



Functional Skills Certificate

FUNCTIONAL MATHEMATICS

4368

Mark scheme

4368

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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)	Alternative method 1		
	4.5 × 2 or 9 or 3 × 2 or 6	M1 Ra	[4.3, 4.7] × 2 or [8.6, 9.4] or [2.8, 3.2] × 2 or [5.6, 6.4]
	their 9 × their 6 or 54	M1 Rb	Must have used the scale twice
	15 × 3 or 45 and 9 × 5 or 45	M1 Aa	Two ways of getting to 45
	their 45 + 8 or 53 or their 54 – 8 or 46 or their 54 – their 45	M1 Aa	area + 8 or scaled area – 8 or scaled area – their 45
	53 and 54 and Yes or 46 and 45 and Yes or 9 and Yes	A2 lb lb	A1 53 and 54 or 46 and 45 or 9 A1ft Correct conclusion for their values Must score M4 for A1ft
	Additional Guidance		
	2nd M1 Use of scale is implied by values ≥ 7		

Q	Answer	Mark	Comments
1(a)	Alternative method 2		
	4.5 × 2 or 9 or 3 × 2 or 6	M1 <i>Ra</i>	[4.3, 4.7] × 2 or [8.6, 9.4] or [2.8, 3.2] × 2 or [5.6, 6.4]
	their 9 × their 6 or 54	M1 <i>Rb</i>	Must have used the scale twice
	their 54 – 8 or 46	M1 <i>Aa</i>	scaled area – 8
	their 46 ÷ 3 or 15.3... and their 46 ÷ 5 or 9.2	M1 <i>Rc</i>	their 46 must be a scaled area (can be 54)
	15.3... and 9.2 and Yes or 15 and 9 with method and Yes	A2 <i>lb lb</i>	A1 15.3... and 9.2 or 15 and 9 with method A1ft Correct conclusion for their values Must score M4 for A1ft
	Additional Guidance		
2nd M1 Use of scale is implied by values ≥ 7			

Q	Answer	Mark	Comments
1(a)	Alternative method 3		
	4.5 × 3 or 13.5	M1 <i>Ra</i>	[4.3, 4.7] × [2.8, 3.2] or [12.04, 15.04]
	their 13.5 × 2 ² or 54	M1 <i>Rb</i>	Must have used the scale ²
	15 × 3 or 45 and 9 × 5 or 45	M1 <i>Aa</i>	Two ways of getting to 45
	their 45 + 8 or 53 or their 54 – 8 or 46 or their 54 – their 45	M1 <i>Rc</i>	area + 8 or scaled area – 8 or scaled area – their 45
	53 and 54 and Yes or 46 and 45 and Yes or 9 and Yes	A2 <i>lb lb</i>	A1 53 and 54 or 46 and 45 or 9 A1ft Correct conclusion for their values Must score M4 for A1ft
	Additional Guidance		
	No scale used can score a max of 1st and 3rd M1		

Q	Answer	Mark	Comments
1(a)	Alternative method 4		
	4.5 × 3 or 13.5	M1 <i>Ra</i>	[4.3, 4.7] × [2.8, 3.2] or [12.04, 15.04]
	their 13.5 × 2 ² or 54	M1 <i>Rb</i>	Must have used the scale ²
	their 54 – 8 or 46	M1 <i>Aa</i>	scaled area – 8
	their 46 ÷ 3 or 15.3... and their 46 ÷ 5 or 9.2	M1 <i>Rc</i>	their 46 must be a scaled area (can be 54)
	15.3... and 9.2 and Yes or 15 and 9 with method and Yes	A2 <i>lb lb</i>	A1 15.3... and 9.2 or 15 and 9 with method A1ft Correct conclusion for their values Must score M4 for A1ft
	Additional Guidance		
No scale used can score a max of 1st M1			

Q	Answer	Mark	Comments
1(b)	$1.8 \times 19 + 32$ or 66	M1 Rb	
	66(.2)	A1 Aa	
	Additional Guidance		
	66.2		M1 A1
	66 without working		M1 A0
	Ignore units		
	Mark holistically with check		
1(b) check	Reverse calculation eg $66.2 - 32 = 34.2$ and $34.2 \div 1.8 = 19$ or Alternative calculation eg $9 \times 19 \div 5 + 32 = 66.2$ or Uses approximations eg $2 \times 20 + 30 = 70$	B1ft Ab	Working back to 19 or 1.8
	Additional Guidance		
	$66.2 - 32 \div 1.8 = 19$ (brackets missing)		B0
	$66.2 - 32 = 34.2$ and $1.8 \times 19 = 34.2$		B0
	$65 - 32 = 33$ and $33 \div 1.8 = 18(.3\dots)$		B1
	Ignore units		
Mark holistically with 1(b)			

Q	Answer	Mark	Comments
1(c)	Alternative method 1		
	16 + 12 + 14 + 15 or 57 and 10 + 8 + 13 + 11 + 7 or 49	M1 <i>Ra</i>	Allow 1 error or omission
	their 57 × 4 or 228 and their 49 × 6 or 294 or 522	M1 <i>Rb</i>	
	their 228 + their 294 – 180 – 90 (– 250) or their 522 – 270 or their 522 – 520	M1 <i>Aa</i>	
	252 or 2 and Yes	A2 <i>lb lb</i>	A1 252 or 2 A1ft Correct conclusion for their value Must score 2nd and 3rd M1 for A1ft
	Additional Guidance		

Q	Answer	Mark	Comments
1(c)	Alternative method 2		
	16 × 4 and 12 × 4 and 14 × 4 and 15 × 4 or 64 and 48 and 56 and 60 and 10 × 6 and 8 × 6 and 13 × 6 and 11 × 6 and 7 × 6 or 60 and 48 and 78 and 66 and 42	M1 Ra	Allow 1 error or omission
	their (64 + 48 + 56 + 60) or 228 and their (60 + 48 + 78 + 66 + 42) or 294 or 522	M1 Rb	Must be products
	their 228 + their 294 – 180 – 90 (– 250) or their 522 – 270 or their 522 – 520	M1 Aa	
	252 or 2 and Yes	A2 lb lb	A1 252 or 2 A1ft Correct conclusion for their value Must score 2nd and 3rd M1 for A1ft
	Additional Guidance		

Q	Answer	Mark	Comments
1(c)	Alternative method 3		
	16 × 4 and 12 × 4 and 10 × 6 or 64 and 48 and 60 and 8 × 6 and 14 × 4 and 15 × 4 or 48 and 56 and 60 and 13 × 6 and 11 × 6 and 7 × 6 or 78 and 66 and 42	M1 Ra	Allow 1 error or omission
	their (64 + 48 + 60) or 172 and their (48 + 56 + 60) or 164 and their (78 + 66 + 42) or 186 or 522	M1 Rb	Must be products
	their 172 + their 164 + their 186 – 180 – 90 (– 250) or their 522 – 270 or their 522 – 520	M1 Aa	
	252 or 2 and Yes	A2 lb lb	A1 252 or 2 A1ft Correct conclusion for their value Must score 2nd and 3rd M1 for A1ft
	Additional Guidance		

Q	Answer	Mark	Comments
2(a)	Alternative method 1		
	0.35 × 375 or 131.25	M1 <i>Ra</i>	0.65 × 375 = 243.75 is M0
	their 131.25 + 6 × 49.5(0) or 428.25 or 9 × 56.75 or 510.75	M1 <i>Rb</i>	their 131.25 cannot be 375 or 35
	their 510.75 – their 428.25	M1 <i>Aa</i>	total option 2 – total option 1 Subtraction may be reversed
	82.5(0) and Yes	A2 <i>lb lb</i>	A1 82.5(0) A1ft Correct conclusion for their value Must score M3 for A1ft SC3 428.25 and 510.75
	Alternative method 2		
	0.35 × 375 or 131.25	M1 <i>Ra</i>	0.65 × 375 = 243.75 is M0
	their 131.25 + 6 × 49.5(0) or 428.25 or 9 × 56.75 or 510.75	M1 <i>Rb</i>	their 131.25 cannot be 375 or 35
	their 428.25 + 80 or 508.25 or their 510.75 – 80 or 430.75	M1 <i>Aa</i>	total option 1 + 80 or total option 2 – 80
	508.25 and 510.75 and Yes or 428.25 and 430.75 and Yes	A2 <i>lb lb</i>	A1 508.25 and 510.75 or 428.25 and 430.75 A1ft Correct conclusion for their values Must score M3 for A1ft SC3 428.25 and 510.75
Additional Guidance			

Q	Answer	Mark	Comments
2(b)	Aigburth 1344 Sandhills 1400 Sandhills 1403 Kirkdale 1406 or Aigburth 1344 Moorfields 1356 Moorfields 1359 Kirkdale 1406 or Aigburth 1344 Central 1353 Central 1355 Kirkdale 1406	B4 <i>la la</i> <i>la la</i>	B3 B4 response with 2nd or 3rd entry missing or B4 response with one slip B2 Sequential journey that is not the shortest time and/or does not arrive at Kirkdale between 2.00 pm and 2.15 pm (2nd or 3rd entry may be missing) eg1 Aigburth 1329 Sandhills 1345 Sandhills 1403 Kirkdale 1406 eg2 Aigburth 1359 Central 1408 Central 1410 Kirkdale 1421 B2 First 3 lines of a B4 response eg Aigburth 1344 Sandhills 1400 Sandhills 1403 B1 Aigburth 1344
	Additional Guidance		

Q	Answer	Mark	Comments	
2(c)	5.7(0) + 1.5(0) or 7.2(0)	M1 Rb		
	21.5(0) + their 7.2(0) or 28.7(0)	M1 Rc	their 7.2(0) must be at least one ticket price	
	340 ÷ their 28.7(0) or [11.8, 11.85]	M1 Aa	their 28.7(0) × 11 = 315.7(0) their 28.7(0) can be 21.5(0)	
	11 with no incorrect working	A1 Aa		
	Additional Guidance			

Q	Answer	Mark	Comments
2(d)	$90 \times 4 = 360$ or $360 \div 90 = 4$ or $360 \div 4 = 90$ or $90 \times 60 \div 15 = 360$ or $5400 \div 15 = 360$	B1 Aa	
	Additional Guidance		
	Mark holistically with check		
2(d) check	Reverse method eg1 $360 \div 4 = 90$ eg2 $90 \times 4 = 360$ eg3 $90 \div 360 \times 60 = 15$ or Alternative method eg $360 \div 2 = 180$ and $180 \div 2 = 90$	B1ft Ab	Working back to 90 or 60 or 15 or 4
	Additional Guidance		
	Mark holistically with 2(d)		
$360 \times 15 = 5400$			B0

Q	Answer	Mark	Comments
2(e)	$360 \times \frac{3}{4}$ or 270	M1 Rc	
	75 × 2 ÷ their 270 or [0.55, 0.56] or 0.6(0) or [55, 56] or 60	M1 Aa	their 270 can be 360
	60p or £0.60	A1 Ia	Must have correct units and correct money notation
	Additional Guidance		
	2 nd M1 may be seen in stages eg $270 \div 2 = 135$ and $75 \div 135$		
	Answer 60p with no incorrect working		M2 A1
	Embedded answer even with correct units/notation		M2 A0

Q	Answer		Mark	Comments	
3(a)	46 ÷ 4 or 11.5	1.5 ÷ 4 or 0.375	M1 <i>Ra</i>	1.5 × 46 or 69	
	their 11.5 × 1.5 or 17(.25) or 17.3 or 18 or their 11.5 × 2 or 23	their 0.375 × 46 17(.25) or 17.3 or 18	M1 <i>Rc</i>	their 69 ÷ 4 or 17(.25) or 17.3 or 18 their 11.5 could be 11	
	their 17.25 – 7 or 10(.25) or 10.3 or 11 and (their 23 – 5) ÷ 8 or 2.25 or 3		M1 <i>Ra</i>	Condone their 23 ÷ 8 or 2.875	
	their 10.25 × 2.85 + their 3 × 1.65 or 29.21 + 4.95 or 29.22 + 4.95		M1 <i>Aa</i>	Must use a rounded up number of packs	
	(£)34.16 or (£)34.17 and Yes		A2 <i>lb lb</i>	A1 (£)34.16 or (£)34.17 A1ft Correct conclusion for their value Must score 1st, 2nd and 4th M1 for A1ft	
	Additional guidance				
	36.3(0) and No			M4 A1ft	

Q	Answer	Mark	Comments	
3(b)	Nobody doing more than one activity on at least 3 days	B1 <i>la</i>		
	Monday or Tuesday B F E A H B F A E H B F H A E E F B A H	B1 <i>la</i>		
	Wednesday B F H D I B F I D H D F B H I	B1 <i>la</i>	Condone A as cook or helper	
	Fully correct	B1 <i>la</i>		
	Additional Guidance			

3(c)	4	B1 <i>Aa</i>	
	Additional Guidance		

Q	Answer	Mark	Comments
3(d)	Alternative method 1		
	11 850 × 3.6(0) or 42 660	M1 Rc	
	11 850 × 4.1(0) or 48 585	M1 Aa	
	42 660 and 48 585	A1 Rc	
	110 500 – their 42 660 – 63 200 or (–)4640	M1 Ra	Loss in 2015 their 42 660 must be money (not 3.6(0))
	114 000 – their 48 585 – 65 000 or (–)415	M1 Aa	Loss in 2016 their 48 585 must be money (not 4.1(0))
	their 4640 + their 415	M1 Ra	Total loss in 2015 and 2016
	(£)5055	A1ft Aa	ft M1 M1 A0 M1 M1 M1
	Additional Guidance		

Q	Answer	Mark	Comments
3(d)	Alternative method 2		
	11 850 × 3.6(0) or 42 660	M1 <i>Rc</i>	
	11 850 × 4.1(0) or 48 585	M1 <i>Aa</i>	
	42 660 and 48 585	A1 <i>Rc</i>	
	110 500 – their 42 660 – 63 200 or (–)4640	M1 <i>Ra</i>	Loss in 2015 their 42 660 must be money (not 3.6(0))
	4640 – (their 48 585 – their 42 660) – (65 000 – 63 200) + (114 000 – 110 500) or (–)415	M1 <i>Aa</i>	Loss in 2016 their 48 585 must be money (not 4.1(0)) their 42 660 must be money (not 3.6(0))
	their 4640 + their 415	M1 <i>Ra</i>	Total loss in 2015 and 2016
	(£)5055	A1ft <i>Aa</i>	ft M1 M1 A0 M1 M1 M1
	Additional Guidance		

Q	Answer	Mark	Comments
3(d)	Alternative method 3		
	11 850 × 3.6(0) or 42 660	M1 Rc	
	11 850 × 4.1(0) or 48 585	M1 Aa	
	42 660 and 48 585	A1 Rc	
	their 42 660 + their 48 585 + 63 200 + 65 000 or 219 445	M1 Ra	Total income from lunches and grants their 42 660 must be money (not 3.6(0)) their 48 585 must be money (not 4.1(0))
	110 500 + 114 000 or 224 500	M1 Aa	Total costs
	their 224 500 – their 219 445	M1 Ra	Total costs – total income from lunches and grants
	(£)5055	A1ft Aa	ft M1 M1 A0 M1 M1 M1
	Additional Guidance		

Q	Answer	Mark	Comments
4 (a)	75 ÷ 50 or 1.5	M1 Rc	
	1.5 h or 1 h 30 (min) or 90 min	A1 Aa	Must see units
	Additional Guidance		
	1.30 h		M1 A0
	Contradictory times eg 1.5 h = 1 h 5 min		M1 A0

4(b)	$(4 \times 2) + (4.5 \times 6) + (5 \times 9) +$ $(5.5 \times 3) + (6 \times 1)$ or $8 + 27 + 45 + 16.5 + 6$ or 102.5	M1 Rb	Attempt at $\sum fx$ with at least 4 correct
	their $102.5 \div 21$	M1 Rc	total ÷ 21 96.7(...) or 96.8 M2 (bracket error)
	4.8(8...) or 4.9	A1 Aa	Allow 5 if 4.8(8...) or correct method seen
	Additional Guidance		
	Check table for working		
	$\sum fx$ but different method used		M0
	Ignore subsequent attempt to change units after 4.8(8...) seen		

Q	Answer	Mark	Comments	
4(c)	Alternative method 1			
	50 000 ÷ 10 × 7 or 35 000 or 50 000 × 2 ÷ 5 or 20 000 or 50 000 × 0.8(0) or 40 000	M1 Ra		
	50 000 ÷ 10 × 7 or 35 000 and 50 000 × 2 ÷ 5 or 20 000 and 50 000 × 0.8(0) or 40 000	M1 Rb		
	their 35 000 + their 20 000 + their 40 000	90 000 – their 35 000 – their 20 000 – their 40 000	M1 Rc	Three components added or 90 000 – three components None of the components can be 50 000
	95 000 and No	(–)5000 and No	A2 Ib Ib	A1 95 000 or (–)5000 A1ft Correct conclusion for their value Must score 1st and 3rd M1 for A1ft
	Additional Guidance			

Q	Answer	Mark	Comments
4(c)	Alternative method 2		
	$\frac{7}{10} + \frac{2}{5} + \frac{80}{100}$ or $0.7 + 0.4 + 0.8$	M1 Ra	
	$\frac{19}{10}$ or 1.9	M1 Rb	
	their $\frac{19}{10} \times 50\,000$ or their $1.9 \times 50\,000$	M1 Rc	
	95 000 and No or (-)5000 and No	A2 lb lb	A1 95 000 or (-)5000 A1ft Correct conclusion for their value Must score 1st and 3rd M1 for A1ft
	Additional Guidance		