



---

# Functional Skills Certificate

# **MATHEMATICS**

Level 1

Mark scheme

---

4367

January 2016

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](http://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)	Diet Cola	B1 Aa	Allow Diet Coke
1(b)	D3	B1 Aa	Allow 3D
1(c)	£1 20p 10p 10p 5p or 50p 50p 20p 20p 5p	B2 Rb Aa	B1 > or < 5 coins totalling £1.45 e.g. £1 20p 20p 5p £1 10p 10p 10p 10p 10p 5p or 1 20 10 10 5 or 50 50 20 20 5
Check	adds their coins to show the total is £1.45 or subtracts their coins from £1.45 to obtain zero	B1ft Ab	
	<b>Additional Guidance</b>		
	Must identify all money symbols for B2		
	<b>Misreads of £1.45</b> Allow for £1.40 and £1.95 as follows		
	£1.40 → £1, 10p, 10p, 10p, 10p or 50p, 50p, 20p, 10p, 10p or £1, 20p, 10p. 5p, 5p Check → adds coins to show total is £1.40		B1 B1ft
	£1.95 → £1, 50p, 20p, 20p, 5p Check → adds coins to show total is £1.95		B1 B1ft
	<b>Check</b> Must see clear calculation (can be done in parts) and '= their £1.45'		
	<b>Holistic marking</b> 50p + 50p + 20p + 20p + 5p = £1.45 scores B2B1ft if seen either in main area of script or in check area.		

Q	Answer		Mark	Comment
1(d)	Raspberry muesli bar 50p, 20p, 10p, 10p, 5p	Cola £1, 20p, 10p, 10p or 50p, 50p, 20p, 10p, 10p	M1 Aa	Exact coins for one item
	£1, 50p	50p, 50p, 5p or £1, 5p	M1 /	Remaining coins after initial selection Must clearly be remaining coins <b>not</b> total of remaining coins
	£1, 50p and No	50p, 50p, 5p and No or £1, 5p and No	A1 /	
	<b>Additional Guidance</b>			
If there is no valid working on script allow clearly crossed-off coins on diagram. E.g. 50p, 20p, 10p, 10p and 5p clearly crossed off leaving £1 and 50p → M2				

Q	Answer	Mark	Comment
<b>1(e)</b>	<b>Alternative method 1</b>		
	21 + 13 + 11 + 13 + 18 + 18 + 32 or 126 or 19 + 14 + 10 + 13 + 19 + 17 + 27 or 119	M1 Ra	or 2 – 1 + 1 + 0 – 1 + 1 + 5 or 9 – 2 or 7
	Strawberry → 126 and Raspberry → 119	A1 Aa	or Strawberry sells 7 more than Raspberry
	Correct decision based on their 126 and their 119 or their 7	A1ft /	For <b>A1ft</b> must score M1 SC1 Strawberry sells more on 4 days or Raspberry sells more on 2 days only
	<b>Alternative method 2</b>		
	Strawberry [21 + 13 + 11 + 13 + 18 + 18 + 32] (÷ 7) or 126 (÷ 7) or Raspberry [19 + 14 + 10 + 13 + 19 + 17 + 27] (÷ 7) or 119 (÷ 7)	M1 Ra	or 11 13 13 18 18 21 32  or 10 13 14 17 17 21 27
	Strawberry → 18 and Raspberry → 17	A1 Aa	
	Correct decision based on their 18 and their 17	A1ft /	For <b>A1ft</b> must score M1 SC1 Strawberry sells more on 4 days or Raspberry sells more on 2 days only
	<b>Additional Guidance</b>		
	In <b>alt 2</b> if 126 and/or 119 is seen ignore inaccurate division (by 7) and mark as <b>alt 1</b>		
	<b>SC1</b> Allow accurate number of days or accurate list of days		

Q	Answer	Mark	Comment
1(f)	<b>Alternative method 1</b>		
	870 ÷ 2 or (£)435	M1 Ra	or $\frac{1}{2} \times 870$ or $0.5 \times 870$
	870 – their 435 – 80	M1 Rc	Allow their 435 – 80
	(£)355 and Yes	A2 /	A1 (£)355 or A1ft correct decision for their (£)355 For <b>A1ft</b> must score 2 <sup>nd</sup> M1 and see an attempt at half of 870 SC2 (£)395 and Yes SC1 (£)395
	<b>Alternative method 2</b>		
	870 ÷ 2 or (£)435	M1 Ra	or $\frac{1}{2} \times 870$ or $0.5 \times 870$
	their 435 + 80 + 350	M1 Rc	
	(£)865 and Yes	A2 /	A1 (£)865 or A1ft correct decision for their (£)865 For <b>A1ft</b> must score 2 <sup>nd</sup> M1 and see an attempt at half of 870
	<b>Additional Guidance</b>		



Q	Answer	Mark	Comment
<b>2(a)</b>	50 × 3 or 150 or 2h 30min	M1 <i>Ra</i>	
	their 150 + 30 + 15 or 195 or 3h 15min	M1 <i>Rc</i>	allow omission of either 30 or 15 their 150 can be 50
	1.00 + their 195 or 4.00 – their 195 or 4.00 – 1.00 or 3h	M1 <i>Rb</i>	adding or subtracting their 195 can be done in stages
	4.15 and No or 12.45 and No or 3 h 15 min and 3 h and No	A2 / /	A1 4.15 or 12.45 or 3h 15min and 3h or A1ft correct conclusion for their value(s) For <b>A1ft</b> must score 2 <sup>nd</sup> and 3 <sup>rd</sup> M1
	<b>Additional Guidance</b>		
	Incorrect (or no) conversion of minutes to hours and minutes can score up to M3 only Incorrect conversion includes use of decimal times e.g. 1.5 implies 150 min → M1 Examples		
	1.5 + 0.3 + 0.15 = 1.95 or 1.5 + 0.3 = 1.8		M2A0
	1.5 + 0.3 + 0.15 = 1.95 → 1 + 1.95 = 2.95 = 3h 35min → No		M3A0
	1.00 + 50 + 30 + 15 = 2.35 and No		M0M1M1A1ft
	<b>3<sup>rd</sup> M1</b> their 195 can be 150, 180, 165, or 95, or 80 or 65 or incorrect answer to 150 + 30 + 15		
<b>3<sup>rd</sup> M1</b> can be implied			
Answers and decision can be implied. E.g. 'It takes 3h 15min so needs to start 15min earlier' → M3A2			
Decision can only be Yes if their starting time is 1.00 or their finishing time is 4.00			

Q	Answer	Mark	Comment
2(b)	(eggs →) $4 \times 2$ or 8 or (sugar →) $100 \times 2$ or 200 or (cream →) $300 \times 2$ or 600 or (milk →) $300 \times 2$ or 600	M1 Rc	
	(sugar →) their $200 - 125$ or 75 or (cream) their $600 - 450$ or 150	M1 Rb	Allow $-75$ and $-150$
	sugar → 75 g and cream → 150 ml	A2 / /	Need names and correct units A1 two correct values and either names or correct units with up to one extra or one correct value with name and correct unit with up to one extra
	<b>Additional Guidance</b>		
	Examples		
	Sugar 75 and Cream 150 (and eggs 2)	M2A1	
	75 g and 150 ml	M2A1	
Sugar 75 g (and eggs 2)	M2A1		

Q	Answer			Mark	Comment
2(c)	$20 \times 15$	$340 \div 15$	$340 \div 20$	M1 Rc	
	300 and Yes	22(.6 ...) and Yes	17 and Yes	A1 /	
Check	$300 \div 15 = 20$ or $300 \div 20 = 15$	15 $\times$ their $22(.6 \dots) = 340$ or 340 $\div$ their $22(.6 \dots) = 15$	20 $\times$ their $17 = 340$ or 340 $\div$ their $17 = 20$	B1ft Ab	
	or alternative method				
<b>Additional Guidance</b>					
<b>Check</b> Original method must be shown to score mark for alternative method					

2(d)	$20 + 15 + 20 + 15 (+ 2)$ or 72 or 70	M1 Ra	
	72 (cm)	A1 Aa	SC1 68 (cm)
	<b>Additional Guidance</b>		
	70 seen (or method for 70 embedded) scores M1		

Q	Answer	Mark	Comment
3(a)	25 × 45 or 0.25 × 45 or 1125(p)	M1 Rb	Allow digits 1125
	£11.25	A1 Aa	Must see £ symbol Ignore further work
	<b>Additional Guidance</b>		
	<b>Misread</b> Any cost in table on Data Sheet × 45 → M1A0 However if 15 is used it must clearly be 15p 15p × 45 = £6.75, £34.20, £1 × 45 = £45 and £58.50 all score M1A0		
	Condone answer of £11.25p for M1A1		

Q	Answer	Mark	Comment
<b>3(b)</b>	<b>Alternative method 1</b>		
	$45 \times 120 \times 8$ or 43200(p) or $45 \times 120 \times 0.08$ or (£)432	M2 Ra Aa	M1 Any two values multiplied, e.g. $45 \times 120$ or 5400 (pages) $120 \times 0.08$ or (£)9.60 (printing cost per book) or $45 \times 120 \times 0.8$ or 4320
	$65 \times 45$ or 2925(p) or $0.65 \times 45$ or (£)29.25	M1 Rc	
	their 432 + their 29.25 + their 11.25	M1 Aa	ft their 11.25 from <b>3 (a)</b>
(£)472(.50) and Yes	A2ft /	ft from <b>3 (a)</b> A1ft (£)472(.50) or A1ft correct conclusion for their (£)472(.50) For <b>A1ft</b> must score at least M1M1M1 SC5 (£)310(.50) and Yes SC4 (£)310(.50)	

Q	Answer	Mark	Comment	
<b>3(b)</b>	<b>Alternative method 2</b>			
	120 × 8 or 960 (p) or 120 × 0.08 or (£)9.60	M1 Ra		
	their 11.25 ÷ 45 or 0.25 or 25 and 65 or 0.65 seen	M1 Rc	ft their 11.25 from <b>3 (a)</b>	
	their 9.60 + their 0.65 + their 0.25 or (£)10.50	M1 Aa		
	475 ÷ 45 or (£)10(.55 ...)	their 10.50 × 45	M1 Aa	
	(£)10.55 ... and (£)10.50 and Yes	(£)472(.50) and Yes	A2ft /	ft from <b>3 (a)</b> A1ft (£)10.55 and (£)10 or 472(.50) or A1ft correct conclusion from their value(s) For <b>A1ft</b> must score at least M1M1M1 SC5 (£)310(.50) and Yes SC4 (£)310(.50)
	<b>Additional Guidance</b>			
	Accept values in £ or p for all M marks For all A marks values must be in consistent units			
	Additional working in <b>3 (a)</b> can be used to support values in <b>3 (b)</b>			
	<b>Incorrect printing costs (5p per sheet)</b> With fully correct working → SC5 or SC4 With incorrect working can score M1M1M1A1ft (Alt 1) or M0M1M1M1A1ft (Alt 2)			
	<b>Examples</b>			
	4320 → 65 × 45 = 2925 → 4320 + 2925 + 11.25 = 7256.25 → No (£ + p + £)		M1M1M1A0	
4320 → 0.65 × 45 = 29.25 → 4320 + 29.25 + 11.25 = 4360.5 → No (£ + £ + £)		M1M1M1A1ft		
9.60 + 29.25 + 11.25 = 50(.10) and Yes		M1M1M1A1ft		

Q	Answer		Mark	Comment		
<b>3(c)</b>	<b>Alternative method 1</b>					
	180 ÷ 60 or 3	180 × 4 or 720	M1 <i>Ra</i>	500 × 4 or 2000	Any method using 60, 180, 500 and 4 that would give 6000 if worked out accurately	
	their 3 × 500 × 4	their 720 ÷ 60 × 500	M1 <i>Rc</i>	their 2000 × 180 ÷ 60		
	6000 and No			A2 <i>I</i>	A1 6000 or A1ft correct conclusion for their value For <b>A1ft</b> must score M2	
	<b>Alternative method 2</b>					
	6500 ÷ 500 or 13			M1 <i>Ra</i>		
	180 ÷ 60 × 4 or 12			M1 <i>Rc</i>		
	12 and 13 and No			A2 <i>I</i>	A1 12 and 13 or A1ft correct conclusion for their values For <b>A1ft</b> must score M2	
	<b>Alternative method 3</b>					
	6500 ÷ 4 or 1625			M1 <i>Ra</i>		
	180 ÷ 60 × 500 or 1500			M1 <i>Rc</i>		
	1625 and 1500 and No			A2 <i>I</i>	A1 1625 and 1500 or A1ft correct conclusion for their values For <b>A1ft</b> must score M2	

Q	Answer	Mark	Comment	
3(c)	<b>Alternative method 4</b>			
	180 × 4 or 720	M1 <i>Ra</i>		
	6500 ÷ 500 × 60 or 780	M1 <i>Rc</i>		
	720 and 780 and No	A2 <i>l</i>	A1 720 and 780 or A1ft correct conclusion for their values For <b>A1ft</b> must score M2	
	<b>Alternative method 5</b>			
	6500 ÷ 500 × 60 or 780	180 ÷ 60 × 500 or 1500	M1 <i>Ra</i>	
	their 780 ÷ 180	6500 ÷ their 1500	M1 <i>Rc</i>	
	4.3(3...) and No	A2 <i>l</i>	A1 4.3(3...) or A1ft correct conclusion for their value For <b>A1ft</b> must score M2	
3(c)	<b>Additional Guidance</b>			
	Use the <b>Alt</b> that gives most marks			
	.			



Q	Answer	Mark	Comment
<b>3(d)</b>	<b>Alternative method 1</b>		
	$2300 \times 0.48$ or 1104 or $2300 \times 48$ or 110 400	M1 Aa	allow $2300 \times 0.3$ or 690 or $2300 \times 30$ or 69 000
	their $1104 \times 10 \div 100$ or 110.4 or their $110\,400 \times 10 \div 100$ or 11 040	M1 Rc	
	their 1104 – their 110.4 or their 110 400 – their 11 040	M1 Rc	M2 their $1104 \times 0.9$ or their $110\,400 \times 0.9$
	(£)993(.60) and Yes	A2 /	A1 (£)993(.60) or A1ft correct conclusion for their value For <b>A1ft</b> must score 1 <sup>st</sup> and 3 <sup>rd</sup> M1 SC4 (£)938(.40) and Yes or (£)1048(.80) and No SC3 (£)938(.40) or (£)1048(.80)

Q	Answer	Mark	Comment
3(d)	<b>Alternative method 2</b>		
	48 × 10 ÷ 100 or 4.8	M1 Aa	Allow 30 × 10 ÷ 100 or 3
	48 – their 4.8 or 43.2	M1 Rc	M2 48 × 0.9
	2300 × their 0.432	M1 Rc	
	(£)993(.60) and Yes	A2 /	A1 (£)993(.60) or A1ft correct conclusion for their value For <b>A1ft</b> must score 1 <sup>st</sup> and 3 <sup>rd</sup> M1 SC4 (£)938(.40) and Yes or (£)1048(.80) and No SC3 (£)938(.40) or (£)1048(.80)

3(d)	<b>Additional Guidance</b>		
	Allow equivalents for finding 10% of 1104 or 48. For example, 1104 ÷ 10 or 48 ÷ 10 or 1104 × 0.1 or 48 × 0.1		
	Use of the wrong % (5% or 15%) that does not score SC4 or SC3 can score up to M1M0M1A1ft		
	<b>Alternative method</b> 10% of 2300 = 230 → 2300 – 230 = 2070 → 2070 × 0.48 = £993(.60) and Yes		
	Example		
	2300 × 0.48 = £1104 → 1104 – 10 = 1094 and No	M1only	

Q	Answer	Mark	Comment
4(a)	-3 °C and 0 °C	B2 Aa Aa	B1 -3 °C only or 0 °C only or -3 °C and one incorrect value or 0 °C and one incorrect value or -3 °C and 0 °C and one incorrect value
	<b>Additional Guidance</b>		

Q	Answer	Mark	Comment
<b>4(b)</b>	<b>Alternative method 1</b>		
	(3 +) 7 + 7 + 9 + 5 + 25 (+3) or 59 (miles), 56 (miles) or 53 (miles) or 2 (hours)	M1 Aa	Allow one error or omission
	30 × 2 or 60	M1 Ra	60 implies M1M1 their 59 – 30 or their 29
	59 and 60 and Yes or In 1 <sup>st</sup> hour travel 30 miles so 2 <sup>nd</sup> hour is enough time to travel remaining 29 miles	A2 /	A1 59 and 60 or 1 <sup>st</sup> hour → 30 (miles) and 2 <sup>nd</sup> hour → 29 (miles) or A1ft correct conclusion for their values For <b>A1ft</b> must score 2 <sup>nd</sup> M1

Q	Answer	Mark	Comment
---	--------	------	---------

<b>4(b)</b>	<b>Alternative method 2</b>		
	(3 +) 7 + 7 + 9 + 5 + 25 (+3) or 59 (miles), 56 (miles) or 53 (miles) or 2 (hours)	M1 Aa	Allow one error
	their 59 ÷ 30 or their 59 ÷ 2	M1 Ra	or their 1 hour 58 min or 4.30 + their 1 hour 58 min
[1.96, 1.97] and 2 and Yes or 29.5 and Yes or 6.28 (am) and Yes	A2 /	A1 [1.96, 1.97] and 2 or 29.5 or 6.28 or A1ft correct conclusion for their values For <b>A1ft</b> must score 2 <sup>nd</sup> M1	

<b>4(b)</b>	<b>Additional Guidance</b>	
	Examples	
	(7 + 7 + 9 + 5 + 25 + 3 =) 56 → 60 → Yes	M1M1A1ft
	54 → 60 → Yes	M1M1A1ft
	(3 + 7 + 7 + 9 + 5 + 25 + 3 =) 54 → 60 → Yes	M1M1A1ft

Q	Answer	Mark	Comment																				
4(c)	Andy on duty on Sunday, Tuesday and Thursday only	B1 Aa																					
	Each driver on duty for three nights	B1 Aa																					
	No driver on duty for 3 nights in a row	B1 Aa																					
4(c)	<b>Additional Guidance</b>																						
	Mark answer grid unless completely blank																						
	<p>An example of a correct answer is</p> <table border="1"> <thead> <tr> <th>Sunday</th> <th>Monday</th> <th>Tuesday</th> <th>Wednesday</th> <th>Thursday</th> </tr> </thead> <tbody> <tr> <td>Andy</td> <td>Deva</td> <td>Andy</td> <td>Baz</td> <td>Andy</td> </tr> <tr> <td>Baz</td> <td>Baz</td> <td>Deva</td> <td>Chun</td> <td>Deva</td> </tr> <tr> <td>Chun</td> <td>Ed</td> <td>Chun</td> <td>Ed</td> <td>Ed</td> </tr> </tbody> </table>			Sunday	Monday	Tuesday	Wednesday	Thursday	Andy	Deva	Andy	Baz	Andy	Baz	Baz	Deva	Chun	Deva	Chun	Ed	Chun	Ed	Ed
	Sunday	Monday	Tuesday	Wednesday	Thursday																		
Andy	Deva	Andy	Baz	Andy																			
Baz	Baz	Deva	Chun	Deva																			
Chun	Ed	Chun	Ed	Ed																			
<p>Any person repeated on same night → B1B0B0 max                      Blank cells → B1B0B0 max</p>																							

Q	Answer	Mark	Comment
4(d)	<b>Alternative method 1</b>		
	53	B1 Aa	
	their $53 \times 2$ or 106	M1 Ra	or their $53 \times 116$ or 6 148
	their $106 \times 116$	M1 Rc	or their $6\ 148 \times 2$ or $12\ 000 - \text{their } 6148$ or $12\ 000 \div \text{their } 6148$
	12 296 and No or 5852 and No or $1.9(5 \dots)$ and No	A2ft /	ft their $53 = 56$ and their $53 = 59$ A1ft 12 296 or 5852 or $1.9(5 \dots)$ or A1ft correct conclusion for their value For <b>A1ft</b> must score at least B0M1M0 or B0M0M1
	<b>Alternative method 2</b>		
	53	B1 Aa	
	their $53 \times 2$ or 106	M1 Ra	or $12\ 000 \div \text{their } 53$ or $226.(...)$
	$12\ 000 \div \text{their } 106$	M1 Rc	or their $226.(...) \div 2$
	113.(...) and No	A2ft /	ft their $53 = 56$ and their $53 = 59$ A1ft 113.(...) or A1ft correct conclusion for their 113.(...) For <b>A1ft</b> must score at least B0M1M0 or B0M0M1

Q	Answer	Mark	Comment
<b>4(d)</b>	<b>Alternative method 3</b>		
	53	B1 Aa	
	their $53 \times 2$ or 106	M1 Ra	
	12 000 $\div$ 116	M1 Rc	
	103.(...) and their 106 and No	A2ft /	ft their 53 = 56 and their 53 = 59 A1ft 103.(...) and their 106 or A1ft correct conclusion for their values For <b>A1ft</b> must score at least B0M1M0 or B0M0M1
	<b>Additional Guidance</b>		
	Examples		
	56 $\rightarrow$ 112 $\rightarrow$ 12 992 $\rightarrow$ No	B0M1M1A2ft	
	59 $\rightarrow$ 118 $\rightarrow$ 13 688 $\rightarrow$ No	B0M1M1A2ft	
54 $\rightarrow$ 108 $\rightarrow$ 12 528 $\rightarrow$ No	B0M1M1A1ft		