FUNCTIONAL SKILLS CERTIFICATE
Functional Mathematics

Level 2

Mark Scheme

4368

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
	Amy, Dita and Tia in 5th dance	B1 *Rb*	
	Amy not in 1st dance	B1 *Rb*	row complete with no repeats
	Grace not in 3rd dance	B1 *Ia*	row complete with no repeats
	All 7 students do at least 2 dances	B1 *Ia*	at most one cell blank and no repeats in any row
	No student in consecutive dances	B1 *Ia*	all rows complete and no repeats in any row
1(a)	**Additional Guidance**		
	Mark second grid unless first grid blank		
	Example of B5		

Dance	Type	Students		
1st	Tap	Grace	Fiona	Tia
2nd	Tap	Dita	Leah	Mel
3rd	Ballet	Amy	Fiona	Tia
4th	Tap	Grace	Leah	Mel
5th	Tap	Amy	Dita	Tia

Q	Answer	Mark	Comments
	At least one correct shape drawn on grid	M1 *Ra*	
	At least 6 correct shapes drawn on grid	M1 *Aa*	implies M1M1
	At least 8 correct shapes drawn on grid	M1 *Aa*	implies M1M1M1
	10 correct shapes drawn on grid and Yes	A2 *Ib Ib*	A1 10 correct shapes drawn on grid A1ft correct conclusion for their number of correct shapes with M3
1(b)	**Additional Guidance**		
	Mark the better response		
	Example of 10 correct shapes 		

Q	Answer	Mark	Comments
1(c)	**Alternative method 1**		
	80 × 10.5(0) (× 2) or 840 or 1680 or 60 × 7.2(0) (× 2) or 432 or 864	M1 *Rb*	
	0.9 × their 840 or 756	M1 *Rc*	their 840 can be 1680
	$\dfrac{2}{3}$ × their 432 or 288	M1 *Aa*	their 432 can be 864
	their 756 × 2 + their 288 × 2 or 1512 + 576 or 2088	M1 *Rc*	total sales
	their 2088 – 925	M1 *Aa*	profit their 2088 can be 1044
	1163 and No	A2 *Ib Ib*	A1 1163 A1ft correct conclusion for their value with M0M1M1M1M1 or M1M1M1M0M1

Q	Answer	Mark	Comments
1(c)	**Alternative method 2**		
	0.9 × 80 (× 2) or 72 or 144	M1 *Rb*	
	$\frac{2}{3}$ × 60 (× 2) or 40 or 80	M1 *Rc*	allow 0.66(6…) or 0.67 for $\frac{2}{3}$
	10.5(0) × their 72 or 756 or 7.2(0) × their 40 or 288	M1 *Aa*	their 72 can be 144 their 40 can be 80
	their 756 × 2 + their 288 × 2 or 1512 + 576 or 2088	M1 *Rc*	total sales
	their 2088 – 925	M1 *Aa*	profit their 2088 can be 1044
	1163 and No	A2 *Ib Ib*	A1 1163 A1ft correct conclusion for their value with M1M1M0M1M1 or M1M1M1M0M1
	Additional Guidance		
	To score all of the first 4 M marks, doubling must have taken place		

Q	Answer	Mark	Comments
2(a)	96 ÷ 15 or 6.4 or 15 × 6 = 90 or 15 × 7 = 105	M1 *Ra*	
	7	A1 *Ib*	
	Additional Guidance		
	Mark holistically with 2(a) check		

Q	Answer	Mark	Comments
2(a) **Check**	Reverse calculation eg their 6.4 × 15 = 96 or alternative method	B1ft *Ab*	ft their calculation
	Additional Guidance		
	Mark holistically with 2(a)		
	No method in (a) with one method in check		B0

Q	Answer	Mark	Comments
2(b)	268	B1 *Aa*	
	Additional Guidance		

Q	Answer		Mark	Comments
2(c)	**Alternative method 1**			
	28 × 3 or 84		M1 *Ra*	
	their 268 × 2 or 536	their 268 × (0.)65 or 174.2(0)	M1 *Rb*	correct or their 268 from (b)
	their 536 × (0.)65 or 348.4(0)	their 174.2(0) × 2 or 348.4(0)	M1 *Rc*	their 536 can be 268
	their 84 + their 348.4(0) or 432.4(0)		M1 *Aa*	cost of minibus their 84 can be 28 their 348.4(0) can be 174.2(0)
	12 × 35 + 2 × (35 – 10) or 470 or trials amount x such that $12x + 2(x – 10)$ gives a total of their 432.4(0) ± 5		M1 *Aa*	total paid if 12 pay (£)35 and 2 pay (£)25
	470 and 432.4(0) and Yes		A2ft *lb lb*	only ft their 268 from (b) A1ft 470 and 432.4(0) A1ft correct conclusion for their values with M1M0M1M1M1 or M1M1M0M1M1

Q	Answer		Mark	Comments
2(c)	**Alternative method 2**			
	28 × 3 or 84		M1 *Ra*	
	their 268 × 2 or 536	their 268 × (0.)65 or 174.2(0)	M1 *Rb*	correct or their 268 from (b)
	their 536 × (0.)65 or 348.4(0)	their 174.2(0) × 2 or 348.4(0)	M1 *Rc*	their 536 can be 268
	their 84 + their 348.4(0) or 432.4(0)		M1 *Aa*	cost of minibus their 84 can be 28 their 348.4(0) can be 174.2(0)
	their 432.4(0) – 12 × 10 or 312.4(0) and their 312.4(0) ÷ 14 + 10 or $\dfrac{\text{their } 432.4(0) + 20}{14}$		M1 *Aa*	
	32(.31...) or 32.32 and Yes		A2ft *lb lb*	only ft their 268 from (b) A1 32(.31...) or 32.32 A1ft correct conclusion for their values with M1M0M1M1M1 or M1M1M0M1M1
	Additional Guidance			
	214 in (b) 470 and 362.2(0) and Yes or 27.3(0) and Yes			7 marks
	298 in (b) 470 and 471.4(0) and No or 35.1(0) and No			7 marks
	536 in (b) 470 and 780.8(0) and No or 57.2(0) and No			7 marks
	Forgetting to double as the only error can score M4A1ft			

Q	Answer	Mark	Comments
	Alternative method 1		
	(6 inches =) 0.5 (ft) or (10 ft 6 inches =) 10.5 (ft) or (10 × 12 + 6) ÷ 12	M1 *Ra*	
	0.3(048) × their 10.5	M1 *Rb*	their 10.5 can be 10.6 their 10.5 cannot be 10 or 7.5
	3.2(0...) from using 10.5 and Yes or 3.15 from using 10.5 and Yes	A2 *lb lb*	A1 3.2(0...) from using 10.5 or 3.15 from using 10.5 A1ft correct conclusion for their value with M2
	Alternative method 2		
	(6 inches =) 0.5 (ft) or (10 ft 6 inches =) 10.5 (ft)	M1 *Ra*	
2(d)	3.1 ÷ 0.3(048) or 10.1(7…) or 10.2 or 10.3(3…)	M1 *Rb*	
	[0.1, 0.2] and 0.5 and Yes or 10.1(7…) or 10.2 and 10.5 and Yes or 10.3(3…) and 10.5 and Yes	A2 *lb lb*	A1 [0.1, 0.2] and 0.5 or 10.1(7…) or 10.2 and 10.5 or 10.3(3…) and 10.5 A1ft correct conclusion for their values with M2

<table>
<tr><td colspan="2" align="center">Additional Guidance</td></tr>
<tr><td>3.2(0...) or 3.15 and Yes with no incorrect working seen</td><td>M2A2</td></tr>
<tr><td>Alt 1 Working with 126 (inches) can only score if subsequently converts back to feet <br> eg 0.3048 × 126 ÷ 12</td><td>M2</td></tr>
<tr><td>For comparison, must compare heights in the same unit <br> eg Alt 2 3.1 ÷ 0.3048 = 10.2
      10.2 × 12 = 122.4
      122.4 (inches) and 126 (inches) and Yes</td><td>(2nd) M1

 M1A2</td></tr>
</table>

Q	Answer	Mark	Comments
	Alternative method 1		
	$10 \div 30$ or $\dfrac{1}{3}$ or $0.3(3...)$	M1 *Rc*	distance ÷ speed
	20	A1 *Aa*	
	Alternative method 2		
3(a)	$30 \div 60$ or $\dfrac{1}{2}$ or 0.5 or $60 \div 30$ or 2	M1 *Rc*	miles per minute or minutes per mile
	20	A1 *Aa*	
	Additional Guidance		
	Mark holistically with 3(a) check		

Q	Answer	Mark	Comments
	Reverse method eg $\dfrac{\text{their } 20}{60} \times 30 = 10$ or alternative method	B1ft *Ab*	ft their calculation
3(a) Check	**Additional Guidance**		
	Mark holistically with 3(a)		
	No method in (a) with one method in check		B0
	(a) $60 \div 3 = 20$ Check $20 \times 3 = 60$		M1A1 B0

Q	Answer	Mark	Comments
3(b)	$\dfrac{3}{4} \times 60$ or 45	M1 Aa	allow 0.45 implied by 110 (min)
	9(.00) – (5 + their 45 + their 20) or 9(.00) – their 70 or 9.00 – their 1.1(0) or 7.5	M1 *Rc*	their 20 from (a) allow one omission from 5, their 45 and their 20
	7.50 (am) or ten to eight (in the morning)	A1ft *Ia*	only ft their 20 with M2 must be correct time notation

Additional Guidance

7.50 pm or 10 to 8 in the evening	M2A0
Decimal times can score up to M1M1A0 eg 9(.00) – 0.05 – 0.45 – 0.20 8.3	M1M1 A0

Q	Answer		Mark	Comments
3(c)	**Alternative method 1**			
	448		B1 *Rb*	
	their 448 ÷ 2 or 224	their 448 ÷ 96 or [4.6, 4.7]	M1 *Aa*	
	their 224 ÷ 96	their [4.6, 4.7] ÷ 2	M1 *Ra*	
	their 2.3... and Yes		A2ft *Ib Ib*	ft B0M2 A1ft their 2.3... A1ft correct conclusion for their value with B0M2

Q	Answer		Mark	Comments
	Alternative method 2			
	448		B1 *Rb*	
	their 448 ÷ 2 or 224	$2\frac{1}{4} \times 96$ or 216 or $2\frac{1}{2} \times 96$ or 240	M1 *Aa*	
	$2\frac{1}{4} \times 96$ or 216 or $2\frac{1}{2} \times 96$ or 240	their 216 × 2 or 432 or their 240 × 2 or 480	M1 *Ra*	
3(c)	their 224 and 216 and 240 and Yes	their 448 and 432 and 480 and Yes	A2ft *Ib Ib*	ft B0M2 A1ft their 224 and 216 and 240 or their 448 and 432 and 480 A1ft correct conclusion for their three values with B0 M2
	Additional Guidance			
	Not dividing by 2 eg1 (alt 1) 448 ÷ 96 4.66 and No eg2 (alt 2) 494 $2\frac{1}{4} \times 96 = 216$ $2\frac{1}{2} \times 96 = 240$ No			B1M1 M0A0 B0M0 M1A0
	Alt 1 494 ÷ 2 = 247 247 ÷ 96 = 2.57 and No			B0M1 M1A2ft
	Alt 2 450 ÷ 2 = 225 $2\frac{1}{4} \times 96 = 216$ $2\frac{1}{2} \times 96 = 240$ Yes			B0M1 M1A2ft

Q	Answer		Mark	Comments	
	Alternative method 1				
	20 × 1000 or 20 000	349 ÷ 1000 or 0.349	M1 *Aa*		
	their 20 000 ÷ 349	20 ÷ their 0.349	M1 *Rb*		
	57 or [57.3, 57.31] and No		A2 *lb lb*	A1 57 or [57.3, 57.31] A1ft correct conclusion for their value with M2	
	Alternative method 2				
	60 × 349 or 20 940		M1 *Aa*		
3(d)	their 20 940 ÷ 1000		M1 *Rb*		
	20.9(4) or 21 and No		A2 *lb lb*	A1 20.9(4) or 21 A1ft correct conclusion for their value with M2	
	Alternative method 3				
	20 × 1000 or 20 000	349 ÷ 1000 or 0.349	M1 *Aa*		
	60 × 349 or 20 940	60 × their 0.349	M1 *Rb*		
	20 000 and 20 940 and No	20.9(4) or 21 and No	A2 *lb lb*	A1 20 000 and 20 940 A1ft correct conclusion for their values with M2	A1 20.9(4) or 21 A1ft correct conclusion for their values with M2

Q	Answer		Mark	Comments	
3(d)	**Alternative method 4**				
	20 × 1000 or 20 000	349 ÷ 1000 or 0.349	M1 *Aa*		
	their 20 000 ÷ 60	20 ÷ 60 or 0.333…	M1 *Rb*		
	333.(…) and No	0.333… and 0.349 and No	A2 *Ib Ib*	A1 333.(…) A1ft correct conclusion for their value with M2	A1 0.333… and 0.349 A1ft correct conclusion for their values with M2
	Additional Guidance				

Q	Answer	Mark	Comments
4(a)	$7 \times 9 + 8 \times 4 + 9 \times 5 + 10 \times 2 = 160$ and $160 \div 20 = 8$ or $\dfrac{7 \times 9 + 8 \times 4 + 9 \times 5 + 10 \times 2}{20} = 8$ or $8 \times 20 = 160$ and $7 \times 9 + 8 \times 4 + 9 \times 5 + 10 \times 2 = 160$ or $8 \times 20 = 160$ and $160 - 7 \times 9 - 8 \times 4 - 9 \times 5 - 10 \times 2 = 0$	B3 *Rb Aa la*	B2 $63 + 32 + 45 + 20 = 160$ and $160 \div 20 = 8$ or $\dfrac{63 + 32 + 45 + 20}{20} = 8$ $8 \times 20 = 160$ and $63 + 32 + 45 + 20 = 160$ or $8 \times 20 = 160$ and $160 - 63 - 32 - 45 - 20 = 0$ B1 7×9 and 8×4 and 9×5 and 10×2 or $63 + 32 + 45 + 20 = 160$ or $160 - 63 - 32 - 45 - 20 = 0$

Additional Guidance	
Totals seen next to table but other incorrect method used	Zero
$160 \div 20 = 8$	Zero
$7 \times 9 + 8 \times 4 + 9 \times 5 + 10 \times 2 \div 20 = 8$	B1

Q	Answer		Mark	Comments
4(b)	7.5(0) ÷ 8 or 0.93(75) or 0.938 or 0.94		M1 *Ra*	
	0.2(0) × their 0.93(75) or 0.18... or 0.19	1.2	M1 *Aa*	their 0.93(75) must be an amount of money
	their 0.93(75) + their 0.18...	1.2 × their 0.93(75)	M1 *Aa*	their 0.93(75) must be an amount of money
	[1.11, 1.128] or 1.13 and No		A2 *Ib Ib*	A1 [1.11, 1.128] or 1.13 A1ft correct conclusion for their value with 1st and 3rd M marks
	Additional Guidance			
	Use of 7.05 for 7.5(0) – allow as a misread and can score up to 4 marks			

Q	Answer		Mark	Comments
	Alternative method 1			
	3600 ÷ 8 or 450		M1 *Aa*	
	10 × 7 × 5 or 350		M1 *Rb*	
	their 450 – their 350 or 100		M1 *Aa*	their 350 can be 70 or 35 or 50
	their 100 ÷ 4.5 ÷ 4 or their 100 ÷ 18 or 5(.5...) or 5.6	4.5 × 4 × 6 or 108	M1 *Rc*	
	6		A1 *Ia*	
4(c)	**Alternative method 2**			
	10 × 7 × 5 (× 8) or 350 (× 8) or 2800		M1 *Aa*	
	3600 – their 2800 or 800		M1 *Rb*	their 2800 cannot be 350 their 2800 can be 560 or 280 or 400
	4.5 × 4 × 8 or 144		M1 *Aa*	
	their 800 ÷ their 144 or 5.5... or 5.6	their 144 × 6 or 864	M1 *Rc*	allow 5 with correct working seen their 144 can be 18 or 36 or 32
	6		A1 *Ia*	
	Additional Guidance			