AQA

Functional Skills Certificate
FUNCTIONAL MATHEMATICS
4367

Level 1

Mark scheme

March 2019

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 $\frac{1}{2}$

Question	Answer	Mark	Comments
1(a)	16 200 – 4500	M1 *Rc*	
	11 700	A1 *Aa*	
Check	reverse or alt method eg their 11 700 + 4500 = 16 200	B1ft *Ab*	
	Additional Guidance		
	4500 + 11 700 = 16 200 with 16 200 – 4500 not seen in check M1A0		
1(b)	288	B1 *Rb*	must be the only repayment value selected implied by 13 824 or 3824
	their 288 × 48 or 13 824	M1 *Aa*	their 288 can be any value from the table
	3824	A1 *Aa*	
	Additional Guidance		
	Using an incorrect value from the table can score B0M1A0 only		
	If working lines are blank check table for 288 indicated which can score B1		

Q	Answer	Marks	Comments
1(c)	49 ÷ 9 or 5.4(..) or 5 × 9 = 45 and 6 × 9 = 54	M1 *Aa*	
	6	A1 *I*	
	Additional Guidance		
	Condone answer 6 days unless clearly from 5 nights		
	Answer 6 will gain full marks unless incorrect arithmetic is seen eg 9 × 6 = 52 Answer 6 M1A0		
	6 × 9 = 54 **or** 5× 9 = 45 with no answer given is insufficient for M1		

Q	Answer	Marks	Comments
1(d)	**Alternative method 1**		
	160 ÷ 40 or 4	M1 *Rc*	allow embedded
	1.30 + their 4 + 45 mins or 1.5 + their 4 + 0.75 or 6 – their 4 – 45 mins	M1 *Aa*	their 4 cannot be 160 or 40
	6.15(pm) and No or 1.15(pm) and No	A2 *I,I*	A1 6.15(pm) or 1.15(pm) or A1ft correct conclusion for their value if at least one method mark scored and addition of times seen
	Alternative method 2		
	160 ÷ 40 or 4	M1 *Rc*	
	1.30 + their 4 or 5.30 **and** 6 – their 5.30 or 6(pm) – 1.30 or 4h 30 **and** their 4 + 45 mins or 4h 45	M1 *Aa*	
	30 (mins) and No or 4h 30 and 4h 45 and No or 4.5 and 4.75 and No	A2 *I,I*	A1 30 (mins) or A1 4h 30 and 4h 45 or A1 4.5 and 4.75 or A1ft correct conclusion for their value if 2nd method mark scored

<table>
<tr><td rowspan="6">1(d)
cont’d</td><td colspan="3">Alternative method 3</td></tr>
<tr><td>uses build up method
adds on 4 lots of one hour with 4 lots of 40 miles + 45 minutes</td><td>M2
Rc, Aa</td><td>eg 1.30 to 2.30 is 40 miles,
to 3.30 → 80 miles
Break 3.30 to 4.15
to 5.15 →120 miles
to 6.15 → 160 miles

M1 for adding on the four separate hours and 4 lots of 40 miles without including a break</td></tr>
<tr><td>6.15(pm) and No
or
1.15(pm) and No</td><td>A2
I,I</td><td>A1 6.15(pm) or 1.15(pm)
or
A1ft correct conclusion for their value if at least one method mark scored</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="3">Omitting the 45 minutes can score maximum 2 marks
eg 160 ÷ 40 = 4
1.30 + 4 = 5.30 Yes M1M0A0A1ft</td></tr>
<tr><td colspan="3">Allow 18.15 for 6.15</td></tr>
<tr><td colspan="3">Allow equivalent final answers such as
Quarter past 6 and no
No they will be 15 mins late</td></tr>
<tr><td colspan="3">Subtracting 45 minutes, leading to answer of 4.45 and Yes scores M1M0A0A1ft</td></tr>
</table>

Q	Answer	Marks	Comments
1(e)	**Alternative Method 1**		
	27 + 2 – 9 or 20	M1 *Ra*	
	their 20 × 7 or 140	M1 *Rc*	140 implies M2
	68 + 35 + their 140 or 250 – (68 + 35 + their 140)	M1 *Aa*	
	243 and Yes or 7 and Yes	A2 *I,I*	A1 243 or 7 or A1ft correct conclusion for their value with two method marks scored
	Alternative Method 2		
	7 × 27 or 189 or 7 × 2 or 14 or 7 × 29 or 203 or 7 × 9 or 63	M1 *Ra*	award M3 for 68 + 35 + 189 + 14 – 63 or 306 – 63
	their 189 + their 14 – their 63 or their 203 – their 63 or 140	M1 *Rc*	
	68 + 35 + their 140 or 250 – (68 + 35 + their 140)	M1 *Aa*	
	243 and Yes or 7 and Yes	A2 *I,I*	A1 243 or 7 or A1ft correct conclusion for their value with two method marks scored

1(e) cont'd	**Alternative Method 3**		
	27 – 9 or 18	M1 *Ra*	
	their 18 × 7 or 126 or 2 × 7 or 14	M1 *Rc*	
	68 + 35 + their 126 + their 14 or 250 – (68 + 35 + their 126 + their 14)	M1 *Aa*	
	243 and Yes or 7 and Yes	A2 *I,I*	A1 243 or 7 or A1ft correct conclusion for their value with two method marks scored
	Alternative Method 4		
	7 × 27 or 189 or 7 × 2 or 14 or 7 × 29 or 203 or 7 × 9 or 63	M1 *Ra*	
	their 189 + their 14 + 68 + 35 or 306	M1 *Rc*	306 implies M2
	their 306 – their 63	M1 *Aa*	
	243 and Yes	A2 *I,I*	A1 243 or A1ft correct conclusion for their value with two method marks scored

Additional Guidance follows on the next page

	Additional Guidance
1(e)	Examples **1)** 27 × 7 = 189 2 × 7 = 14 9 × 7 = 63 189 +14 + 68 – 63 = 208 and Yes M1M1M0A0A1ft (Alt 2) omits £35 **2)** 27 + 2 – 9 = 20 20 + 68 + 35 = 123 and Yes M1M0M1A0A1ft (Alt 1) omits number of nights **3)** 27 + 2 + 9 = 38 38 × 7 = 266 266 + 68 + 35 = 369 and No M0M1M1A0A1ft (Alt 1) adds 'discount' **4)** 27 – 9 or 18 18 × 7 = 126 126 + 68 + 35 = 229 and Yes M1M1M0A0A1ft (Alt 3) omits electricity

Q	Answer	Mark	Comments
2(a)	7 × 6 or 42	M1 *Ra*	
	their 42 × 300 or 12 600	M1 *Rb*	
	their 12 600 ÷ 1000	M1 *Rc*	
	12.6 or $\frac{63}{5}$	A1 *Aa*	Ignore units
	Additional Guidance		
	Each step is independent eg 7 × 300 ÷ 1000 gains M0M1M1A0 They can be done in any order		
	7 × 6 × 0.3 with no further steps is M3		
	7 × 6 × 0.3 ÷ 1000 is M2 (divided by 1000 twice)		
	7 × 6 = 42 42 × 300 = 12600 12600 ÷ 1000 = 12.6 12.6 ÷ 1000 = 0.0126 M1M1M0A0 (divided by 1000 twice)		
	Check diagram for 7 × 6 or 42		

Q	Answer	Mark	Comments

2(b)	4 × 80 or 320	80 × 0.1 or 8	M1 *Ra*	
	their 320 × 0.1	their 8 × 4	M1 *Rb*	
	(£)32		A1 *Aa*	SC2 288
	Additional Guidance			
	Allow equivalent methods for calculating 10%			
	32 seen M2 A0 Examples **1)** 80 – 32 = 48 M2A0 **2)** 80 × 4 = 320 320 ÷ 10 = 32 32 × 4 = 128 M2A0			
	Answer 32% discount M2 A0			

Q	Answer	Mark	Comments
2(c)	**Alternative method 1**		
	700 + 600 + 700 + 600 or 2600	M1 *Ra*	perimeter of edge in centimetres
	their 2600 ÷ 10 or 260	M1 *Rc*	division by 10 their 2600 can be any attempt at perimeter including 1200, 1300 or 1400
	their 260 – 4	M1 *I*	adjustment for corners
	256	A1 *Aa*	
	Alternative method 2		
	700 ÷ 10 or 70 or 600 ÷ 10 or 60	M1 *Ra*	
	2 × their 70 + 2 × their 60 or 260	M1 *Rc*	Must be from division by 10
	their 260 – 4	M1 *I*	
	256	A1 *Aa*	

2(c) cont'd	**Alternative method 3**		
	700 – 10 or 690 or 700 – 20 or 680 or 600 – 10 or 590 or 600 – 20 or 580	M1 *Ra*	
	2 × (700 – 10) + 2 × (600 – 10) or 2 × (700 – 20) + 2 × 600 or 2 × 700 + 2 × (600 – 20) or 2560	M1 *I*	
	their 2560 ÷ 10	M1 *Rc*	their 2560 can be from any attempt at perimeter
	256	A1 *Aa*	
	Alternative method 4		
	700 ÷ 10 or 70 or 600 ÷ 10 or 60	M1 *Ra*	
	their 70 – 2 or 68 or their 60 – 2 or 58 or their 70 – 1 **and** their 60 – 1 or 69 **and** 59	M1 *I*	must be from division by 10
	2 × their 70 + 2 × their 58 or 2 × their 68 + 2 × their 60 or 2 × their 69 + 2 × their 59	M1 *Rc*	must be correct pairings from previous method
	256	A1 *Aa*	

2(c)	**Additional Guidance**
	Working out area of drive divided by area of tiles cannot score any marks 700 × 600 = 420 000 10 × 10 = 100 420 000 ÷ 100 = 4200 M0M0M0A0 (70 and/or 60 cannot be implied)

Q	Answer	Mark	Comments
2(d)	8 squares shaded in an arrangement with exactly 2 lines of symmetry	B2 *I,I*	B1 8 squares shaded in an arrangement with 1 line of symmetry or with 4 lines of symmetry or any pattern with exactly two lines of symmetry (and NOT 8 squares)
	Additional Guidance		
	Mark final answer grid unless blank		

3(a)	25%	B1 *Aa*	
	Additional Guidance		

Q	Answer	Mark	Comments
3(b)	3 × 35 or 105	M1 *Ra*	luxury bouquets
	24 ÷ 4 or 6	M1 *Aa*	number of standard bouquets
	their 6 × 22 or 132	M1 *Aa*	their 6 must be a positive whole number ≤ 24 excluding 1 and 3
	their 105 + their 132 or 250 – their 132 or 118 or 250 – their 105 or 145	M1 *Rc*	their 105 and their 132 must be from attempts at multiples of 35 and 22 (not 35 and 22)
	237 and No or 105 and 118 and No or 132 and 145 and No	A2 *I,I*	A1 237 or 105 and 118 or 132 and 145 or A1ft correct conclusion for their value(s) if 4th M1 scored
	Additional Guidance		
	If their 6 (standard bouquets) ≥ 12 then the income will be > 250 on its own However this still only gains (3rd) M1 unless the income from luxury bouquets is also included Examples **1)** 24 × 22 = 528 Yes M0M0M1M0A0A0 **2)** 3 × 35 = 105 24 × 22 = 528 105 + 528 = 633 Yes M1M0M1M1A0A1ft **(continued on next page)** Using 3 of each type of bouquet can score max 3 marks Example		

	3 × 35 = 105 3 × 22 = 66 105 + 66 = 171 N0 M1M0M0M1A0A1ft

Q	Answer	Mark	Comments
3(c)	180 ÷ 60 or 3 or 180 ÷ 50 or 3.6 or 3 or 130 ÷ 60 or 2.(16…) or 2 or 130 ÷ 50 or 2.6 or 2	M1 *Rb*	allow embedded eg 60 × 3 = 180
	180 ÷ 60 and 130 ÷ 50 or 3 and 2.(6) or 180 ÷ 50 and 130 ÷ 60 or 3.(6) and 2.(1..)	M1 *Rc*	must be correct pairings
	their 3 × their 2	M1 *I*	must be rounded down to integer(s).
	6	A1 *Aa*	
	Additional Guidance		
	Area by area (180 × 130) ÷ (60 × 50) = 7.8 M0M0M0A0		
	Beware incorrect method 180 ÷ 60 = 3 130 ÷ 50 = 2.6 = 3 3 + 3 = 6 This would score M1M1M0A0 Similarly 3 + 2.6 = 5.6 = 6 scores M1M1M0A0		

Q	Answer	Mark	Comments
3(d)	Any route visiting each house once	M1 *I*	allow more than one visit to the shop eg SBSASCS
	Selects the four correct distances for one of the 6 possible routes	M1 *Rc*	(S)BAC(S) = 14 + 12 + 8 + 5 = 39 (S)CAB(S) = 5 + 8 + 12 + 14 = 39 (S)BCA(S) = 14 + 17 + 8 +7 = 46 (S)ACB(S) = 7 + 8 + 17 + 14 = 46 (S)CBA(S) = 5 + 17 + 12 + 7 = 41 (S)ABC(S) = 7 + 12 + 17 + 5 = 41
	Totals these 4 distances correctly	M1 *Aa*	numbers can be in any order letters are not required a total without individual distances stated must include the letters of the route eg ABCS = 41 scores M3
	(S)BACS and 39 (miles) or (S)CABS and 39 (miles)	A2 *I* *I*	A1 correct route with incomplete communication eg no distance or no letters shown to indicate route
	Additional Guidance		
	M3 is available for any correct route with correct total		
	The first mark is for stating where they are going eg BAC The next 2 marks can be just values Examples 7 + 12 + 17 + 5 or 7, 12, 17, 5 M0M1M0A0 7 + 12 + 17 + 5 = 41 M0M1M1A0 14 + 12 + 8 + 5 = 39 M0M1M1A0A1 41 on its own M0M0M0 (S)BACS or (S)CABS with no attempt at using values scores M1M0M0A0A1 BAC and 39 miles or CAB and 39 miles scores 4 marks M1M1M1A0A1 (last S missing) 39 (miles) with no other working or letters is 3 marks		

Q	Answer	Mark	Comments
4(a)	29 minutes	B1 *Rb*	
	Additional Guidance		

Q	Answer	Mark	Comments
4(b)	**Alternative method 1**		
	(0)8.12	M1 *Ra*	arrives at bus stop implied by bus at (0)8.20
	(0)8.20	M1 *Rb*	bus leaves Oxford ft their arrival at bus stop
	(0)8.49	M1 *Rb*	bus arrives at Bicester ft their bus leaving time
	(0)8.56 and Yes or 11 mins (left) to do 7 min walk and Yes or 4 mins and Yes	A2 *I,I*	A1 (0)8.56 or A1ft correct decision for their value with at least one method mark scored SC2 (0)8.48 and Yes SC1 (0)8.48 with no decision or incorrect decision
	Alternative method 2		
	(0)8.53	M1 *Ra*	time bus must arrive by implied by arrival time of (0)8.49
	(0)8.49	M1 *Rb*	time last possible bus arrives ft their time bus must arrive by
	(0)8.20	M1 *Rb*	time last possible bus leaves ft their time last possible bus arrives
	(0)8.08 and Yes	A2 *I,I*	A1 (0)8.08 or A1ft correct decision for their value with at least one method mark scored SC2 (0)8.48 and Yes SC1 (0)8.48 with no decision or incorrect decision
	Additional Guidance		
	For Alt 2 they must clearly be working in reverse		

	Must clearly state a decision eg 'she is 4 mins early' also needs 'Yes (she is correct) '
	Answer 48 minutes is zero Answer 48 –she has 12 minutes left zero (both have no additions to 8 am

Q	Answer	Mark	Comments
4(c)	8.64 × 37 or 319.68	M1 *Aa*	
	£319.68	A1 *I*	must have £ sign-can be in check condone £319.68p
4(c) Check	reverse or alt method 319.68 ÷ 8.64 = 37 or 319.68 ÷ 37 = 8.64	B1ft *Ab*	
	Additional Guidance		
	Penalise further work eg 319.68 ÷ 2 = 159.84 M0A0		

Q	Answer	Mark	Comments
4(d)	**Alternative method 1**		
	453 + 399 + 504 + 483 + 411 + 312 + 90 + 843 + 471 + 534 or 4500	M1 *Rc*	condone one error
	their 4500 ÷ 60 or 75 or their 4500 ÷ 10 or 450	M1 *Aa*	
	their 75 ÷ 10 or their 450 ÷ 60	M1 *Aa*	
	7.5 and Yes or 7 minutes 30 seconds and Yes	A2 *I,I*	A1 7.5 or 7 minutes 30 seconds or A1 ft correct decision for their value(s) if 1st M1 scored and division by 10 seen
	Alternative method 2		
	453 + 399 + 504 + 483 + 411 + 312 + 90 + 843 + 471 + 534 or 4500	M1 *Rc*	condone one error
	their 4500 ÷ 10 or 450	M1 *Aa*	
	8 × 60 or 480	M1 *Aa*	
	450 and 480 and Yes	A2 *I,I*	A1 450 and 480 or A1 ft correct conclusion from their values if 1st M1 scored and division by 10 seen

4(d) cont'd	**Alternative method 3**		
	one value converted to minutes correctly eg 7.55 or 7 mins 33 secs	M1 *Rc*	
	7.55 + 6.65 + 8.4 + 8.05 + 6.85 + 5.2 + 1.5 + 14.05 + 7.85 + 8.9 or 75	M1 *Aa*	ft their converted values
	their 75 ÷ 10	M1 *Aa*	
	7.5 and Yes	A2 *I,I*	A1 7.5 or A1ft correct decision for their value if 2nd M1 scored and division by 10 seen
	Alternative method 4		
	453 + 399 + 504 + 483 + 411 + 312 + 90 + 843 + 471 + 534 or 4500	M1 *Rc*	condone one error
	8 × 60 or 480 or 8 × 10 or 80	M1 *Aa*	
	their 480 × 10 or their 80 × 60	M1 *Aa*	
	4500 and 4800 and Yes	A2 *I,I*	A1 4500 and 4800 or A1ft correct conclusion for their values if 1st M1 scored and multiplication by 10 seen

Additional Guidance is on the next page

	Additional Guidance
4(d)	7.5 followed by 7 minutes 5 seconds and Yes M3A0A1ft
	Allow comparison between inconsistent units eg 450 and 8
	Condone 453 + 399 + 504 + 483 + 411 + 312 + 90 + 843 + 471 + 534 ÷ 10 = 4019.4 (or similar depending on order) for method marks