AQA

FUNCTIONAL SKILLS CERTIFICATE
Functional Mathematics

Level 1

Mark Scheme

4367

March 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)	2 × 5.79 + 2 × 4.79 or 11.58 + 9.58 or 21.16	M1 *Rb*	
	their 21.16 – 18.99 or 18.99 + 3 or 21.99 or 21.16 – 3 or 18.16	M1 *Aa*	their 21.16 must be from an attempt at the cost of at least 2 tickets the subtraction may then be reversed
	2.17 and No or 21.16 and 21.99 and No or 18.16 and No	A2 *I*	A1 2.17 or A1 21.16 and 21.99 or A1 18.16 A1 ft correct decision for their value(s) if 2nd M1 awarded and cost is attempted for exactly 4 tickets SC2 21.16 and No
	Additional Guidance		
	No can be implied eg Its less than £3 Example of ft 4 x 5.79 = 23.16 23.16 – 18.99 = 4.17 Yes M0M1A0A1ft		

Q	Answer	Mark	Comments
1(b)	8	B1 *Aa*	
	17	B1ft *Aa*	correct total of their 8 + 9
	Additional Guidance		
	If frame 1 is blank award B1 for 17 in frame 2		

Q	Answer	Mark	Comments
1(c)	(Frame 9=) 75 + 10 + 3 + 5 or 93	M1 *Ra*	93 may be written in frame 9 total
	their 93 + 3 + 5	M1 *Aa*	their 93 must be >75 75 + 10 + 3 + 5 + 3 +5 or 75 + 26 implies M2
	101 and Yes	A2 *I*	A1 101 A1 ft correct decision for their value if 2nd M1 awarded SC2 88 and 91 and No SC1 88 and 91
	Additional Guidance		
	Working may be seen on the scorecard. Mark working lines if different to scorecard. 85 in frame 9 and 93 in frame 10 and No scores M0M1A0A1ft Final answer of 93 and No gains M0M1A0A1ft This may be in the working lines.		

Q	Answer	Mark	Comments
1(d)	Jamil/He won 3 games (out of 5) but Tom (only) won 2 (out of 5) or Jamil/He won a greater proportion of games/more games (than Tom) or Jamil/He won 60% of the games but Tom (only) won 40%	B1 *I*	oe eg Tom lost 3 games but Jamil (only) lost 2
	Additional Guidance		
	Ignore other non-contradictory working or comments unless they state that Jamil is not correct/supported.		

Q	Answer	Mark	Comments
	Alternative method 1		
	Compares totals 145 +138 + 204 + 186 + 172 or 192 + 165 + 144 + 210 + 184	M1 *Rc*	
	845 and 895	A2 *Aa*	A1 845 or 895
	Alternative method 2		
	Compares means (145 +138 + 204 + 186 + 172) ÷ 5 or 845 ÷ 5 or (192 + 165 + 144 + 210 + 184) ÷ 5 or 895 ÷ 5	M1 *Rc*	
	169 and 179	A2 *Aa*	A1 169 or 179
	Alternative method 3		
1(e)	**Compares medians** 138, 145, 172, 186, 204 or 144, 165, 184, 192, 210	M1 *Rc*	ordering
	172 and 184	A2 *Aa*	A1 172 or 184 Must be evidence that they are working out median. Eg states median or shows method
	Alternative method 4		
	192 – 145, 165 – 138, 144 – 204, 210 – 186 and 184 – 172 or 145 – 192, 138 – 165, 204 – 144, 186 – 210 and 172 – 184	M1 *Rc*	
	Tom (+)47, (+)27, (-)60, (+)24, (+)12 or Jamil (-) 47, (-) 27, (+) 60 (-)24, (-) 12	A1 *Aa*	
	Tom +50 or Jamil -50	A1 *Aa*	Allow clear comparison of difference totals eg 47 + 27 + 24 + 12 is clearly more than Jamil's +60
	Additional Guidance		

Q	Answer	Mark	Comments
	Evidence of method may be seen under/next to tables.		
	For Alt 4 other ways of comparing the differences may be seen.		
	eg Toms 4 positive differences listed and Jamil's 1 positive difference.		
	Ignore other non-contradictory working or comments unless they state that Tom is not correct/supported.		

2(a)	Tuna	B1 *Aa*	
	Additional Guidance		

Q	Answer	Mark	Comments
2(b)	**Alternative method 1**		
	(with salad) 29 + 20 + 32 + 25 or 106 or (without salad) 26 + 30 + 36 + 22 or 114	M1 *Rb*	Allow one error when reading from graph
	106 and 114 and No	A2 *I*	A1 106 and 114 A1ft Correct decision for their values
	Alternative method 2		
	Differences (without salad) -3, +10, +4, -3 or (with salad) +3, -10, -4, +3	M1 *Rb*	Allow one error
	+14 and -6 and No or -14 and +6 and No or 8 and No or 8 more without salad or 8 less with salad	A2 *I*	A1 +14 and -6 or -14 and +6 or 8 A1ft Correct decision for their value(s)
	Additional Guidance		
	M1 can be awarded for indicating addition of 4 corresponding values with at most one error. Example 27 + 20 + 32 + 25 and 26 + 30 + 34 + 23 gains M1 for the first 4 (one error) even though the 2nd list has two errors. Allow 'they sold more without salad' to imply 'No' May need to look at graph		

Q	Answer	Mark	Comments
2(c)	300 ÷ 25	M1 *Rc*	
	12	A1 *Aa*	
2(c) check	Reverse method eg 12 × 25 = 300 or 300 ÷ 12 = 25 or Alternative method eg 300 ÷ 5 = 60 and 60 ÷ 5 = 12	B1 *Ab*	
	Additional Guidance		
	Mark holistically.		

Q	Answer	Mark	Comments
2(d)	**Alternative method 1**		
	2 × 1000 or 2000	M1 *Aa*	
	500 × their 12 or 6000	M1 *Ra*	ft their 12 from **(c)**
	their 6000 ÷ their 2000	M1 *Rc*	their total grams needed ÷ their grams in 2kg
	3	A1ft *Aa*	only ft their 12 from **(c)**

Q	Answer	Mark	Comments
	Alternative method 2		
	500 × their 12 or $\dfrac{500}{25} \times 300$ or 6000	M1 *Aa*	ft their 12 from **(c)** Allow complete build up method to 500 eg 25 = 300(g) 50 = 600(g) 500 = 6000(g)
	their 6000 ÷ 1000 or 6	M1 Ra	their total grams needed ÷ 1000
	their 6 ÷ 2	M1 Rc	their 6 must come from converting their grams to kg
	3	A1ft *Aa*	only ft their 12 from **(c)**
2(d)	**Alternative method 3**		
	2 × 1000 or 2000	M1 *Aa*	
	their 2000 ÷ 300 × 25 or their 2000 ÷ their 12 or 166.(66…) or 166.7	M1 Ra	
	500 ÷ their 166.(66….)	M1 Rc	
	3	A1ft *Aa*	only ft their 12 from **(c)**
	Additional Guidance		
	Allow 3 with no working for full marks. If their 12 from **c** leads to a decimal accept the complete decimal or rounding up correctly to any sf.		

Q	Answer	Mark	Comments
2(e)	**Alternative method 1**		
	$90 \div 30$ or 3 or $140 \div 60$ or 2.3(..) or 2 or $90 \div 60$ or 1.5 or 1 or $140 \div 30$ or 4.6(..) or 4.7 or 4	M1 *Ra*	
	their 3 × their 2	M1 *I*	Any decimal value(s) must be rounded down to integer(s) Multiplication can be implied by answer
	6	A1 *Aa*	from correct working SC2 6 from no working or insufficient correct working
	Alternative method 2		
	Draws one correct crate	M1 *Ra*	
	Draws at least 4 correct size crates	M1 *I*	ignore additional incorrect sized crates
	6	A1 *Aa*	All 6 crates of correct size clearly shown SC2 6 from no working or insufficient, correct working
	Additional Guidance		
	Mark the method that leads to the answer stated. If no answer is given mark the best method. If the answer space is blank then 6 correctly drawn boxes numbered to 6 gains M2A1 Allow dots to indicate the corners of boxes.		
	Use of area divided by area given as their answer (7.(875)) is M0M0A0 Ignore any diagram.		
	For SC2 the insufficient, correct working is most likely to come from the diagram method. These may include unclear lines drawn for some boxes or not all 6 boxes shown. To merit 3 marks the 6 boxes must be clearly shown and either numbered to 6 or 6 stated.		

Q	Answer	Mark	Comments
2(f)	Fully communicated shortest route chosen starting shop to A and 8 (miles) (Shop) → A → C → B → Shop and 8 (miles)	B3 *Rb Aa I*	B2 The correct shortest route with incorrect or no distance or not indicated as their choice or Shortest route but starting shop to B and 8 miles (Shop) →B →C →A →Shop and 8 miles or A possible route starting shop to A with correct distance (but not the shortest) eg1 (Shop) →A → B → C → Shop and $10\frac{1}{2}$ (miles) eg2 (Shop) → A → C → Shop → B→ Shop and $8\frac{1}{2}$ (miles) B1 A possible route starting shop to A but with incorrect or no total distance eg1 (Shop) →A → B → C → Shop and $11\frac{1}{2}$ (miles) or B1 Route with correct distance visiting all 3 offices but either not starting shop to A or not finishing at the shop eg1 (Shop) → C → B → A → Shop and $10\frac{1}{2}$ (miles) eg2 (Shop) → A → B → C and $7\frac{1}{2}$ (miles) **Note** the exception to this is the shortest route of 8 miles starting shop to B as shown in B2 above

Q	Answer	Mark	Comments
	Additional Guidance		

Penalise, by 1 mark, routes not communicated by letters.

Examples

1½ + 2 + 3½ + 1 = 8   B2   (B3 -1)
This is the correct distance for the shortest route (Shop) → A → C → B → Shop

1 + 2½ + 2 + 3 = 8½   B0   (B1 -1)
This is the correct distance for the route (Shop) → B → A → C → Shop

Omitting the word shop at the end but giving the correct distance including return to shop loses the communication mark.

If a choice is made, mark that choice.
If a choice is not made the maximum mark allowed is B2. Award the best attempt.
Eg SABCS = 10½
    SCBAS = 10½
Award B2 for first alternative

Q	Answer	Mark	Comments
3(a)	Two sinks of correct size against North wall	B1 *Ra*	
	Three circles of approx. correct size in a line in the South half	B1 I	May be sketched
	One rectangle (for desk) measuring 1 cm by 2 cm	B1 Aa	
	One rectangle (for waiting area) 4cm by 2cm	B1 Aa	
	Door area kept clear and all items labelled correctly	B1 I	
	Additional Guidance		

Q	Answer	Mark	Comments
3(b)	2 different people on each shift	B1 *Ra*	
	Jenny, Craig and Mia included 8 times each	B1 *Aa*	
	Craig does not work on Saturday	B1 I	
	Each person has at least 1 day off	B1 I	
	Additional Guidance		
	For 2nd B1 condone twice on the same shift		
	If there are blanks then the only possible mark is the 3rd B1 if Saturday is completed using only Jenny and Mia.		
	Mark 2nd grid unless blank.		

Q	Answer	Mark	Comments
3(c)	12 × 60 or 720 or 30 × 33 or 990	M1 *Rb*	
	12 × 60 + 30 × 33 or their 720 + their 990 or 1710	M1 *Rc*	2 different values their 720 must be >60 their 990 must be >33
	704 + 300 or 1004	M1 *Aa*	
	their 1710 – their 1004 or their 1004 + 700 or 1704 or their 1710 – 700 or 1010	M1 *Rc*	their 1710 – 704 – 300 implies previous M1 their 1710 can be 93 (from 60 + 33) their income – both costs
	706 and Yes or 1710 and 1704 and Yes or 1010 and 1004 and Yes	A2 *I*	A1 706 or 1710 and 1704 or 1010 and 1004 A1ft correct decision for their value(s) if 3rd and 4th M1 awarded
	Additional Guidance		

Q	Answer	Mark	Comments
4(a)	3 × 6 or 18	M1 *Ra*	Allow 3000 × 6
	their 18 × 15 (÷ 100) or 270 (÷100) or 250 ÷ 15 or 2.5(0) ÷ 0.15	M1 *Aa*	their 18 cannot be 3 or 6
	(£)2.7(0) and Yes or 16.(....) and 18 and Yes	A2 *I I*	A1 (£)2.7(0) or 16.(....) and 18 A1ft correct decision for their values if M2 awarded

Additional Guidance

16.(..) comes from calculating the number of units you can buy for £2.50

Allow any rounding including rounding up to 17

Answer 270p and Yes scores M2A2

Answer 270 and 250 and Yes scores M2A2

Answer 270 with no units and Yes scores M2A0A1

6 × 15 (= 90) oe scores M0

Use of 3000 × 6 needs division by 1000 for the accuracy mark
Example
3000 × 6 = 18000
18000 × 0.15 = 270 Yes M2 A0 A1ft

Use of 2kw or 1kw instead of 3kw clearly shown can gain max 3 marks

Q	Answer	Mark	Comments
	Alternative method 1		
	$100 \div 1000$ or 0.1 or $\dfrac{1}{10}$	M1 *Ra*	
	their 0.1×500 or 50 or $500 \div 10$ or 50 or 500×4 or 2000	M1 *Aa*	
	$50 \times 4 = 200$ or $200 \div 4 = 50$ or $2000 \times 0.1 = 200$	A1 *I*	50 must be from 0.1×500
	Alternative method 2		
	100×500 or $50\,000$	M1 *Ra*	
	their $50\,000 \div 1000$ or 50	M1 *Aa*	
4(b)	$50 \times 4 = 200$ or $200 \div 4 = 50$	A1 *I*	50 must be from $50\,000 \div 1000$
	Alternative method 3		
	500×4 or 2000	M1 *Ra*	500×100 or $50\,000$
	their 2000×100 or $200\,000$	M1 *Aa*	their $50\,000 \times 4$ or $200\,000$
	$200\,000 \div 1000 = 200$ or $200 \times 1000 = 200\,000$	A1 *I*	
	Additional Guidance		
	$50 \times 4 = 200$ or $200 \div 4 = 50$ on its own is M0M0A0 Any 50 used must clearly be from using the method in alt 1 or alt 2		

Q	Answer	Mark	Comments
4(c)	200 ÷ 5	M1 *Rc*	
	40	A1 *Aa*	
4(c) check	Reverse or alt method eg reverse their 40 × 5 = 200 or 200 ÷ their 40 = 5 eg alt method 200 ÷ 10 × 2 = 40 or 200 × 0.2 = 40	B1ft *Ab*	
	Additional Guidance		
	Mark holistically so two different methods of 200 ÷ 5 = 40 and 200 ÷ 10 × 2 = 40 gains M1A1B1		

Q	Answer	Mark	Comments
	Alternative method 1		
	Their 40 × 15 (÷ 100) or 600 or 6	M1 *Ra*	ft from **(c)** implied by 19.88
	38 – (their 6 + 13.88) or 20 + (their 6 + 13.88)	M1 *Rc*	For 38 condone 68
	(£)18.12 and No or (£)39.88 and No	A2ft *I I*	ft from **(c)** A1 (£)18.12 or (£)39.88 or A1ft correct decision for their value if M2 awarded
	Alternative method 2		
	their 40 × 15 (÷ 100) or 600 or 6	M1 *Ra*	ft from **(c)**
4(d)	38 – 20 or 18 and their 6 +13.88 or 19.88	M1 *Rc*	For 38 condone 68
	(£)18 and (£)19.88 and No	A2ft *I I*	ft from **(c)** A1 (£)18 and (£)19.88 or A1ft correct decision for their values if M2 awarded
	Additional Guidance		
	68 comes from adding the cost of 200 units at 15p to the cost for the ordinary bulbs- a misinterpretation This gives 68 – 19.88 = 48.12 Yes M1M1 A0A1ft Equivalent comparisons should be given full credit Example 40 × 0.15 = 6 38 – 20 – 6 =12 No M2A2 (this is a comparison of £12 with £13.88)		