Functional Skills Certificate

FUNCTIONAL MATHEMATICS

4367

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	Comments
1(a)	**Alternative Method 1**		
	7 × 6 or 42 (squares in the room) or attempt to count squares in the room	M1 *Ra*	Must be from trying to work out the number of squares in the room-can be implied by a number written by the grid
	their 42 ÷ 3 (= 14) or 3 × 14 (= 42) or their 42 ÷ 14 (= 3)	M1 *Rc*	
	their 42 ÷ 5 or 8.4 or 5 × 8 or 40 or their 42 ÷ 8 or 5.25	M1 *Aa*	
	42 ÷ 3 = 14 **and** 42 ÷ 5 = 8(.4) **and** Yes or 42 ÷ 14 = 3 **and** 5.25 **and** Yes or 42 juniors **and** 40 **and** 42 squares in the room **and** Yes (clear distinction between the 42's)	A2 *I* *I*	A1 42 ÷ 3 = 14 **and** 42 ÷ 5 = 8(.4) or 42 ÷ 14 = 3 **and** 5.25 or 42 juniors **and** 40 **and** 42 squares in the room (clear distinction between the 42's) or A1 ft correct decision for their value Must score 1st M1 and the 2nd or 3rd M1

Q	Answer	Mark	Comments
1(a)	**Alternative Method 2**		
	One row or column marked off in 3s or 5s	M1 *Ra*	
	Whole diagram marked off in 3s or 5s	M1 *Rc*	Allow one error or omission
	Evidence of using sets of 3s **and** sets of 5s	M1 *Aa*	For whole diagram-allow one block of 5 **or** one block of 3 not indicated/indicated incorrectly
	14 sets of 3 **and** 8 sets of 5 **and** Yes	A2 *I*	A1 14 sets of 3 **and** 8 sets of 5 or A1ft correct conclusion for their value(s) Must score first 2 M's

Q	Answer	Mark	Comments

	Additional guidance	
1(a)	Check diagram and mark the best attempt or combination (diagram or working lines) Most of the values for A2 are given in the question/data sheet so only gain A marks if fully correct method is seen. 42 can come from 7 × 6 or from 3 × 14 so both methods must be seen for full marks. **Example** 3 × 14 = 42, 5 × 8 = 40 Yes M0M1M1A0A0 (no evidence of counting squares in room) **Example** The room is 42 squares. 3 × 14 = 42 so juniors fit Seniors also fit with 2 squares left over M1M1M1A1A1 2(m^2) left over for seniors implies 40 or 8 sets of 5 and can imply 42 squares in the room. If only use juniors **or** seniors then maximum 3 marks available. M2 and A1 for correct conclusion for their value. If both juniors and seniors are calculated then the decision must refer to both groups and be correct for both groups **Example** marks off in 3s and counts 14 sets of 3 and yes M1M1M0A0A1ft	

Q	Answer	Mark	Comments
1(b)	**Alternative method 1**		
	48 × 4 or 192 or 37 × 6 or 222	M1 *Rc*	
	their 192 + their 222 or 414	M1 *Rc*	their 192 and their 222 cannot come from multiplication by 260 414 seen implies M2
	their 414 – 260 or their 414 – 150	M1 *Aa*	
	154 **and** Yes or 264 **and** Yes	A2 *I*	A1 154 or 264 or A1ft correct conclusion for their value Must score 2nd and 3rd M's SC4 176 **and** Yes or 286 **and** Yes SC3 176 or 286 (working with 4 and 6 switched)

Q	Answer	Mark	Comments
1(b)	**Alternative method 2**		
	48 × 4 or 192 or 37 × 6 or 222	M1 *Rc*	
	their 192 + their 222 or 414	M1 *Rc*	414 seen implies M2
	260 + 150 or 410	M1 *Aa*	
	414 **and** 410 **and** Yes or (£)4 **and** Yes	A2 *I*	A1 414 **and** 410 or (£)4 or A1ft correct conclusion for their value(s) Must score 2nd and 3rd M's SC4 436 **and** 410 **and** Yes or 26 **and** Yes SC3 436 **and** 410 or 26 (working with 4 and 6 switched)

	Additional Guidance
1(b)	(£)4 seen may imply 414 and 410
	If 4 and 6 are switched with numerical errors, apply the scheme to score max M0M1M1A0A1ft

Q	Answer	Mark	Comments
1(c)	20 × 9 or 180	M1 *Ra*	
	their 180 ÷ 5 or 36	M1 *Ra*	
	their 36 + 32	M1 *Aa*	
	68	A1 *Aa*	Ignore units

1(c)	**Additional guidance**	
	Note no conclusion needed	

2(a)	D3 D4 D5 or D8 D9 D10 Allow D 3,4,5 or D3-5 etc	B2 *Rb* *I*	Allow seats unambiguously selected on diagram if no answer in working lines Allow 3D for D3 etc Do not penalise both D3,4,5 and D8,9 10 given B1 F1 F2 F3 or E8 E9 E10 or any 3 unoccupied seats in row B

2(a)	**Additional Guidance**	
	If answer on diagram and in working lines, mark the working lines	

Q	Answer	Mark	Comments
2(b)	**Alternative method 1**		
	320 ÷ 4 or 80	M1 *Rb*	
	29.75 × 10 or 297.5(0)	M1 *Ra*	377.5 implies M2
	their 80 + their 297.5(0) – 50 or their 377.5(0) – 50 or their 80 + their 297.5(0) – 320 or their 377.5(0) – 320	M1 *Aa*	their 80 cannot be 320 their 297.5(0) must come from an attempt at 10 lots of 29.75
	327.5(0) **and** Yes or 57.5(0) **and** Yes	A2 *I* *I*	A1 327.5(0) or 57.5(0) or A1ft correct decision for their values Must score 2nd and 3rd M's
	Alternative method 2		
	320 ÷ 4 or 80	M1 *Rb*	
	29.75 × 10 or 297.5(0)	M1 *Ra*	377.5 implies M2
	their 80 + their 297.5(0) **and** 320 + 50	M1 *Aa*	their 80 cannot be 320 their 297.5(0) must come from an attempt at 10 lots of 29.75
	377.5(0) **and** 370 **and** Yes	A2 *I* *I*	A1 377.5(0) **and** 370 or A1ft correct decision for their values Must score 2nd and 3rd M's

2(b)	Additional Guidance	
	Allow any equivalent method for finding 25%	

Q	Answer	Mark	Comments
2 (c)	1405	B1 *Rb*	
2(d)	5.7(0) + 1.5(0) or 7.2	M1 *Rb*	
	7.20	A1 *Aa*	SC1 for 7.50 or for 12.(00)

	Additional Guidance	
2(d)	If the student tries more than one possible cost (eg single + bus), they can gain M1 for the correct method of 5.7(0) + 1.5(0) but must choose this combination with correct answer of 7.20 for the A1 to be awarded	

Q	Answer	Mark	Comments
2(e)	**Alternative method 1**		
	10 + 20 or 30	M1 *Aa*	
	their 30 ÷ 18	M1 *Rc*	their 30 can be 20 or 10
	[1.66, 1.7]	A1 *Aa*	
	(£)1.70 or 170p	B1ft *I*	ft their value rounded up to nearest 10p There must be a value that can be rounded
	Alternative method 2		
	10 + 20 or 30	M1 *Aa*	
	Tries 18 × any value between £1 and £2 inclusive eg 18 × 1.5(0) (= (£)27)	M1 *Rc*	
	Tries a value which gives an answer closer to their £30	M1 *Aa*	
	1.70 or 170p	A1 *I*	

2(e)	**Additional Guidance**
	For alt 1 dividing 18 by 30 gives 0.6 which is 60p and therefore does not need rounding. This gains M1M0A0B0 For alt 2 (T&I) there may be many attempts at numbers × 18 Any one attempt gains the 2nd M1 with an improved attempt gaining the 3rd M1. If 1.70 is their first attempt then M2 is gained

Q	Answer	Mark	Comments
2(f)	No, with valid reason	B1 *I*	eg No the winning ticket is 35 minutes No 33 rounds up

2(f)	**Additional Guidance**
	'Yes' is B0

3(a)	**Alternative method 1**		
	40 ÷ 4 or 10	M1 *Ra*	
	their 10 – 3 or 7	M1 *Rc*	their 10 must be from attempt to scale up to 40 for the recipe
	their 7 × 2.85	M1 *Aa*	their 7 can be 10
	19.95 **and** Yes	A2 *I*	A1 19.95 or A1ft Correct decision for their value Must score 1st and 3rd M's
	Alternative method 2		
	40 ÷ 4 or 10	M1 *Ra*	
	their 10 – 3 or 7	M1 *Rc*	
	20 ÷ 2.85	M1 *Aa*	
	7.0(1…) **and** 7 **and** Yes	A2 *I*	A1 7.0(1..) **and** 7 or A1ft Correct conclusion from their values Must score 1st and 3rd M's

Q	Answer	Mark	Comments

	Additional Guidance	
3(a)	For their 7 accept 2 to 10 inclusive	
	Accept other ways of getting to 7 eg 3kg = 12 people. Need enough for another 28 and 28 ÷ 4 = 7	
	No and 28.50 will probably score M1M0M1A0A1ft	

3(b)	All people used	B1 *I*	
	One person per cell with nobody doing more than one activity per day	B1 *I*	
	Nobody allocated on a day or activity they are unavailable	B1 *I*	SC1 Saturday correct CH and DE or EH and DC if no other marks are awarded If there are any blanks then only SC1 is available

	Additional Guidance	
3(b)	The only drivers are A,C,E,H Harry cannot be a helper D,L and S can only be helpers The only people working on Saturday are C,D,E,H There are 7 different people	
	Mark the bottom grid unless totally blank. If there are blanks in the bottom grid check Saturday for the SC. This is the only mark available.	

Q	Answer	Mark	Comments
3(c)	290	B1 *Rb*	Ignore other readings
	their 290 × 3	M1 *Aa*	their 290 can be 100 to 400 inclusive
	870	A1ft *Aa*	ft their single value from the graph if between 100 and 400 inclusive SC2 1650 (total for first 2 weeks)
Check	Reverse or alt method their 870 ÷ 3 = their 290 or their 870 ÷ their 290 = 3	B1ft *Ab*	

3(c)	**Additional Guidance**	

Q	Answer	Mark	Comments
3(d)	**Alternative method 1**		
	8 seen or used	B1 *Rb*	
	3 × their 8 or 24 or 2 × their 8 or 16	M1 *Rc*	their 8 cannot be 1 In working or seen in total column 24 or 16 implies B1
	40 + their 24 + 5 + their 16 +10	M1 *Aa*	Must be 5 totalT values
	95.(00) **and** No	A2ft *I* *I*	ft their 8 A1 95.(00) or A1ft correct decision for their 95.(00) Must score M2
	Alternative method 2		
	3 + 2 or (£)5 (per 15 mins)	B1 *Rb*	
	5 × 4 or (£)20 per hour or 5 × 4 × 2 or 40 in 2 hours	M1 *Rc*	
	their 40 + 40 + 10 + 5	M1 *Aa*	
	95.(00) **and** No	A2 *I, I*	A1 95.(00) or A1ft correct decision for their 95.(00) Must score M2

Q	Answer	Mark	Comments

	Additional Guidance
3(d)	Need M2 to score A1 ft
	All working except the decision may be on the sponsor form
	For the 1st M1 if their 8 is not 8 then both £3 and £2 must be multiplied by the same value. This cannot be 1 Example inserts £3 and £2 in the two missing totals and adds up the 5 values B0M0M1A0A0 Eg £36 and £24 implies their 8 is 12→ B0M1 If one value is correct that implies the 8 Eg 34 and 16 → B1M1
	Assume a total in the final box is an attempt to add all 5 values if 5 completed

Q	Answer	Mark	Comments
4(a)	**Alternative method 1**		
	8am + 1 hour + 45 mins	M1 *Rb*	or M2 8am + 1 hour + 45 mins + ½ hour
	9.45 (+ ½ hour)	M1 *Aa*	½ hour can be 30 mins
	9.45 **and** 10 **and** Yes or 9.45 **and** 45 mins is more than ½ hour **and** Yes or 10.15 **and** Yes	A2 *I*	A1 9.45 **and** 10 or 9.45 **and** 45 mins is more than ½ hour or 10.15 or A1ft correct decision for their value(s) Must score M2
	Alternative method 2		
	10.30 – ½ hour - 45 mins – 1 hour	M2 *Rb* *Aa*	M1 for 10.30 – any 2 of the 3 times ½ hour can be 30 mins
	8.15 **and** Yes	A2 *I*	A1 8.15 or A1ft correct decision for their value Must score M2 SC2 8.45 **and** Yes SC1 8.45
	Alternative method 3		
	1 hour + 45 mins + ½ hour or 2h 15	M11 *Rb*	½ hour can be 30 mins
	10.30 – 8(am) or 2h 30	M1 *Aa*	
	2h 15 **and** 2 h 30 **and** Yes	A2 *I*	A1 2h 15 **and** 2h 30 or A1ft correct decision for their values Must score M2

Q	Answer	Mark	Comments

	Additional Guidance
4(a)	½ hour may be 30 minutes or their attempt at changing to minutes Example 8am + 1hr + 45mins + 50 mins could imply M2 (see alt 1)

Q	Answer	Mark	Comments
4(b)	**Alternative method 1**		
	23 + 23.4 + 24.5 + 26.1 or 23 + 23 + 24 + 26 **and** 0.4 + 0.5 + 0.1 or 97 mins	M1 *Rc*	
	their 97 ÷ 4	M1 *Aa*	
	24.2(5) **and** Yes or 24.3 **and** Yes	A2 *I*	A1 24.2(5) Allow 24 if 97 seen or A1ft correct decision for their value Must score M2
	Alternative method 2		
	23 + 23.4 + 24.5 + 26.1 or 23 + 23 + 24 + 26 **and** 0.4 + 0.5 + 0.1 or 97 mins	M1 *Rc*	
	25 mins × 4	M1 *Aa*	
	100 mins **and** 97 mins **and** Yes	A2 *I*	A1 100 mins and 97 mins or A1ft correct decision for their value(s) Must score M2

4(b)	Additional Guidance	

Q	Answer	Mark	Comments
4(c)	21 × 60 or 1260	M1 *Ra*	
	their 1260 ÷ 150	M1 *Aa*	
	8.4	A1 *Aa*	Ignore fw if 8.4 seen SC1 digits 84 seen

4(c)	**Additional Guidance**	

4(d)	49.5(0) + 12.3(0) + 8.99	M1 *Rc*	
	£70.79	A1 *Aa*	Must see £ sign
Check	Reverse or alt calc, or rounding eg 70.79 – 8.99 – 12.3 = 49.5 eg 50 + 12 + 9 = 71	B1ft *Ab*	

4(d)	**Additional Guidance**
	Mark holistically so that 70.79 in body of script and £70.79 in check can be awarded the £ sign mark