AQA

FUNCTIONAL SKILLS CERTIFICATE
Functional Mathematics

Level 1

Mark Scheme

4367

November 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)	1.5 × 30	M1 *Rc*	
	45	A1 *Aa*	
1(a) check	Reverse or alt calculation eg 45 ÷ 30 = 1.5 or 45 ÷ 1.5 = 30 or 30 + 15 = 45	B1ft *Ab*	
	Additional Guidance		
1(a)	If starting from 288 litres for 32 flushes the complete method must be seen for M1 (288 ÷ 32) × 30 = 270 and ((288 ÷ 32) – 1.5) × 30 = 225 and their 270 – their 225 oe eg seeing 9 for 288 ÷ 32 Further work seen is A0 eg 1.5 × 30 = 45, 288 – 45 = 243 M1A0		

Q	Answer	Mark	Comments
1(b)	**Alternative method 1**		
	3 × 77 or 231	M1 *Rb*	
	216 ÷ 6 × 3 or 216 ÷ 2 or 108	M1 *Rb*	
	their 231 – their 108 or their 108 + 120 or 228	M1 *Aa*	baths – showers
	123 and Yes or 231 and 228 and Yes	A2 *I*	A1 123 or A1 231 and 228 A1ft Correct conclusion for their value(s) if 3rd M1 awarded
	Alternative method 2		
	216 ÷ 6 or 36	M1 *Rb*	
	77 – their 36 or 41	M1 *Rb*	bath – shower
	3 × their 41 or 120 ÷ their 41	M1 *Aa*	their 41 must be bath – shower
	123 and Yes or 2.9…. and Yes	A2 *I*	A1 123 or 2.9…. A1ft Correct conclusion for their value if 3rd M1 awarded
	Additional Guidance		

Q	Answer	Mark	Comments

1(c)	**Alternative method 1**			
	600 × 365 = 219 000 and 219 000 ÷ 1000 = 219	600 ÷ 1000 = 0.6 and 0.6 × 365 = 219	B2 *Rc* *Aa*	B1 600 × 365 = 219 000 or 600 ÷ 1000 = 0.6
	Alternative method 2			
	219 × 1000 = 219 000 and 219 000 ÷ 365 = 600	219 × 1000 = 219 000 and 219 000 ÷ 600 = 365	B2 *Rc* *Aa*	B1 219 × 1000 = 219 000
	Additional Guidance			
	Division or multiplication by 1000 must be shown eg 600 × 365 = 219 000 = 219 litres Allow starting at both ends eg 600 × 365 = 219000 and 219 × 1000 = 219 000			B1 B2

Q	Answer	Mark	Comments
1(d)	**Alternative method 1**		
	219 × 3 or 657	M1 *Ra*	
	their 657 + 125 or their 657 + 125 – 720 or 720 – their 657	M1 *Rb*	their 657 cannot be 3 or from 125 × 3 or 720 × 3 or 1000 × 3
	782 and No or 62 and No or 63 and No	A2 *I*	A1 782 or 62 or 63 A1ft Correct conclusion for their value if 2nd M1 awarded
	Alternative method 2		
	219 × 3 or 657	M1 *Ra*	
	720 – 125 or 595	M1 *Rb*	
	595 and 657 and No	A2 *I*	A1 595 and 657 A1ft Correct conclusion for their values
	Additional Guidance		
	Use of 219 000 instead of 219 can gain max 2 marks Example 219 000 × 3 = 657 000 657 000 + 125 = 657 125 and No They must make a decision for the final mark eg It's £62 more expensive/cheaper eg No It's £62 more expensive eg 782 No, without a water meter would be cheaper		M0M1A0 A1ft M2A1A0 M2A2 M2A2

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="3">2(a)</td><td>53.23</td><td>B1
Rb</td><td></td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2"></td><td></td></tr>
<tr><td rowspan="3">2(b)</td><td>All correct
<table><tr><td>Lane 1</td><td>Dai</td></tr><tr><td>Lane 2</td><td>Cheng</td></tr><tr><td>Lane 3</td><td>Ahmed</td></tr><tr><td>Lane 4</td><td>Jack (given)</td></tr><tr><td>Lane 5</td><td>Kev</td></tr><tr><td>Lane 6</td><td>Paul</td></tr><tr><td>Lane 7</td><td>Zain</td></tr><tr><td>Lane 8</td><td>Tom</td></tr></table></td><td>B3
Ra,Rb,I</td><td>B2 one pair of swimmers swapped with the rest correct
eg all correct except Kev in Lane 3 and Ahmed in Lane 5
B1 Ahmed in Lane 3 and Kev in Lane 5
or
B1 all 8 correct names used</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2">For the B2 for one pair swapped they can only be swapped with the next lane that would be allocated
The possible swaps are
Kev and Ahmed
Ahmed and Paul
Paul and Cheng
Cheng and Zain
Zain and Dai
Dai and Tom</td><td></td></tr>
</table>

Q	Answer	Mark	Comments
2(c)	**Alternative method 1**		
	50.6 + 51.7 + 52.6 + 49.6 + 50.2 + 49.8 or 304.5 or 50.2 + 49.6 + 51.2 + 48.2 + 49.5 + 51.3 or 300	M1 *Aa*	
	50.6 + 51.7 + 52.6 + 49.6 + 50.2 + 49.8 or 304.5 **and** 50.2 + 49.6 + 51.2 + 48.2 + 49.5 + 51.3 or 300	M1 *Aa*	
	304.5 and 300 and Duncan	A2 *I,I*	A1 304.5 and 300 A1ft correct conclusion for their values
	Alternative method 2		
	50.6 + 51.7 + 52.6 + 49.6 + 50.2 + 49.8 or 304.5 or 50.2 + 49.6 + 51.2 + 48.2 + 49.5 + 51.3 or 300	M1 *Aa*	
	their 304.5 ÷ 6 or 50.75 or their 300 ÷ 6 or 50	M1 *Aa*	
	50.75 and 50 and Duncan	A2 *I,I*	A1 50.75 and 50 A1ft correct conclusion for their values

Q	Answer	Mark	Comments
2(c) cont'd	**Alternative method 3**		
	Ben 49.6, 49.8, 50.2, 50.6, 51.7, 52.6, or **Duncan** 48.2, 49.5, 49.6, 50.2, 51.2, 51.3,	M1 *Aa*	Arranges at least 4 in order from either end and indicates middle
	50.4 or 49.9	M1 *Aa*	
	50.4 and 49.9 and Duncan	A2 *I,I*	A1 50.4 and 49.9 A1ft correct conclusion for their values
	Alternative method 4		
	compares number or proportion of times under 50 seconds eg Ben 2/6 or Duncan 3/6	M1 *Aa*	
	Ben 2/6 and Duncan 3/6	M1 *Aa*	
	Duncan as he has more times under 50 seconds/is more likely to swim under 50 seconds	A2 *I,I*	A1 Duncan without clear explanation A1ft correct conclusion for their values SC2 Choose Duncan as he won 5 of the races or SC2 choose Duncan as Ben only won one of the races SC1 Duncan won 5 of the races/Ben only won one of the races SC2 compares quickest and/or slowest time and chooses Duncan SC1 compares quickest and/or slowest time

Q	Answer	Mark	Comments

	Additional Guidance	
2(c)	Note that the number of times under 51 seconds are the same for both swimmers	
	using alt 4 it must be clear that they are making a choice	
	examples	
	choose Duncan as he only had 3 swims over 50 secs but Ben had 4	M2A2
	Duncan had 3 swims over 50 secs and Ben had 4	M2 A0
	Examples of SC for comparing single values	
	Choose Duncan as he never swam slower than 52 seconds	SC2
	Duncan had the quickest time	SC1
	Choose Duncan as he had the quickest time	SC2
	Duncan is best as Ben had a time over 52 seconds but Duncan didn't	SC2

Q	Answer	Mark	Comments
2(d)	**Alternative method 1**		
	49.5(0) × 10 or 495	M1 *Rc*	
	7 × 5 or 35	M1 *Aa*	M2 for (7 + 58) × 5 or 325
	58 × 5 or 290	M1 *Aa*	
	their 495 + their 35 + their 290 or 820	M1 *Aa*	their values must be from an attempt at multiples of 49.5(0), 7 and 58 49.5(0) + 7 + 58 (= 114.5) is M0
	their 820 ÷ 10 or 82	M1 *Ra*	M2 for their 820 × 0.9
	their 820 – their 82	M1 *Aa*	
	738 and Yes	A2 *I,I*	A1 738 A1ft correct conclusion for their value if 4th method mark is awarded

Q	Answer	Mark	Comments
2(d) cont'd	**Alternative method 2**		
	49.5(0) × 10 or 495	M1 *Rc*	
	7 × 5 or 35	M1 *Aa*	M2 for (7 + 58) × 5 or 325
	58 × 5 or 290	M1 *Aa*	
	their 495 ÷ 10 or 49.5 or their 35 ÷ 10 or 3.5 or their 290 ÷ 10 or 2.9	M1 *Aa*	
	their 495 – their 49.5 or 445.5(0) and their 35 – their 3.5 or 31.5(0) and their 290 – their 29 or 261	M1 *Ra*	At least two reductions by their 10% seen
	their 445.5(0) + their 31.5(0) + their 261	M1 *Aa*	Must be adding their 90% values or subtracts the sum of two of the values from 750 and compares with the third value
	738 and Yes	A2 *I,I*	A1 738 A1ft correct conclusion for their value if 6th method mark awarded

Q	Answer	Mark	Comments
2(d) cont'd	**Alternative method 3**		
	49.5(0) ÷ 10 or 4.95 or 7 ÷ 10 or 0.7 or 58 ÷ 10 or 5.8	M1 *Ra*	M2 for at least two of 49.5(0) × 0.9 or 44.55 and 7 × 0.9 or 6.3(0) and 58 × 0.9 or 52.2(0) At least two reductions by their 10% seen
	49.5 – their 4.95 or 44.55 and 7 – their 0.7 or 6.3(0) and 58 – their 5.8 or 52.2(0)	M1 *Rc*	
	their 44.55 × 10 or 445.5(0)	M1 *Rc*	
	their 6.3 × 5 or 31.5(0)	M1 *Aa*	M2 for (their 6.3 + their 52.2(0)) × 5 or 292.5(0)
	their 52.2(0) × 5 or 261	M1 *Aa*	
	their 445.5(0) + their 31.5(0) + their 261	M1 *Aa*	Must be adding their 90% values
	738 and Yes	A2 *I,I*	A1 738 A1ft correct conclusion for their value if 6th method mark awarded

Additional Guidance for this question is on the next page

Q	Answer	Mark	Comments
2(d)	**Additional Guidance** For **Alt 2,** variations of the final M1 by subtracting 2 values from 750 and comparing what is left, can gain full marks eg 750 – (their 445.5(0) + their 31.5(0)) = 273 and compares with 261 or 750 – (their 261 + their 31.5(0)) = 457.5 and compares with 445.5(0) or 750 – (their 445.5(0) + their 261) = 43.5(0) and compares with 31.5(0) or with 35 (Note that as 43.5(0) is more than 35 they do not have to compare with the discounted amount) Failing to work out 10% off £35 (as it does not affect the decision) needs justification for full marks Example 1 445.5(0) + 261 + 35 =741.5(0) and Yes gains 7 marks (no justification for leaving 35 without the discount Example 2 445.5(0) + 261 + 35 = 741.5(0) and states 'this is below £750 without deducting the 10% for the swim caps' gains 8 marks		

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="7">3(a)</td><td>Eva on all six days on shift 1 only</td><td>B1
Ra</td><td></td></tr>
<tr><td>Cathy on all six days on shift 2 only</td><td>B1
Rb</td><td></td></tr>
<tr><td>Amy on every day except Monday</td><td>B1
I</td><td></td></tr>
<tr><td>Ben on Mon, Thurs and Friday only</td><td>B1
I</td><td></td></tr>
<tr><td>David on Mon, Tues, Wed and Sat only</td><td>B1
I</td><td></td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="3">Example of a possible rota
<table>
<tr><th></th><th colspan="2">Shift 1</th><th colspan="2">Shift 2</th></tr>
<tr><td>Monday</td><td>Eva</td><td>Ben</td><td>Cathy</td><td>David</td></tr>
<tr><td>Tuesday</td><td>Eva</td><td>David</td><td>Cathy</td><td>Amy</td></tr>
<tr><td>Wednesday</td><td>Eva</td><td>David</td><td>Cathy</td><td>Amy</td></tr>
<tr><td>Thursday</td><td>Eva</td><td>Ben</td><td>Cathy</td><td>Amy</td></tr>
<tr><td>Friday</td><td>Eva</td><td>Ben</td><td>Cathy</td><td>Amy</td></tr>
<tr><td>Saturday</td><td>Eva</td><td>David</td><td>Cathy</td><td>Amy</td></tr>
</table>
Mark the bottom grid unless it is blank
Ignore repeats as they will be penalised by another person being incorrect
A crossed out name in a cell not replaced would be marked as though it were not crossed out</td></tr>
</table>

Q	Answer	Mark	Comments
3(b)	24 × 7.5(0) or 180	M1 *Rc*	
	£180	A1 *I*	Must see £ symbol or 180 pounds
3(b) check	reverse or alt calculation eg 180 ÷ 24 = 7.5	B1ft *Ab*	
3(b)	**Additional Guidance**		
	The £ sign (for 180) can be seen in the body of the script or the check –just needs to be seen once eg 24 × 7.50 = 180 check £180 ÷ 7.50 = 24 M1A1B1 If £180 seen and then further work, penalise the accuracy mark eg 24 × 7.5(0) = £180, £180 × 7 = £1260 M1A0 £ sign must be seen eg 24 × 7.5(0) = 180, 180 × 7 = £1260 M0A0 (No £ sign seen here. However £180 could still be seen in the check and awarded the mark)		

Q	Answer	Mark	Comments
3(c)	**Alternative method 1**		
	120 + 120 + 120 or 120 × 3 or 370 – 120 – 120 – 120	M1 *Aa*	
	360 and Yes or He will have 10 spare/left	A2 *I,I*	A1 360 or A1ft correct conclusion for their value
	Alternative method 2		
	370 ÷ 120 or 370 ÷ 3	M1 *Aa*	
	3.08 (…) and Yes or 3.1 and Yes or 123.3 (…) and Yes	A2 *I,I*	A1 3.08(…) or 3.1 or 123.3(…) or A1ft correct conclusion for their value
	Additional Guidance		
	Equivalent methods may be seen eg 370 – 120 – 120 = 130 and Yes130 is bigger than 120. This would score full marks.		

Q	Answer	Mark	Comments
3(d)	**Alternative method 1**		
	5p – 1p or 4p or 460 × 5(p) or 2300	M1 *Rb*	
	460 × 4p or their 2300 – 460 or 1840	M1 *Rc*	460 × 4p is M1M1 Allow equivalent in pounds (18.40)
	their 1840 ÷ 2 or 920 or their 1840 × 0.5(0)	M1 *Aa*	
	(£)9.20	A1 *Aa*	
	Alternative method 2		
	5p – 1p or 4p	M1 *Rb*	
	their 4p ÷ 2 or their 4p × 0.5(0) or 2p	M1 *Rc*	4p ÷ 2 is M1M1 Allow equivalent in pounds (18.40)
	their 2p × 460 or 920	M1 *Aa*	
	(£)9.20	A1 *Aa*	
	Alternative method 3		
	5p – 1p or 4p	M1 *Rb*	
	460 ÷ 2 or 460 × 0.5	M1 *Rc*	

Q	Answer	Mark	Comments
	or 230		

Q	Answer	Mark	Comments
3(d) cont'd	their 230 × 4 or 920	M1 *Aa*	
	(£)9.20	A1 *Aa*	
	Additional Guidance		
	Allow work in pounds throughout eg 0.05 – 0.01 or 0.04 Forgetting to subtract the 1p per bag cost can gain maximum 2 marks eg 460 × 5 = 2300 2300 ÷ 2= 1150 £11.50 Beware 460 ÷ 50 = 9.2 ans 9.20	 M1 M0M1 A0 M0	
4(a)	1121	B1 *Rb*	
	Additional Guidance		

Q	Answer	Mark	Comments
4(b)	2 × 40 + 2 × 60 or 80 + 120 or 200 or (40 + 60) × 2	M1 *Ra*	
	their 200 × 4 or 800	M1 *Aa*	or their 200 ÷ 150 or 1.3(3…)
	their 800 ÷ 150 or 5.3(3..) or their 800 ÷ 5 or 160 or 5 × 150 or 750	M1 *Rc*	or their 1.3(3..) × 4 their 800 cannot be 150
	5.3(3…) and No or 160 and No or 750 and 800 and No or (No) he is 50 (m) short	A2 *I,I*	A1 5.3(3…) or A1 160 or A1 750 and 800 or A1 ft correct decision for their value if 1st and 3rd method marks awarded For 5.3(3…) allow 6 from correct method seen
	Additional Guidance		
	Using area or half the perimeter can gain a maximum of M0M1M1A0A0 The 2nd and third method marks can be done in either order eg 200 ÷ 150 × 4 No can be implied eg he is 50 m short Subtracting sides from 750 continuously can score full marks eg 5 × 150 = 750 750 – 40 – 40 – 60 – 60 – 40 – 40 – 60 – 60 – 40 – 40 – 60 – 60 – 40 – 40 – 60 – 60 -50 No	M1 M1M1 A2	

Q	Answer	Mark	Comments
4(c)	60 × 40 or 2400	M1 *Ra*	
	their 2400 ÷ 5 or 480 or their 2400 × 6 or 14 400	M1 *Aa*	
	their 480 × 6 or their 14 400 ÷ 5 or 2880	M1 *Aa*	
	4840 ÷ 2 or 2420 or their 2880 × 2 or 5760 or their 2880 ÷ 4840	M1 *Rb*	their 2880 cannot be 2400
	2880 and 2420 and Yes or 460 yards extra or 5760 and Yes or 0.59(5…) and Yes or 0.6 and Yes	A2 *I,I*	A1 2880 and 2420 or A1 5760 or A1 0.59(5..) or 0.6 A1ft correct decision for their value(s) if first 3 method marks awarded
	Additional Guidance		
	Use of perimeter can gain max 3 marks eg 60 + 40 + 60 + 40 or 200 200 ÷ 5 or 40 40 × 6 or 240 4840 ÷ 2 or 2420 yes		 M0 M1 M1 M1A0 A0ft as first M1 not awarded

Q	Answer	Mark	Comments

4(d)

Sub-totals correct for all notes and coins	B2 *Aa*	B1 for at least two correct
Correct total for their six values + 20.00 + 13.18	B1ft *Aa*	ft their six sub-totals

Additional Guidance

£20	1	20.00		B3
£10	2	20.(00)		
£5	5	25.(00)		
£2	1	2.(00)		
£1	16	16.(00)		
50p	9	4.5(0)		
20p	31	6.2(0)		
Other coins		13.18		
	Total	£ 106.88		

Assume integers are pounds eg 450 implies £450 unless written as 450p

Just repeating the £10, £5 etc from the left hand column can gain the B1ft for the correct total of 51.88