



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:

- la** Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.
- lb** 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
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1(a)	$3\frac{1}{2}$	B1 Rb	
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1(b)	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 /	A1 126 or A1 18 and 21.4 or A1ft Correct conclusion for their value(s) if M2 awarded
	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 /	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
1(b)	Additional Guidance		
	Using the incorrect calorie value(s) from the table can still gain method marks Eg $170 \times 7 = 1190$ $219 \times 7 = 1533$ $1533 - 1190$ $= 343$ No	M1 M1 A0A1ft	
	The other incorrect value is $222 \times 7 = 1554$		
	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		
	$\frac{10}{100} \times 2500$	M1 Aa	any correct method to find 10%
	250 and Yes or 250 and it's 10 more	A2 /	A1 250 A1ft Correct conclusion for their value
	Alternative method 2		
	$\frac{260}{2500} (\times 100)$ or 0.104	M1 Aa	
	10.4 and Yes or 0.104 and 0.1 and Yes	A2 /	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		
1(d)	8×3.5 or $8 + 8 + 8 + 4$ or 28	M1 <i>Rb</i>	Cost of oats Ignore units		
	$72 \div 4$ or 18	M1 <i>Ra</i>	Cost of dried apricots Ignore units		
	their 28 + their 18 + 95 or 141	M1 <i>Aa</i>	Total cost (3 components)		
	$2.65 - \text{their } 1.41$	$\text{their } 1.41 + 1.2(0)$	M1 <i>Rc</i>	their 1.41 must be from an attempt at total of 3 costs $2.65 - \text{their } 0.28 - \text{their } 0.18 - 0.95$ implies M2	
	(£)1.24 and Yes	(£)2.61 and Yes	A2 <i>I</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 $8 + 72 + 95 = \text{£}1.75$ $2.65 - 1.75 = 90\text{p}$ No				M0M0M1M1 A0A1ft
	Some incorrect work may lead to the shop muesli being cheaper so the 4th method mark is redundant Example $8 + 8 + 8 + 4 = 28$ $72 \times 4 = 288$ $28 + 288 + 95 = 411 = \text{£}4.11$ 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

Q	Answer	Mark	Comments
2(a)	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
	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
2(a)	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		
	<p>A correct answer of 35.5 and yes with no method scores full marks M1M1A2</p> <p>An incorrect total time with no times for each day shown is M0M0A0A0ft</p> <p>Example</p> <p>$29 + 7.5 = 36.5$ yes M0M0A0</p> <p>but times seen next to the table can be awarded marks</p> <p>Example 3.5 and 4 seen next to the table then $29 + 7.5 = 36.5$ yes score M1M1A0A1ft</p>		

Q	Answer	Mark	Comments
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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)	$3200 \div 4$	M1 Ra	ignore units
	800	A1 Aa	
Check	Reverse or alt method eg $800 \times 4 = 3200$ or $3200 \div 800 = 4$	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 $3200 \div 4 = 900$ Award M1A0B0		
	$4 \times 800 = 3200$ with 800 not identified as the answer is M1A0		

Q	Answer	Mark	Comments		
2(d)	Alternative method 1				
	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
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Additional Guidance	
2(d)	<p>For the first accuracy mark their 7 must be ≤ 12 but cannot be 4 or 8 (unless they clearly state 4 months etc)</p> <p>Values to look out for</p> <p>32480 scores B1 M3</p> <p>580 is 145×4 (M1 for one correct pair multiplied)</p> <p>1160 is 145×8 (M1 for one correct pair multiplied)</p> <p>4640 is $145 \times 4 \times 8$ (M2 for three correct values multiplied)</p> <p>4060 is $145 \times 4 \times 7$ (M2 for three correct values multiplied and B1 for 7)</p> <p>8120 is $145 \times 7 \times 8$ (M2 for three correct values multiplied and B1 for 7)</p> <p>If their 32 480 is less than 7950 then they must state that it is a loss</p>
	<p>Common incorrect months used with their final answers</p> <p>6 months: income 27480 \rightarrow profit 19890 and No (6 marks) (27480 scores M3)</p> <p>12 months: income 55680 \rightarrow profit 47730 and Yes (6 marks) (55680 scores M3)</p> <p>5 months: income 23200 \rightarrow profit 15250 and No (6 marks) (23200 scores M3)</p>

Q	Answer	Mark	Comments
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2(d)	Alternative method 2			
	7 (months)	B1 Rb	seen or used. Implied by 56	
	8 x 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 x their 7 x 4 M1 for one pair multiplied
	their 56 x 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 \div their 224 or their 32 950 \div 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
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3 (a)	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 \div 20	M1 Aa	
	2.9 and Yes or (Yes) it's increased by 0.4	A2 //	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
	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 \times 20 or 50	M1 Aa	
	58 and 50 and Yes	A2 //	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 $\div 20$ at the end (no brackets round the 20 values) is M1M0A0 unless recovered to correct answer		

3 (b)	Alternative method 1			
	80 \div 20 or 4	M1 <i>Rb</i>		
	E&C or BLT or CS	their 4 \times 5 or 20 or their 4 \times 10 or 40 or their 4 \times 5 or 20	M1 <i>Aa</i>	$\frac{5}{20} \times 80$ or $\frac{10}{20} \times 80$ or $\frac{5}{20} \times 80$
	their 20 \times 2 or 40 or their 40 \times 3 or 120 or their 20 \times 3 or 60	M1 <i>Rc</i>	Costs of their number of sandwiches	
	their 40 + their 120 + their 60	M1 <i>Aa</i>	must add 3 values not 2 + 3 + 3 or 5 + 10 + 5	
	(£)220 and Yes or (£) 20 more	A2 <i>//</i>	A1 (£)220 or A1ft correct conclusion for their value if 3rd and 4th M1 awarded	

Q	Answer	Mark	Comments
3 (b)	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
	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 //	A1 (£)220 or A1ft correct conclusion for their value if 1st and 2nd M1 awarded
	Additional Guidance		

Q	Answer	Mark	Comments
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3 (c)	Alternative method 1 (bar chart)		
	Axes labelled S,V,T,N oe and number (of people) or frequency	B1 /	May be horizontal or vertical bar chart
	Frequency scales shown from 0 to at least 7	B1 <i>Ra</i>	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 <i>Aa</i>	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 /	A consistent symbol that can be split into smaller parts
	Correct number of symbols for one item (horizontal or vertical)	B1 <i>Ra</i>	
	Correct number of symbols for all items, approximately equally spaced (horizontal or vertical) with items correctly labelled	B1 <i>Aa</i>	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
4 (a)	Alternative method 1		
	3 + 2 + 3 + 2 or 2 × 3 + 2 × 2	M1 Rc	
	10	A1 Aa	
	Alternative method 2		
	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 <i>Ra</i>	step 1	3 × 2 × 2.5 in any order is M2	
	their 6 × 2.5 or 15	M1 <i>Aa</i>	step 2		
	their 15 × 141	M1 <i>Rb</i>	step 3 their 15 cannot be 2, 3 or 2.5		
	2115 (BTU per hour)	A1 <i>Aa</i>			
	600 mm	B1ft <i>/</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 /	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 /	A1 24.21 and 23.94 or A1 ft correct conclusion for their values if 3rd M1 awarded

Q	Answer	Mark	Comments
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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 $10 \times 3.99 = 39.9$ $39.9 + 5.79 + 95 = 140.69$ 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 /	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		