AQA

FUNCTIONAL SKILLS CERTIFICATE
Functional Mathematics

Level 1

Mark Scheme

4367

January 2018

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)	90 ÷ 15	M1 *Ra*	
	6	A1 *Aa*	
Check	Reverse process or alternative method, e.g. 6 × 15 = 90	B1ft *Ab*	
1(a)	**Additional Guidance**		
	Embedded solution (e.g. 6 × 15 = 90) scores M1 only Mark holistically **Check** Allow 15 + 15 + 15 + 15 + 15 + 15 = 90 as an alternative to 6 × 15		

Q	Answer	Mark	Comments
1(b)	60 ÷ 24 or 24 + 24 + 12 (= 60)	M1 *Ra*	
	2.5	A1 *Aa*	SC1 15
	Additional Guidance		
	60 ÷ 24 = 2.5 followed by 2.5 × 6 = 15 scores M1A0 6 × 60 ÷ 24 = 15 scores SC1		

Q	Answer	Mark	Comments
1(c)	168 (× 2)	M1 *Rb*	
	336	A1 *Aa*	
	Additional Guidance		
	168 + 168 = 336 and 336 ÷ 10 scores M1A0		

Q	Answer	Mark	Comments
1(d)	21 × 3 or 63	M1 *Ra*	
	their 336 × 70 or 23 520 or their 336 × 0.7(0) or 235.2(0)	M1 *Ra*	their 336 can be 168
	their 63 + their 235.2(0) or 298.2(0)	M1 *Aa*	units must be consistent
	their 298.2(0) ÷ 10	M1 *Aa*	their 298.2(0) can be their 63 or their 235.20
	£29.82	A1ft *I*	must see £ symbol ft their 336 from 1(c)

Additional Guidance

Example 1

    21 × 3 = 63

    168 × 0.7 = 117.6

    63 + 117.6 = 180.6

    180.6 ÷ 10 = £18.06

Scores M4A1ft if their 336 = 168 in 1(c)

Scores M4A0ft if their 336 ≠ 168

Example 2

    21 × 3 = 63

    336 × 0.7 = 235.2

    235.2 ÷ 10 = 23.52

Scores M1M1M0M1A0ft

Q	Answer	Mark	Comments
1(e)	**Alternative method 1** $11 \times 300 \div 1000 = 3.3$ or $11 \div 1000 \times 300 = 3.3$ or $11 \times 300 = 3300$ and $3300 \div 1000 = 3.3$ or $11 \div 1000 = 0.011$ and $0.011 \times 300 = 3.3$	**B2** **/** **/**	B1 any incomplete method, e.g. $11 \times 300 \div 1000$ or their $3300 \div 1000 = 3.3$ or $11 \times 300 = 3300$ or $11 \div 1000 = 0.011$ or $0.011 \times 300 = 3.3$ or 3.3 or full method with one error, e.g. $11 \times 300 = 330$ and $330 \div 1000 = 3.3$

Q	Answer	Mark	Comments
1(e)	**Alternative method 2**		
	3.2 × 1000 ÷ 300 = 10.6(…) or 10.7 or 3.2 ÷ 300 × 1000 = 10.6(…) or 10.7 or 3.2 × 1000 = 3200 and 3200 ÷ 300 = 10.6(…) or 10.7 or 3.2 ÷ 300 = 0.0106(…) or 0.0107 and 0.0106(…) × 1000 = 10.6(…) or 10.7	B2 / /	B1 any incomplete method, e.g. 3.2 × 1000 ÷ 300 or their 3200 ÷ 300 = 10.6(…) or 10.7 or 3.2 × 1000 = 3200 or 3.2 ÷ 300 = 0.0106(…) or 0.0107 or 0.0106(…) × 1000 = 10.6(…) or 10.7 or 10.6(…) or 10.7 or full method with one error, e.g. 3.2 × 1000 = 320 and 320 ÷ 1000 = 1.06(…) or 1.07
	Additional Guidance		
	Allow imprecise statements, e.g. 11 × 300 = 3300 ÷ 1000 = 3.3		

Q	Answer	Mark	Comments
	Alternative method 1		
	$\frac{1}{4}$ × 60 or 15	M1 *Ra*	implied by 55
	their 15 + 5 + 35 or 55	M1 *Rc*	allow if adding any two times seen
	8.45 – their 55 or 7.5 or their start time + their 55	M1 *Aa*	their 55 must be from 3 times their start time must be between 7.40 am and 8.00 am
	7.50 (am) or 10 to 8 (in the morning)	A1 *I*	must be correct time notation
2(a)	**Alternative method 2**		
	$\frac{1}{4}$ × 60 or 15	M1 *Ra*	
	8.45 – their 15 – 5 or 8.25 or 8.45 – their 15 – 35 or 7.55 or 8.45 – 5 – 35 or 8.05	M1 *Rc*	or their start time + any two times their start time must be between 7.40 am and 8.00 am
	8.45 – their 15 – 5 – 35 or 7.5 or their start time + their 15 + 5 + 35	M1 *Aa*	must add or subtract 3 times their start time must be between 7.40 am and 8.00 am
	7.50 (am) or 10 to 8 (in the morning)	A1 *I*	must be correct time notation

Q	Answer	Mark	Comments
2(a)	**Additional Guidance**		
	7.50 pm or 10 to 8 in the evening scores M1M1M1 A0		
	Decimal times can score up to M3 A0 Example $\frac{1}{4} \times 60 = 0.15$ 0.15 + 0.05 + 0.35 = 0.55 8.45 – 0.55 = 7.9 scores M1M1M1A0		

Q	Answer	Mark	Comments
2(b)	382 ÷ 2	M1 *Rb*	
	191	A1 *Aa*	SC1 382 seen
Check	reverse or alternative method, e.g. their 191 × 2 = 382 or 191 + 191 = 382 or approximation 400 ÷ 2 = 200	B1ft *Ab*	
2(b)	**Additional Guidance**		
	Mark holistically		

Q	Answer	Mark	Comments
	Alternative method 1		
	2×96 or 192 or $2\frac{1}{2} \times 96$ or 240	M1 *Ra*	for $2\frac{1}{2} \times 96$ allow $96 + 96 + 48$
	192 and 240 and Yes	A2 *I* *I*	A1 192 and 240 or A1ft correct conclusion for their values must score M1
	Alternative method 2		
2(c)	$216 \div 96$	M1 *Ra*	
	2.25 or $2\frac{1}{4}$ and Yes	A2 *I* *I*	A1 2.25 or $2\frac{1}{4}$ or A1ft correct conclusion for their value must score M1
	Alternative method 3		
	$216 \div 2$ or 108 or $216 \div 2.5$ or 86.4	M1 *Ra*	
	108 and 86.4 and Yes	A2 *I* *I*	A1 108 and 86.4 or A1ft correct conclusion for their values must score M1

Q	Answer	Mark	Comments
2(d)	Axel and Gina in any pen together with no others	B1 *Ra*	
	Jake in any pen on own	B1 *Ra*	
	Buddy, Ella, Hugo in large pen together with no others	B1 *Aa*	
	two of Cora, Dax, Frank and Iggy in any pen together with no others	B1 *I*	
	two remaining from Cora, Dax, Frank and Iggy in any pen with no others	B1 *I*	

Additional Guidance

Example of a fully correct solution

Axel Gina	Cora Dax	Jake

Buddy Ella Hugo	Frank Iggy

If both sets of cages are blank check the original.

Q	Answer		Mark	Comments
3(a)	one rectangle of correct length and width seen		M1 *Ra*	7 cm by 1 cm
	at least 6 of their rectangles fitted in		M1 *Aa*	6 rectangles of the same size seen on grid
	11 rectangles of correct size shown		A1 *I*	

Q	Answer		Mark	Comments
3(b)	140 + 20 + 140 + 20 or 320	25 × 140 or 3500 or 25 × 20 or 500 or 25 × 160 or 4000	M1 *Ra*	
	25 × their 320	2 × their 3500 + 2 × their 500 or their 7000 + their 1000 or 2 × their 4000	M1 *Rc*	their 320 must be a length
	8000 (cm)		A1 *Aa*	SC1 4000
	Additional Guidance			
	2nd M1 - their 320 Example 1 140 ÷ 20 = 7 and 7 × 25 scores M0 (7 is not a length) Example 2 11 × 25 scores M0 (11 is the number of sashes from 3(a) and not a length) Example 3 2800 × 25 scores M0 (2800 is an area)			

Q	Answer		Mark	Comments	
3(c)	C13 and C14		B1 *Aa*		

3(d)	150 seen		B1 *Aa*	implied by 300 seen or by 121 seen or by 1275 or 2550 seen	
	their 150 × 2 or 300	their 150 × 8.5(0) or 1275	M1 *Ra*	8.5(0) × 2 or 17.(00)	
	their 300 × 8.5(0) or 2550	their 1275 × 2 or 2550 or 960 ÷ 2 or 480	M1 *Rc*	their 17 × 150 or 2550	
	their 2550 – 960 or (their 1275 – their 480) × 2 or 1500 + 960 or 2460		M1 *Aa*	their 2550 can be their 1275	
	1590 and Yes or 2550 and 2460 and Yes		A2ft *I* *I*	ft their 150 A1 1590 or 2550 and 2460 or A1ft correct conclusion for their value(s) must score 3rd M1 and × 8.5(0)	

Additional Guidance

Miscounting the number of tickets per night can still gain 5 marks B0M1M1M1A2ft

Example 1

   150 × 8.5 = 1275

   1275 – 960 = 315 and No scores B1M1M0M1A1ft

Example 2

   121 × 8.5 = 1028.5

   1028.5 × 2 = 2057

   2057 − 960 = 1097 and No scores B1M1M1M1A1ft

Q	Answer	Mark	Comments
	Alternative method 1		
	10+7+9+8+6+7+7+10+9+7 = 80 and 80 ÷ 10 = 8	B2 / /	B1 10+7+9+8+6+7+7+10+9+7 = 80 or 80 ÷ 10 = 8 or full working with one error or omission
4(a)	**Alternative method 2**		
	10+7+9+8+6+7+7+10+9+7 = 80 and 8 × 10 = 80	B2 / /	B1 10+7+9+8+6+7+7+10+9+7 = 80 or 8 × 10 = 80 or full working with one error or omission
	Additional Guidance		
	Example 1 10+7+9+8+6+7+7+10+9+7 ÷ 10 = 73.7 scores B0 **Example 2** 10+7+9+8+6+7+7+10+9+7 = 90 and 90 ÷ 10 = 9 scores B1 Allow imprecise statements, e.g. 10+7+9+8+6+7+7+10+9+7 = 80 ÷ 10 = 8		

Q	Answer		Mark	Comments
4(b)	**Alternative method 1**			
	5.6(0) or 560 seen or used		B1 *Rb*	
	their 5.6(0) ÷ 8 or 0.7(0)	their 560 ÷ 8 or 70	M1 *Ra*	their 5.6(0) must be a minimum wage
	their 0.7(0) × 6 or 4.2(0)	their 70 × 6 or 420	M1 *Rc*	
	their 4.2(0) ÷ 5	their 420 ÷ 5	M1 *Aa*	
	0.84 and No	84 and No	A2ft *l* *l*	ft their 5.60 A1ft 0.84 or 84 or A1ft correct decision for their value must score at least 3 marks from B1M3
	Additional Guidance			
	Condone incorrect use of money symbols. E.g. allow 5.00p or £5.00p for £5(.00) ft other values of National Minimum Wage (can score B0 M3A2ft)			
	NMW = £4.05 4.05 ÷ 8 = 0.50625 0.50625 × 6 = 3.0375 3.0375 ÷ 5 = 0.6075 60p or 61p and No	NMW = £7.05 7.05 ÷ 8 = 0.88125 0.88125 × 6 = 5.2875 3.0375 ÷ 5 = 1.0575 £1.05 or £1.06 and No	NMW = £7.50 7.50 ÷ 8 = 0.9375 0.9375 × 6 = 5.625 5.625 ÷ 5 = 1.125 £1.12 or £1.13 and No	

Q	Answer		Mark	Comments
	Alternative method 2			
	5.6(0) or 560 seen or used		B1 *Rb*	
	0.75 × 5 or 3.75	75 × 5 or 375	M1 *Ra*	
	their 3.75 ÷ 6 or 0.625	their 375 ÷ 6 or 62.5	M1 *Rc*	
	their 0.625 × 8 or 5 or their 5.6(0) ÷ their 0.625 or 8.96	their 62.5 × 8 or 500 or their 560 ÷ their 62.5 or 8.96	M1 *Aa*	their 5.6(0) must be a minimum wage
4(b)	5 (per hour) and 5.60 (per hour) and no or 8.96 (skirts per hour) and no		A2ft / /	A1 5 (per hour) and 5.60 per hour or 8.96 (skirts per hour) or A1ft correct decision for their value(s) must score at least 3 marks from B1M3
	Additional Guidance			
	Condone incorrect use of money symbols. E.g. allow 5.00p or £5.00p for £5(.00) ft other values of National Minimum Wage (can score B0 M3A2ft)			
	NMW = £4.05 0.75 × 5 = 3.75 3.75 ÷ 6 = 0.625 4.05 ÷ 0.625 = 6.48 6.(…) and No	NMW = £7.05 0.75 × 5 = 3.75 3.75 ÷ 6 = 0.625 7.05 ÷ 0.625 = 11.28 11.(…) and No	NMW = £7.50 0.75 × 5 = 3.75 3.75 ÷ 6 = 0.625 7.5 ÷ 0.625 = 12 [11.9. 12.1] and No	

Q	Answer	Mark	Comments
	Alternative method 1		
	8 × 10 × 2 × 6	M2 *Ra* *Aa*	M1 any three values multiplied
	960 and No or 40 (lower) and No	A2ft *I* *I*	A1 960 or A1ft correct decision for their value must score M1 from 3 values including 8
	Alternative method 2		
4(c)	8 × 2 × 6 or 96	M1 *Ra*	
	1000 ÷ their 96	M1 *Aa*	
	10.41(6…) or 10.42 and No	A2ft *I* *I*	A1 10.41(6…) or 10.42 or A1ft correct decision for their value must score M1
	Additional Guidance		
	In alt 2 can multiply any 3 values and compare with the fourth **Example** 10 × 2 × 6 = 120 1000 ÷ 120 = 8.3(3…) No		

Q	Answer	Mark	Comments
	Alternative method 1		
	2000 × 1.64 or 3280	M1 *Ra*	
	their 3280 + 1900 + 705 + 1080 or 6965	M1 *Rc*	must be all 4 costs their 3280 can be 1.64
	2000 × 4.99 or 9980	M1 *Aa*	
4(d)	their 9980 – their 6965 or their 6965 + 3000 or 9980 − 3000 or 6980	M1 *Aa*	their 6965 must be based on at least 2 costs
	3015 and yes or 9965 and 9980 and yes or 6980 and 6965 and yes	A2 *I* *I*	A1 3015 or 9965 and 9980 or 6980 and 6965 or A1ft correct decision for their value(s) must score 1st and 4th M1 or 3rd and 4th M1

Q	Answer	Mark	Comments
	Alternative method 2		
	4.99 − 1.64 or 3.35	M1 *Ra*	
	their 3.35 × 2000 or 6700	M1 *Rc*	
	their 6700 − 1900 − 705 − 1080 or their 6700 − 3685	M2 *Aa* *Aa*	M1 their 6700 − any two costs their 6700 must be from profit per skirt
	3015 and Yes	A2 *I* *I*	A1 3015 or A1ft correct decision for their value must score M1M1M1

4(d)	**Additional Guidance**		

Example 1	**Example 2**
2000 × 1.64 = 328	2000 ÷ 1.64 = 1220
328 + 1900 + 705 + 1080 = 4013	1220 + 1900 + 705 + 1080 = 4905
2000 × 4.99 = 9980	2000 × 4.99 = 9980
9980 − 4013 = 5967	9980 − 4905 = 5075
Yes	Yes
scores M1M1M1M1A1ft	scores M0M1M1M1A1ft

Example 3	
2000 × 1.64 = 3280	
2000 × 4.99 = 9980	
9980 − 3280 = 6700	
Yes	
scores M1M0M1M0A0	

Q	Answer	Mark	Comments

Q	Answer	Mark	Comments