FUNCTIONAL SKILLS CERTIFICATE

Functional Mathematics

4367

Level 1

Mark scheme

January 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)	(arrives) 0848 or 8.48(am) if (at Piccadilly Gardens)	B2 *Ra* *Aa*	B1 0835 (arrives at Tram stop) implied by 0846 seen or 0837 (gets on tram at Queens Road)
	Additional Guidance		
	Allow any correct version of time eg 12 minutes to 9 For B1 allow 37 minutes past the hour etc		
1 (b)	(Gets on) their 0912 (at Piccadilly Gardens)	B1ft *Ra*	ft their 0848 from 1(a) or correct
	(arrives) 0945 (at Trafford Centre)	B1ft *Rb*	ft their 0912
	their 0945 + 10 or 10 am – 10 minutes or 10 – 0945 or 15 (mins)	B1 *Aa*	implied by 0945 and 0955 seen
	0955 and Yes or 5 minutes early and Yes or 0945 and 0950 and Yes or 15 mins left and the walk only takes 10 mins and yes	B2ft *I* *I*	ft their 0848 from 1(a) B1ft 0955 or B1ft 0945 and 0950 or B1ft correct conclusion for Emmie's arrival time providing first B1 is awarded and the arrival time is in the same column as their time getting on the bus

	Additional Guidance
1(b)	Allow any correct version of time eg 5 minutes to 10
	Examples-These all gain 3 marks 9.12, 9.30, 9.40 and yes B1B0B1B0B1ft 9.18, 9.45, 9.55 and yes B0B1B1B1B0 9.12 + 10 = 9.22 yes B1B0B1B0B1ft If the 9.12 bus should be used but is not stated then the max they can score is B0B1B1B1B0 for 9.45 and 9.55 seen (implied + 10)
	Omitting the addition of 10 minutes can score 3 marks maximum Example 8.48 seen in part a) Get on 9.12 B1 Arrive 9.45 Yes B1B0B0B1ft The B1ft can be awarded because the first B1 has been awarded and 9.45 is an arrival time in the same column as their 'get on' time of 9.12

Question	Answer	Mark	Comments
1 (c)	4 + 3.7 or 7.7	M1 *Ra*	
	41.3(0) – their 7.7 or 35 + their 7.7 or 41.3(0) – 35	M1 *Aa*	their 7.7 can be 4 or 3.7
	33.6(0) and No or 42.7 and No or 6.3(0) and 7.7 and No	A2ft *I* *I*	A1 33.6(0) or 42.7 or 6.3(0) and 7.7 or A1ft correct conclusion from their value(s) if 2nd method mark awarded
	Additional Guidance		
	Subtracting only one cost can gain M0M1A0A1ft		
	4 + 3.7 + 41.3(0) or 7.7 + 41.3(0) is M1M0A0A0		
	Doubling the fares can gain 2 marks Eg 8 + 7.40 =15.40 M0 41.30 – 15.40 M1 = 25.90 No A0A1ft		

Question	Answer	Mark	Comments
1 (d)	7.38 (× 8)	M1 *Rb*	
	59.04	A1 *Aa*	59.4 implies M1A0
Check	reverse or alt method, eg their 59.04 ÷ 8 = 7.38 or their 59.04 ÷ 7.38 = 8	B1ft *Ab*	
1 (d)	**Additional Guidance**		
	Mark holistically		
2 (a)	20.82 + 22.03 + 22.24 + 21.42 + 21.36 + 21.91 + 22.14 + 23.12 + 21.81 + 21.55 or 218.4	M1 *Rc*	
	their 218.4 ÷ 10 or 10 × 21.76 or 217.6	M1 *Aa*	
	21.8(4) and Yes or 218.4 and 217.6 and Yes	A2 *I,I*	A1 21.8(4) or A1 218.4 and 217.6 or A1ft correct conclusion for their value(s) if both method marks awarded
	Additional Guidance		
	Yes can be implied eg 21.84 is more than 21.76		
	20.82 + 22.03 + 22.24 + 21.42 + 21.36 + 21.91 + 22.14 + 23.12 +21.81 + 21.55 ÷ 10 M1M0 unless recovered		

Question	Answer	Mark	Comments
2 (b)	**Alternative method 1**		
	7944 × 150 or 1 191 600 or 7944 × 33 or 262 152 or 7944 × 0.33 or 7944 × $\frac{33}{100}$ or 2621.52	M1 *Ra*	7944 × 150 × 0.33 or 7944 ×150 × 33 in any order is M2 0.33 can be seen as $\frac{33}{100}$
	their 1 191 600 × 0.33 or their 2621.52 × 150 or 393 228 or their 262 152 × 150 or 39 322 800	M1 *Rc*	
	their 393 228 – 333 600 or their 393 228 – 60 000 or 333 600 + 60 000	M1 *Aa*	must use pounds here allow $\frac{\text{their } 39322800}{100}$ in place of 393 228
	59 628 and No or 333 228 and No or 393 600 and 393 228 and No	A2 *I*	A1 59628 or A1 333 228 or A1 393 600 and 393 228 or A1ft correct conclusion for their value if 3rd method mark awarded and profit made

Question	Answer	Mark	Comments
2(b) cont'd	**Alternative method 2**		
	7944 × 0.33 or 2621.52	M1 *Ra*	income per cow
	333 600 ÷ 150 or 2224	M1 *Rc*	cost to keep each cow
	(their 2621.52 – their 2224) × 150 or 397.52 × 150	M1 *Aa*	
	59 628 and No	A2 *I*	A1 59628 or A1ft correct conclusion for their value if 3rd method mark awarded and profit made
	Additional Guidance		
	Working may be in pence throughout including the answer only if £60000 is changed to pence		
2 (c)	2.48 and 1.8(0)	M1 *Rb*	These two values only
	4.28	A1 *Aa*	ignore units penalise further work eg 4.28 ÷ 5
Check	reverse or alt check eg their 4.28 – 1.8 = 2.48	B1 *Ab*	
	Additional Guidance		

Question	Answer	Mark	Comments
2 (d)	Fully correct diagram with five 4 by 4 squares drawn around edges of field (and at least one side facing open space) and a rectangle of area at least 30 sq m and a 2 by 3 rectangle (feeding trough)	B3 *Aa,I,I*	B2 Two of five 4 by 4 squares a rectangle of area at least 30 sq m a 2 by 3 rectangle (feeding trough) B1 one 4 by 4 square or a rectangle of area at least 30 sq m or a 2 by 3 rectangle (feeding trough)
	Additional Guidance		
	For B2 the squares do not need at least one side facing open space		
	The digging area rectangle cannot just be space left over and not identified. It must have a boundary to show the area		
	The feeding trough cannot be in the digging area for B3 or B2 but can be used for the B1 mark		
	If items are labelled they must be considered as that item Eg a 2 by 3 rectangle labelled digging area does not score for the feeding trough		

Question	Answer	Mark	Comments
3 (a)	**Alternative method 1**		
	385 x 2	M1 *Aa*	
	770 and No	A2 *I,I*	A1 770 or A1ft correct decision for their value
	Alternative method 2		
	759 ÷ 2 or 385 ÷ 759	M1 *Aa*	
	379.5 and No or 0.507 and No	A2 *I,I*	A1 379.5 or 0.507 or A1ft correct decision for their value
	Alternative method 3		
	759 ÷ 385	M1 *Aa*	
	1.9(…) and No	A2 *I,I*	A1 1.9(…) or A1ft correct decision for their value
	Alternative method 4		
	759 – 385	M1 *Aa*	
	374 and No	A2 *I,I*	A1 374 or A1ft correct decision for their value
	Additional Guidance		

Question	Answer	Mark	Comments
3(b)	7 × 4 or 28 (m^2)	M1 *Ra*	Step 1
	their 28 × 3 or 84 (m^3)	M1 *Rc*	Step 2
	their 84 ÷ 14	M1 *Aa*	Step 3
	6 (kw)	A1 *Aa*	correct heat output
	Chester	B1ft *I*	ft correct Log Burner for their 6 kw ≤ 11
	Additional Guidance		
	A common error is to use 4 for the height of the room Example 7 × 4 = 28 M1 28 × 4 = 112 M0 112 ÷ 14 = 8 M1A0 Dover B1ft		

Question	Answer	Mark	Comments
3 (c)	**Alternative method 1**		
	24 × 2 or 48 (kg)	M1 *Ra*	or 16 ÷ 2 or 8 or 12 ÷ 2 or 6
	their 48 ÷ 16 or 3 **and** their 48 ÷ 12 or 4	M1 *Rc*	or 24 ÷ their 8 or 3 and 24 ÷ their 6 or 4
	their 3 × 7.5(0) or 22.5(0)	M1 *Aa*	their 3 and their 4 must be from an attempt at calculating number of bags. **Not** days, hours, kg
	their 4 × 6.9(0) or 27.6(0)	M1 *Aa*	
	their 27.6(0) – their 22.5(0) or their 27.6(0) – 5 or 22.6(0) or their 22.5(0) + 5 or 27.5(0)	M1 *Rc*	not 7.5(0) – 6.9(0)
	(£)5.1(0) and Yes or 22.6(0) and 22.5(0) and Yes or 27.6(0) and 27.5 (0) and Yes	A2 *I,I*	A1(£)5.1(0) or A1 22.6(0) and 22.5(0) or A1 27.6(0) and 27.5(0) A1ft correct conclusion for their values if 5th method mark awarded

3(c) cont'd	**Alternative method 2**		
	24 × 2 or 48 (kg)	M1 *Ra*	Amount of fuel needed
	7.50 ÷ 16 or 0.46875	M1 *Rc*	Price of smokeless fuel per kg
	6.90 ÷ 12 or 0.575	M1 *Aa*	Price of wood per kg
	their 0.46875 × 48 or 22.50 and their 0.575 × 48 or 27.60 or their 0.575 – 0.46875 or 0.10625	M1 *Aa*	
	their 27.60 – their 22.50 or their 0.10625 × 48	M1 *Rc*	not 7.5(0) – 6.9(0)
	(£)5.1(0) and Yes	A2 *I,I*	A1 (£)5.1(0) or A1ft correct conclusion for their values if their two costs are subtracted
	Additional Guidance		
	There are two full calculations required for M4 24 × 2 ÷ 16 × 7.5(0) and 24 × 2 ÷ 12 × 6.9(0) Other methods such as build up may be used. The mark scheme should be applied in a similar fashion. eg Working out the cost of 2kg per hour and multiplying up to 24 hours 7.50 ÷ 8 or 0.9375 M1 6.90 ÷ 6 or 1.15 M1 1.15 – 0.9375 or 0.2125 M1 0.2125 × 24 M1 5.10 and yes A2		
	Multiplying their 27.6(0) and /or 22.5(0) by 7 gains the first 4 marks only		

Question	Answer	Mark	Comments
4 (a)	0.25 litres	B1 *Aa*	
4 (b)	**Alternative method 1**		
	8 ÷ 2 or 4	M1 *Ra*	or 8 × 600 or 4800
	their 4 × 600 or 2500 ÷ 4	M1 *Aa*	or their 4800 ÷ 2 (their 4800 or their 4 cannot be 2500)
	2400 and Yes or he has 100(g) more (than he needs) or 625 and Yes	A2 *I,I*	A1 2400 or 625 or A1ft correct decision for their value if both method marks awarded
	Alternative method 2		
	2500 ÷ 600 or 4.1(…) or 4.2	M1 *Ra*	
	8 ÷ 2 or 4 or their 4.1(…) × 2 or 8.3…	M1 *Aa*	
	4.1(…) and 4 and Yes or 4.2 and 4 and Yes or 8.3(…) and Yes	A2 *I,I*	A1 4.1(…) and 4 or 4.2 and 4 or A1 8.3(...) or A1ft correct decision for their value(s) if both method marks awarded

4(b) cont'd	**Alternative method 3**		
	2500 ÷ 8 or 312.5	M1 *Ra*	sugar they have per kg of apricots
	600 ÷ 2 or 300	M1 *Aa*	sugar needed per kg of apricots
	312.5 and 300 and yes	A2 *I,I*	A1 312.5 and 300 or A1ft correct conclusion for their values if both method marks awarded
	Additional Guidance		

Question	Answer	Mark	Comments
4 (c)	105 – 98.4	M1 *Rb*	
	6.6	A1 *Aa*	
	Additional Guidance		
	Embedded answer 98.4 + 6.6 = 105 M1A0		
4 (d)	3.35 + 40 minutes	M1 *Rb*	allow 0.40 for 40 for M1
	4.15 (pm) or 16.15	A1 *Aa*	3.75 implies M1
	Additional Guidance		
4 (e)	20 × 16 or 320	M1 *Rc*	
	their 320 ÷ 10	M1 *Rc*	
	32	A1 *Aa*	ignore units
	Additional Guidance		
	20 × 16 ÷ 10 can be seen as 16 ÷ 10 × 20		

Question	Answer	Mark	Comments
4 (f)	**Alternative method 1**		
	3.99 – 3.04 or (0).95	M1 *Rc*	
	their (0).95 × 25	M1 *Aa*	digits 2375 implies M2
	(£)23.75 and No	A2 *I,I*	A1 (£)23.75 or A1ft correct decision for their value if both method marks awarded SC2 (£) 22.8(0) and No
	Alternative method 2		
	3.99 × 25 or 99.75 or 3.04 × 25 or 76	M1 *Rc*	
	their 99.75 – their 76 or their 99.75 – 24 or their 76 + 24	M1 *Aa*	their 76 cannot be 3.04
	(£)23.75 and No or 75.75 and 76 and No or 99.75 and 100 and No	A2 *I,I*	A1 (£)23.75 or A1 75.75 and 76 or 99.75 and 100 or A1ft correct decision for their value(s) if both method marks awarded SC2 (£) 22.8(0) and No

4(f) cont'd	**Alternative method 3**		
	3.99 – 3.04 or (0).95	M1 *Rc*	
	24 ÷ their (0).95	M1 *Aa*	
	25(.26…) and No or 25.3 and No	A2 *I,I*	A1 for 25(.26…) or 25.3 or A1ft correct decision for their value if both method marks awarded SC2 (£) 22.8(0) and No
	Additional Guidance		