FUNCTIONAL SKILLS CERTIFICATE

Functional Mathematics

4367 Level 1
Mark scheme

4367
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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	Comment
1(a)	£245	B1 *Rb*	circled or indicated

Q	Answer	Mark	Comment
1(b)	**Alternative Method 1**		
	7 × 52 or 364	M1 *Rb*	
	their 364 + their 245 + 199 or 808	M1 *Aa*	ft their (a) or correct their 364 can be 52, or 1 or 7 times any of the other campsite prices
	their 808 ÷ 4 or 200 × 4	M1 *Aa*	808 must be from at least a campsite and one ferry crossing totalled
	202 **and** No or 808 **and** 800 and No	A2ft *I*	ft their (a) or correct A1 202 or 808 **and** 800 or A1ft correct conclusion for their values if 1st and 3rd M1's scored SC3 124 **and** Yes (only one night considered) SC2 124

Q	Answer	Mark	Comment
	Alternative Method 2		
1(b)	52 ÷ 4 × 7 or 13 × 7 or 7 × 52 ÷ 4 or 91	M1 *Rb*	
	their 245 ÷ 4 or 61.25 or 199 ÷ 4 or 49.75 or 444 ÷ 4 or 111	M1 *Aa*	Divides ferry cost by 4 or total of two ferry crossings by 4 ft their 245 from (a)
	their 91 + their 61.25 + their 49.75 or their 91 + their 111	M1 *Aa*	their 91 can be 13 or 18.25 or 13.5(0) or 16.25 (Any campsite price divided by 4)
	202 **and** No	A2ft *I*	ft their (a) or correct A1 202 or A1ft correct conclusion for their values if 1st and 2nd M1's scored SC3 124 **and** Yes (only one night considered) SC2 124

	Additional Guidance
1(b)	ft their ferry cost in 1a or if the correct value is used in b assume they started again. Use of a different campsite gives the following values La Croix 511 + 245 + 199 = 955 955 ÷ 4 = 238.75 La Breche 378 + 245 + 199 = 822 822 ÷ 4 = 205.5(0) La Foret 455 + 245 + 199 = 899 899 ÷ 4 = 224.75 Any of these correct final answers scores M0M1M1A0A0 If they only use one ferry the answer of 152.25 or 140.75 **and** Yes scores 3 marks (scores 2 marks without Yes)

Q	Answer	Mark	Comment
1(c)	200 (miles)	B1 *Rb*	
	Additional Guidance		
	Ignore units If 1c is blank you can award B1 for 200 used in 1d		

Q	Answer	Mark	Comment
1(d)	their 200 × 12 or 2400 or their 200 × 0.12 or 24	M1 *Rc*	any value × 12 or × 0.12
	£24 or 2400p	A1ft *Aa*	must have correct units ft from their (c) or correct
	Additional Guidance		
	Their 200 can be any number and does not have to follow their (c) £2400p or £24p is M1A0 Common incorrect answer: 190 × 12 = 2280p or £22.80		

Q	Answer	Mark	Comment
1(d) Check	reverse or alt calculation with consistent units on their 24 and 12 digits eg 24 ÷ 200 = 0.12 B1 (£)24 ÷ 12p = 200 B1 24 ÷ 200 = 12 B0 24 ÷ 12 = 200 B0	B1 *Ab*	

Q	Answer	Mark	Comment
	Caen to la Croix Paris campsite shows distance of 240 (km) and at least 2 nights	B1 *Rb*	
	exactly 2 other campsites used	B1 *I*	Must be two from La Foret, La Breche and Les Eaux (NOT Caen) They can revisit a campsite
	At least 3 nights at each of their "2" other campsites	B1 *I*	Could be just one other. If all 3 campsites are used, allow a 3rd campsite to make the total up to 10 nights, rather than needing to be ≥3 nights
	All other distances less than 6 hours (less than 480 km) and correct	B1 *Rc*	
	Return to Caen included	B1 *Ra*	
1(e)	All their rows completed in the table **and** exactly 10 nights	B1 *I*	For return to Caen no value is needed for number of nights (but can be 0) Caen can be used as a campsite for this mark
	Additional Guidance		
	Mark the 2nd grid unless totally blank. The only place they can't go after La Croix is La Foret (552 km) They might for eg, spend 3 nights at La Breche then La Foret then return to La Croix for the final 2 nights If they use Caen as a campsite, penalise the 2nd B mark but all other marks are possible. Example for 3rd mark: Caen to La Croix Paris 2 La Croix Paris to La Breche 4 La Breche to Les Eaux 3 Les Eaux to La Foret 1 gains the 3rd M1		

Q	Answer	Mark	Comment
2(a)	200 × 1.25 or 250 or 100 × 3.8(0) or 380	M1 *Ra*	
	250 + 380 = 630 or 630 – 380 = 250 or 630 – 250 = 380	A1 *Aa*	Must see + or – being used correctly or 2 5 0 3 8 0 —————— 6 3 0

Q	Answer		Mark	Comment
2(b)	**Alternative Method 1**			
	$200 \times 1.8(0)$ **and** $65 \times 5.2(0)$ or 360 **and** 338 or 698		M1 *Ra*	Income at normal prices
	$5.2(0) \times 0.1$ or 0.52 or 52p	$1 - 0.1$ or 0.9	M1 *Rb*	use of 5.72 later implies this 52p
	$5.2(0) -$ their 0.52 or 4.68	their $0.9 \times 5.2(0)$ or 4.68	M1 *Aa*	their 0.52 cannot be 10 or 0.1(0) Reduced price of pans
	$(100 - 65) \times$ their 4.68 or $35 \times$ their 4.68 or 163.8(0)		M1 *Rc*	Income at reduced prices
	their 360 + their 338 + their 163.8(0) or 861.8(0) or their 698 + their 163.8(0)		M1 *Aa*	Total income Must add mugs, pans and discount pans and must be exactly 3 values added Not just 1.80 + 5.20 + their reduced price
	their 861.8(0) – 630	630 + 225 or 855	M1 *Aa*	Total income – 630 total income must include some pans and some mugs
	231.8(0) **and** Yes	855 and 861.8(0) **and** Yes	A2 *I* *I*	A1 231.8(0) or 855 **and** 861.8(0) A1ft Correct decision for their value(s) if 1st, 5th **and** 6th M1's scored if their answer is negative they must state 'No it is a loss' for ft oe

Q	Answer		Mark	Comment
2(b)	**Alternative Method 2**			
	1.8(0) – 1.25 or 0.55 or 55(p) **and** 5.2(0) – 3.8(0) or 1.4(0)		M1 *Ra*	profit on each mug and pan at normal prices
	their 0.55 × 200 or (£)110 **and** their 1.4(0) × 65 or (£)91		M1 *Aa*	profit on all mugs and pans at normal price
	5.2(0) × 0.1 or 0.52 or 52p	1 – 0.1 or 0.9	M1 *Rb*	use of 5.72 later implies this 52p
	5.2(0) – their 0.52 or 4.68	their 0.9 × 5.2(0) or 4.68	M1 *Aa*	their 0.52 cannot be 10 or 0.1(0) Reduced price of pans
	(100 – 65) × (their 4.68 – 3.8(0)) or 35 × their 0.88 or 30.8(0)		M1 *Rc*	Profit on reduced prices
	their 110 + their 91+ their 30.8(0)		M1	Totalling profit Must add mugs, pans and discount pans and must be exactly 3 values added Not just 0.55 + 1.40 + their reduced price
	231.8(0) **and** Yes		A2 *I* *I*	A1 231.8(0) A1ft Correct decision for their value(s) if 1st, 2nd **and** 6th M1's scored

Q	Answer	Mark	Comment

	Additional Guidance		
2(b)	Not subtracting the 10% (ie using the price of the reduced pans as 52p can score a maximum of 6 marks eg 360 and 338 seen 10% = 52p 35 × 52p = 18.2(0) 360 + 338 + 18.20 = 716.20 716.20 – 630 = 86.20 No scores M1M1M0M1M1M1A0A1ft If their total income is less than 630 they do not need to subtract from 630. If they state it is a loss award the final M1 and possibly the A1ft (if 1st, 5th and 6th M1's scored) 4.68 implies M2 (2nd and 3rd) For alt 1: 163.8(0) implies M3 (2nd, 3rd and 4th) 861.8(0) implies first 5 method marks For alt 2: 30.8(0) implies M3 (2nd , 3rd and 4th)		

2(c)	Tom included and only works before 12 noon	B1 *Ra*	
	Ali works for exactly 3 hours	B1 *RB*	
	Nobody does five or more consecutive hours	B1 *I*	
	All 4 people work and 2 different people are at work each hour	B1 *I*	ie no duplicate person on the same time slot
	Additional Guidance		
	If any blanks then only the first two marks are possible		

Q	Answer	Mark	Comment
	Alternative Method 1		
3(a)	1500 × 4 or 6000	M1 *Rc*	
	their 6000 ÷ 500	M1 *Aa*	
	12	A1 *Aa*	

Q	Answer	Mark	Comment
	Alternative Method 2		
3(a)	1500 ÷ 500 or 3	M1 *Rc*	Allow 500 + 500 + 500 = 1500 oe
	their 3 × 4	M1 *Aa*	
	12	A1 *Aa*	

Q	Answer	Mark	Comment
	Alternative Method 3		
3(a)	500 ÷ 4 or 125	M1 *Rc*	
	1500 ÷ their 125	M1 *Aa*	
	12	A1 *Aa*	

Q	
3(a)	**Additional Guidance**
	embedded answer eg 125 × 12 = 1500 is M1M1A0 unless 12 then given as separate answer

Q	Answer	Mark	Comment
3(b)	**Alternative Method 1**		
	1500 × 11 or 16 500 or 1500 × 0.11 or 165	M1 *Rc*	
	1500 – 1140 or 360	M1 *Aa*	
	their 360 × 50 or 18 000 or their 360 × 0.5(0) or 180	M1 *Aa*	their 360 can be 1140
	(£)180 **and** (£)165 **and** Yes or 18000(p) **and** 16500(p) **and** Yes or (180 – 165 =) (£)15 **and** Yes or (£)15 profit or 1500(p) profit	A2 *I*	A1 (£)180 **and** (£)165 or 18000 **and** 16500 or (£)15 or 1500(p) or A1ft correct conclusion for their values if 1st and 3rd M1's scored

Q	Answer	Mark	Comment
3(b)	**Alternative Method 2**		
	1500 × 11 or 16 500 or 1500 × 0.11 or 165	M1 *Rc*	
	1500 – 1140 or 360	M1 *Aa*	
	their 16 500 ÷ 50 or 330 or their 165 ÷ 0.5 or 330	M1 *Aa*	
	360 **and** 330 **and** Yes	A2 *I*	A1 360 **and** 330 or A1ft correct conclusion for their values if 2nd and 3rd M1's scored

Q	Answer	Mark	Comment
3(b)	**Alternative Method 3**		
	1500 × 11 or 16 500 or 1500 × 0.11 or 165	M1 *Rc*	
	1500 – 1140 or 360	M1 *Aa*	
	Their 16 500 ÷ their 360 or their 165 ÷ their 360	M1 *Aa*	
	45(.83…)(p) or (£)0.45(83…) **and** Yes	A2 *I*	A1 45(.83…)(p) or (£)0.45(83…) or A1ft correct conclusion for their values if 2nd and 3rd M1's scored

Q		
3(b)	**Additional Guidance**	
	incorrect units on final answer are penalised eg Alt 1 £18 000 and £ 16 500 and Yes is A0A1ft	

Q	Answer	Mark	Comment
3(c)	Correct grid	B2 *I*	B1 No more than10 squares shaded with 8 or 9 correct or B1 10 squares shaded with a horizontal line of symmetry or B1 11 squares shaded with 10 correct
	Additional Guidance		
	Ignore numbers written in squares		

Q	Answer	Mark	Comment
3(d)	(14 + 17 + 19 + 13 + 13 + 14 + 16 + 14) ÷ 8 or 120 ÷ 8	M1 *Ra*	Condone no brackets
	15	A1 *Aa*	
	Additional Guidance		

Q	Answer	Mark	Comment
3(e)	**Alternative Method 1**		
	750 ÷ their 15	M1 *Aa*	ft their 3d
	750 ÷ their 15 = 50 **and** Yes	A2ft *I,I*	ft their 3d A1 750 ÷ their 15 = 50 A1ft correct conclusion for their value

Q	Answer	Mark	Comment

Q	Answer		Mark	Comment
3(e)	**Alternative Method 2**			
	50 × their 15		M1 *Aa*	ft their 3d
	50 × their 15 = 750 **and** Yes		A2ft *I,I*	ft their 3d A1 50 × their 15 = 750 A1ft correct conclusion for their value

Q	Answer		Mark	Comment
3(e)	**Alternative Method 3**			
	750 ÷ 50		M1 *Aa*	
	750 ÷ 50 = 15 **and** Yes **and** 15 as answer in 3d or 750 ÷ 50 = 15 **and** No ft a different answer in 3d		A2ft *I,I*	A1 750 ÷ 50 = 15 A1ft correct conclusion for their value
	Alternative method 4			
	750 ÷ their 120 × 8 or 6.25 × 8	50 ÷ 8 × their 120 or 6.25 × their 120	M1 *Aa*	working on total words
	6.25 × 8 = 50 **and** Yes	6.25 × their 120 = 750 **and** Yes	A2ft *I,I*	A1 6.25 × 8 = 50 or 6.25 × their 120 = 750 A1ft correct conclusion for their value

Q	Answer
3(e)	**Additional Guidance**
	The mode or median gives 14 in 3d. This gives 53.(…) in 3e for which they should conclude NO. If they use Alt 3 following 14 in (d) then 750 ÷ 50 = 15 and No gains M1A2

Q	Answer	Mark	Comment
4(a)	$7800 \div 650$	M1 *Rc*	
	12	A1 *Aa*	

Q	Answer	Mark	Comment
4(a) **Check**	Reverse or alt calculation eg their 12 × 650 = 7800 or 7800 ÷ their 12 = 650	B1ft *Ab*	

4(a)	**Additional Guidance**
	embedded value needs clear answer stated.
	650 × 12 = 7800 M1A0
	Holistic marking
	Award marks for 4(a) if working seen in space for check
	Award marks for check if seen in space for 4(a)

Q	Answer	Mark	Comment
4(b)	Draws **one** solar panel on roof to correct scale (3 by 2)	B1 *Ra*	mark intention
	Draws at least 4 panels of the same size	B1 *Ra*	Any size except 1 by 1 Must all be rectangles. Condone gaps between panels If their panels are too big to fit 4 then B0
	Draws at least 12 panels of the same size	B1 *I*	Any size except 1 by 1 Must all be rectangles. Condone gaps between panels If their panels are too big to fit 12 then B0
	Shows 16 panels on roof all correctly drawn to scale	B1 *I*	3 cm by 2 cm mark intention condone extra panels of the correct size
	Additional Guidance		
	Mark 2nd grid unless totally blank Do not count spaces left as incorrect panels unless numbered Using wrong size solar panels can gain a max of B0B1B1B0		

Q	Answer	Mark	Comment
4(c)	12 ÷ 2 or 6	M1 *Rc*	Step 1
	their 6 + 3 or 9	M1 *Aa*	Step 2
	their 9 × 4 × 11 or their 36 × 11 or their 9 × 44	M1 *Aa*	Step 3 and Step 4
	396 **and** No/his estimate is lower or 54 (lower) **and** No/his estimate is lower	A2 *I*	A1 396 or 54 A1ft Correct conclusion from their value if 2 method marks scored

Q	Answer	Mark	Comment
	Additional Guidance		

Q	Answer	Mark	Comment
4(d)	**Alternative Method 1**		
	6502 – 3463 or 3039	M1 *Ra*	
	(P =) 18 × their 3039 (÷ 100) or 0.18 × their 3039 or 54 702 or 547.02	M1 *Aa*	their 3039 can be 9965
	(£)550 or 55000p	A1 *I*	

Q	Answer	Mark	Comment
4(d)	**Alternative Method 2**		
	18 × 3463 or 62 334 or 0.18 × 3463 or 623.34 or 18 × 6502 or 117 036 or 0.18 × 6502 or 1170.36	M1 *Ra*	
	their 117 036 – their 62 334 or 54 702 or their 1170.36 – their 623.34 or 547.02	M1 *Aa*	
	(£)550 or 55000p	A1 *I*	

Q	Additional Guidance
4(d)	If working in pence must see units in answer