded

Q	Answer	Mark	Comments
	Additional Guidance		
	Other variations on the mark schemes are possible.		
	Common incorrect answers: 3.99 + 5.79 + 95 = 104.78 and Yes		M0M0M1A0A1ft
	using perimeter 10 ✗ 3.99 = 39.9 39.9 + 5.79 + 95 = 140.69 No		M0M1M1A0A1ft

Q	Answer	Mark	Comments
4 (d)	28 × 6 or 168	M1 Rc	
	their 168 + 55	M1 *Aa*	their 168 cannot be 28
	£223	A1 *I*	Must see £ sign 223 gains M2 A0
4 (d) check	Reverse or alt method eg (their 223 – 55) ÷ 6 = 28 or their 168 ÷ 28 = 6	B1 Ab	A check of a single calculation is sufficient eg 223 – 55 = 168

Additional Guidance	
Mark 'holistically' so check can be in lines for 4d and method can be given credit in check	