



Functional Skills Certificate

MATHEMATICS

Level 2

Mark scheme

4368

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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)	Alternative method 1		
	5 or 6 or 7	M1 Rb	Must be an attempt at number of days at or below 0°C
	their $6 \div 31$ ($\times 100$) or 0.19(3...) or 0.194	M1 Aa	Condone use of 30 for 31
	19(.3...)(%) or 19.4(%) and No or 0.19(3...) or 0.194 and 0.2 and No	A2 lb lb	A1 19(.3...)(%) or 19.4(%) or 0.19(3...) or 0.194 and 0.2 A1ft Correct conclusion for their comparable value(s)
	Alternative method 2		
	5 or 6 or 7	M1 Rb	Must be an attempt at number of days at or below 0°C
	0.2×31 or 6.2	M1 Aa	Condone use of 30 for 31
	6.2 and 6 and No	A2 lb lb	A1 6.2 and 6 A1ft Correct conclusion for their values
	Additional Guidance		
	Must score 2nd M1 for A1ft		
	5 $5 \div 31$ 16(.1...)(%) and No	M1 M1 A1ft	
	7 $7 \div 31$ 22(.5...)(%) or 22.6(%) or 23(%) and Yes	M1 M1 A1ft	
Alt 2 If the only sight of 6 is from rounding 6.2 do not award the first M1			

Q	Answer	Mark	Comment
1(b)	Alternative method 1		
	4.3 + 11.4 + 11.7 + 14.3 + 8.4 + 40.6 + 4.3 or 95	M1 Rb	Allow one error or omission 90.7 implies M1
	their 95 ÷ 50 or 1.9 (h) or 1 h 54 (min) or 114 (min)	M1 Rc	Condone 1.54 (h)
	4.35 + their 1 h 54 (min) or 6.30 – 4.35 or 1 h 55 (min) or 115 (min)	M1 Aa	Condone 1.55 (h) May be seen as 1 h and 55 min
	6.29 (am) and Yes or 1 h 54 min and 1 h 55 min and Yes	A2 lb lb	A1 6.29 (am) or 1 h 54 min and 1 h 55 min A1ft Correct conclusion for their value(s)
	Alternative method 2		
	4.3 + 11.4 + 11.7 + 14.3 + 8.4 + 40.6 + 4.3 or 95	M1 Rb	Allow one error or omission 90.7 implies M1
	6.30 – 4.35 or 1 h 55 (min) or 115 (min)	M1 Aa	Condone 1.55 (h) May be seen as 1 h and 55 min
	their 1 h 55 (min) ÷ 60 × 50 or 95.8(3...)	M1 Rc	
	95 and 95.8(3...) and Yes	A2 lb lb	A1 95 and 95.8(3...) A1ft Correct conclusion for their values
	Additional Guidance		
	Must score 2nd and 3rd M1 for A1ft		
	Omitting 4.3 twice is two errors		
	Do not award any A marks if conceptual time error seen		
4.35 – 6.30 is M0 unless 1 h 55 (min) oe also seen			

Q	Answer	Mark	Comment	
1(c)	Alternative method 1			
	28 ÷ 2 × 3 (= 42)	28 ÷ 2 × 5 = 70 and 70 – 28 (= 42)	B2 Rc Aa	B1 28 ÷ 2 (= 14) or $\frac{1}{5} \rightarrow 14$ or 70 or $\frac{3}{5}$
	Alternative method 2			
	$\frac{1}{5} \rightarrow 14$ and $\frac{3}{5} \rightarrow 42$	B2 Rc Aa	B1 28 ÷ 2 (= 14) or $\frac{1}{5} \rightarrow 14$ or 70 or $\frac{3}{5}$	
	Alternative method 3			
	$\frac{1}{5} \rightarrow 14$ and 14 + 28 (= 42)	B2 Rc Aa	B1 28 ÷ 2 (= 14) or $\frac{1}{5} \rightarrow 14$ or 70 or $\frac{3}{5}$	
	Alternative method 4			
	28 + 42 = 70 or 28 ÷ 2 × 5 = 70 and 70 ÷ 5 × 3 (= 42)	B2 Rc Aa	B1 28 ÷ 2 (= 14) or $\frac{1}{5} \rightarrow 14$ or 70 or $\frac{3}{5}$	
	Additional Guidance			
14 with no working or link with $\frac{1}{5}$		B0		

Q	Answer	Mark	Comment
1(d)	$81\,000 \times 42 + 4000 \times 42$ or $85\,000 \times 42$ or 3 570 000	M2 <i>Ra Rb</i>	M1 $81\,000 \times 42$ or 3 402 000 or 4000×42 or 168 000
	(£)3.57 million and Yes or (£)3 570 000 and (£)3 500 000 and Yes or (£)70 000 (more) and Yes	A2 <i>lb lb</i>	A1 (£)3.57 million or (£)3 570 000 and (£)3 500 000 or (£)70 000 A1ft Correct conclusion for their value(s) with no incorrect conversions SC1 3.5 million → 3 500 000
	Additional Guidance		
	Must score M2 for A1ft		
	(£)3 570 000 and Yes		M2 A1ft

Q	Answer	Mark	Comment	
2(a)	Alternative method 1			
	52 ÷ 10 × 28 500	50 ÷ 10 × 28 500	M1 Rc	Condone 48 ÷ 10 × 28 500 or 136 800
	(£)148 200	(£)142 500	A1 Aa	
	Alternative method 2			
	28 500 ÷ (7 × 10) × 365 or 28 500 ÷ (7 × 10) × 366		M1 Rc	
	(£)148 607.(...) or (£)149 014.(...)		A1 Aa	
	Additional Guidance			
Mark holistically with 2(a) check				

2(a) Check	Alternative method eg $28\,500 \times 5 + 28\,500 \div 5 = 148\,200$ or reverse calculation eg1 $148\,200 \div 28\,500 \times 10 = 52$ eg2 $142\,500 \div (50 \div 10) = 28\,500$ or uses estimation eg $5 \times 30\,000 = 150\,000$	B1ft Ab	Must work back to 28 500 or their 52 or 10
	Additional Guidance		
	Mark holistically with 2(a)		

Q	Answer	Mark	Comment
2(b)	Alternative method 1		
	22 460 × 36 or 808 560	M1 <i>Rb</i>	Total salary
	their 808 560 + 760 000 or 1 568 560	M1 <i>Aa</i>	Total costs their 808 560 can be 22 460
	2 370 000 – their 1 568 560 or 801 440	M1 <i>Rc</i>	(Profit =) Income – total costs
	2 370 000 ÷ 3 or 2 370 000 × 0.33.. or 790 000	M1 <i>Aa</i>	$\frac{1}{3}$ of income
	(£)801 440 and (£)790 000 and Yes	A2 <i>lb lb</i>	A1 (£)801 440 and (£)790 000 or A1ft Correct conclusion for their values
	Alternative method 2		
	22 460 × 36 or 808 560	M1 <i>Rb</i>	Total salary
	their 808 560 + 760 000 or 1 568 560	M1 <i>Aa</i>	Total costs their 808 560 can be 22 460
	2 370 000 – their 1 568 560 or 801 440	M1 <i>Rc</i>	(Profit =) Income – total costs
	their 801 440 × 3 or 2 404 320	M1 <i>Aa</i>	3 × profit
	(£)2 404 320 and Yes	A2 <i>lb lb</i>	A1 (£)2 404 320 A1ft Correct decision for their value
	Additional Guidance		
	Must score 3rd and 4th M1 for A1ft		

Q	Answer	Mark	Comment		
2(b)	Alternative method 3				
	22 460 × 36 or 808 560	M1 <i>Rb</i>	Total salary		
	their 808 560 + 760 000 or 1 568 560	M1 <i>Aa</i>	Total costs their 808 560 can be 22 460		
	2 370 000 – their 1 568 560 or 801 440	their 1 568 560 ÷ 2 370 000 (× 100) or [0.66, 0.662] or [66, 66.2](%)	M1 <i>Rc</i>	(Profit =) Income – total costs	total costs ÷ income (× 100)
	their 801 440 ÷ 2 370 000 (× 100)	1 – their [0.66, 0.662] or 100(%) – their [66, 66.2](%)	M1 <i>Aa</i>	profit ÷ income (× 100)	
	[0.338, 0.34] and 0.33... and Yes or [33.8, 34](%) and 33.(...)(%) and Yes	A2 <i>lb lb</i>	A1 [0.338, 0.34] and 0.33... or [33.8, 34](%) and 33.(...)(%) A1ft Correct conclusion for their values with no incorrect conversion of $\frac{1}{3}$		
	Additional Guidance				
	Must score 3rd and 4th M1 for A1ft				
34(%) and Yes			M4 A1ft		

Q	Answer	Mark	Comment
2(b)	Alternative method 4		
	22 460 × 36 or 808 560	M1 <i>Rb</i>	Total salary
	their 808 560 + 760 000 or 1 568 560	M1 <i>Aa</i>	Total costs their 808 560 can be 22 460
	2 370 000 ÷ 3 or 2 370 000 × 0.33.. or 790 000	M1 <i>Aa</i>	$\frac{1}{3}$ of income
	2 × their 790 000 or 1 580 000	M1 <i>Rc</i>	$\frac{2}{3}$ of income
	(£)1 568 560 and (£)1 580 000 and Yes	A2 <i>lb lb</i>	A1 (£)1 568 560 and (£)1 580 000 A1ft Correct decision for their values
	Additional Guidance		
	Must score 2nd , 3rd and 4th M1 for A1ft		

Q	Answer	Mark	Comment
2(c)	28	B1 Aa	
	Additional Guidance		
2(d)	Alternative method 1		
	27 × 9 or 243 or 28 × 7 or 196 or 29 × 5 or 145 or 30 × 4 or 120 or 704	M1 Rb	
	their total ÷ 25	M1 Aa	588.8 implies M2
	28.1(6) or 28.2 and strawberry	A2ft lb lb	ft their (c) for conclusion for A2 and A1ft A1 28.1(6) or 28.2 A1ft correct conclusion for their value
	Additional Guidance		
	Must score M1 M1 for A1ft		
	Must have 28.1(6) or 28.2 and correct ft conclusion for A2ft		
	Do not allow first M1 if there is a choice of methods eg 27 × 9 and/or 28 × 7 and/or 29 × 5 and/or 30 × 4 with 27 + 28 + 29 + 30		M0

Q	Answer	Mark	Comment
2(d)	Alternative method 2		
	27 × 9 or 243 or 28 × 7 or 196 or 29 × 5 or 145 or 30 × 4 or 120 or 704	M1 Rb	
	their total or 704 and their 28 × 25 or 560 × 5 ÷ 4 or 700	M1 Aa	their 28 from (c)
	704 and their 700 and strawberry	A2ft lb lb	ft their (c) for conclusion for A2 and A1ft A1ft 704 and their 700 A1ft correct conclusion for their value
	Additional Guidance		
	Must score M1 M1 for A1ft		
	Do not allow first M1 if there is a choice of methods eg 27 × 9 and/or 28 × 7 and/or 29 × 5 and/or 30 × 4 with 27 + 28 + 29 + 30		M0
Do not apply A2ft if using 560 × 5 ÷ 4 in 2nd M1			

Q	Answer	Mark	Comment
2(d)	Alternative method 3		
	27 × 9 or 243 or 28 × 7 or 196 or 29 × 5 or 145 or 30 × 4 or 120 or 704	M1 <i>Rb</i>	
	their total × 4 ÷ 5 or 563(.2)	M1 <i>Aa</i>	
	563(.2) and strawberry	A2 <i>lb lb</i>	A1 563(.2) A1ft correct conclusion for their value
	Additional Guidance		
	Must score M1 M1 for A1ft		
	Do not allow first M1 if there is a choice of methods eg 27 × 9 and/or 28 × 7 and/or 29 × 5 and/or 30 × 4 with 27 + 28 + 29 + 30		M0
	There is no A2ft as 28 from (c) is not used		

Q	Answer	Mark	Comment
2(d)	Alternative method 4		
	27 × 9 or 243 or 28 × 7 or 196 or 29 × 5 or 145 or 30 × 4 or 120 or 704	M1 <i>Rb</i>	
	their total × 4 or 2816 and 560 × 5 or 2800	M1 <i>Aa</i>	
	2816 and 2800 and strawberry	A2 <i>lb lb</i>	A1 563(.2) A1ft correct conclusion for their value
	Additional Guidance		
	Must score M1 M1 for A1ft		
	Do not allow first M1 if there is a choice of methods eg 27 × 9 and/or 28 × 7 and/or 29 × 5 and/or 30 × 4 with 27 + 28 + 29 + 30		M0
There is no A2ft as 28 from (c) is not used			

Q	Answer	Mark	Comment		
3(a)	Alternative method 1				
	40 × 4.5 + 30 or 210 (min) or 3 h 30 (min)		M1 Rc	Condone 3.30 (h)	
	their 210 (min) + 20 (min) or 230 (min) or 3 h 50 (min)	9.40 + their 210 (min) or 1.10	M1 Ra	9.40 + 20 (min) or 10.00 Condone 0.20 (h)	
	9.40 + their 230 (min)	their 1.10 + 20 (min)	M1 Aa	their 10.00 + their 210 (min)	
	1.30 (pm) and Yes		A2 lb lb	A1 1.30 (pm) A1ft Correct conclusion for their value	
	Alternative method 2				
	40 × 4.5 + 30 or 210 (min) or 3 h 30 (min)		M1 Rc	Condone 3.30 (h)	
	9.40 + their 210 (min) or 1.10		M1 Ra		
	1.30 – their 1.10	1.30 – 20 (min)	M1 Aa		
	20 (min) and Yes	1.10 (pm) and 1.10 (pm) and Yes	A2 lb lb	A1 20 (min) A1ft Correct conclusion for their value	A1 1.10 (pm) and 1.10 (pm) A1ft Correct conclusion for their values
	Additional Guidance				
	Must score M1 M1 M1 for A1ft				
	Do not award any A marks if conceptual time error seen				
	Alt 1 Must see correct working leading to 1.30				
	Alt 2 Must see correct working leading to 20 (min) or must see correct working leading to 1.10 in two ways				
1.10 or 10.00 or 3 h 50 (min) oe can only score 2 marks if method seen					

Q	Answer	Mark	Comment	
3(a)	Alternative method 3			
	40 × 4.5 + 30 or 210 (min) or 3 h 30 (min)		M1 Rc	Condone 3.30 (h)
	their 210 (min) + 20 (min) or 230 (min) or 3 h 50 (min)	1.30 – their 210 (min) or 10.00	M1 Ra	1.30 – 20 (min) or 1.10 Condone 0.20 (h)
	1.30 – their 230 (min)	their 10.00 – 20 (min)	M1 Aa	their 1.10 – their 210 (min)
	9.40 (am) and Yes		A2 lb lb	A1 9.40 (am) A1ft Correct conclusion for their value
	Alternative method 4			
	40 × 4.5 + 30 or 210 (min) or 3 h 30 (min)		M1 Rc	Condone 3.30 (h)
	their 210 (min) + 20 (min) or 230 (min) or 3 h 50 (min)		M1 Ra	Condone 0.20 (h)
	1.30 – 9.40 or 3 h 50 (min) or 230 (min)		M1 Aa	
	3 h 50 (min) and 3 h 50(min) and Yes or 230 (min) and 230 (min) and Yes		A2 lb lb	A1 3 h 50 (min) and 3 h 50 (min) or 230 (min) and 230 (min) A1ft Correct conclusion for their values
	Additional Guidance			
	Must score M1 M1 M1 for A1ft			
	Do not award any A marks if conceptual time error seen			
	Alt 3 Must see correct working leading to 9.40			
	Alt 4 Must see correct working leading to 3 h 50 min oe in two ways			
1.10 or 10.00 or 3 h 50 (min) oe can only score 2 marks if method seen				

Q	Answer	Mark	Comment
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3(b)	42 ÷ 7.6 or [5.5, 5.53] or 5 or 25 ÷ 7.6 or [3.2, 3.3] or 3	M1 Ra	7.6 × 5 (= 38) or 7.6 × 3 (= 22.8)
	their 5 and their 3	M1 la	Must round two values down to nearest integer
	their 5 × their 3	M1 Aa	their 5 and their 3 must both be integers
	15 and No	A2 lb lb	A1 15 A1ft Correct decision for their 15
	Additional Guidance		
Must score 1st and 3rd M1 for A1ft			

3(c)	(eggs) $4 \times \frac{9}{6}$ or 6 or (sugar) $100 \times \frac{9}{6}$ or 150 or (cream) $300 \times \frac{9}{6}$ or 450 or (milk) $300 \times \frac{9}{6}$ or 450	M1 Rc	
	(sugar) their 150 – 25 or 125 or (cream) their 450 – 275 or 175	M1 Aa	Any necessary subtraction for their amounts from first M1
	sugar 125 g and cream 175 ml and no other ingredients	A2 la la	A1 sugar 125 g or cream 175 ml or sugar 125 and cream 175
	Additional Guidance		

Q	Answer	Mark	Comment
4(a)	136 × 0.16 or 21.76 or 21.8 or 2 × 0.23 or 0.46	M1 Ra	
	22.22 (So Binder C)	A1 Aa	Allow 22 with correct method seen
	Additional Guidance		

4(b)	38 ÷ 50 × 90 or 68.4(0) or £68.40p	M1 Ra	
	£68.40	A1 Aa	Must see £ symbol
	Additional Guidance		
	Mark holistically with 4(b) check		

4(b) Check	Alternative method eg 38 × 1.8 = 68.4 or reverse calculation eg 68.40 ÷ 90 × 50 = 38 or uses estimation eg 40 ÷ 50 × 90 = 72	B1ft Ab	Must work back to 38 or 50 or 90
	Additional Guidance		
	Mark holistically with 4(b)		
	Reverse is for their calculation		

Q	Answer		Mark	Comment
4(c)	Alternative method 1			
	136 × 90 or 12 240		M1 <i>Rb</i>	Total inside pages
	their 12 240 × (0.08 + 0.01) or 1101.6(0)		M1 <i>Ra</i>	Cost of inside pages Condone 136 × 90 × 0.08 or 979.2(0) or 138 × 90 × 0.08 or 993.6(0) or 138 × 90 × (0.08 + 0.01) or 1117.8(0) or 68 × 90 × 0.08 or 489.6(0) or 68 × 90 × (0.08 + 0.01) or 550.8(0)
	2 × 90 × (0.3(0) + 0.05) or 63		M1 <i>Rb</i>	Cost of cover
	their inside pages cost + their cover cost + their binders cost or 1164.6(0) or 1170 or 131.4(0) or 1233		M1 <i>Aa</i>	Must be the sum of at least two of the three costs ft their binders cost from (b)
	their 0.15 × their 1233 or 184.95	1 – their 0.15 or 0.85	M1 <i>Rc</i>	% of total charge ft % from their 12 240
	their 1233 – their 184.95	their 0.85 × their 1233	M1 <i>Aa</i>	Allow pages – % of pages
	(£)1048(.05) and No		A2ft <i>lb lb</i>	ft their binders cost from (b) for A2ft and A1ft A1ft (£)1048(.05) A1ft Correct conclusion for their value
	Additional Guidance			
	Must score 1st, 2nd, 4th and 6th M1 or M0 M1 M1 M1 M1 M1 for A1ft			
Accept working in £ or p for all M marks				

Q	Answer	Mark	Comment	
4(c)	Alternative method 2			
	136 × 90 or 12 240	M1 <i>Rb</i>	Total inside pages	
	136 × (0.08 + 0.01) or 12.24	M1 <i>Ra</i>	Cost of inside pages Condone 136 × 0.08 or 10.88 or 138 × 0.08 or 11.04 or 138 × (0.08 + 0.01) or 12.42 or 68 × 0.08 or 5.44 or 68 × (0.08 + 0.01) or 6.12	
	2 × (0.3(0) + 0.05) or 0.7(0)	M1 <i>Rb</i>	Cost of cover	
	(their inside pages cost + their cover cost) × 90 + their binders cost or 1164.6(0) or 1170 or 131.4(0) or 1233	M1 <i>Aa</i>	Must be (sum of at least two of the three costs) × 90 ft their binders cost from (b)	
	their 0.15 × their 1233 or 184.95	1 – their 0.15 or 0.85	M1 <i>Rc</i>	% of total charge ft % from their 12 240
	their 1233 – their 184.95	their 0.85 × their 1233	M1 <i>Aa</i>	Allow pages – % of pages
	(£)1048(.05) and No		A2ft <i>lb lb</i>	ft their binders cost from (b) for A2ft and A1ft A1ft (£)1048.05 A1ft Correct conclusion for their value
	Additional Guidance			
	Must score 1st, 2nd, 4th and 6th M1 or M0 M1 M1 M1 M1 M1 for A1ft			
Accept working in £ or p for all M marks				

Q	Answer	Mark	Comment
4(d)	10 ÷ 1.15 or [8.6, 8.7]	M1 <i>Ra</i>	8 (booklets per box) implies M1 M1 with no incorrect method seen
	Rounds their [8.6, 8.7] down to nearest integer or 8	M1 <i>la</i>	
	90 ÷ their 8 or 11.25 or their 8 × 11 (= 88)	M1 <i>Aa</i>	their 8 must be an integer 1.15 × 90 ÷ (1.15 × their 8) or 103.5 ÷ 9.2
	12	A1 <i>la</i>	Must round up to nearest integer
	Additional Guidance		
	[8.6, 8.7] → 9 9 × 10 (= 90) Answer 10	M1 M0 M1 A0	