Functional Skills Certificate
FUNCTIONAL MATHEMATICS
4368

Level 2

Mark scheme

March 2019

Version: 1.0 Final

193A4368/MS

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 $\frac{1}{2}$

Question	Answer	Mark	Comments
1 (a)	7.5 × 5.7 + 2.7 × 4.5 or 42.75 + 12.15 or (5.7 + 4.5) × 2.7 + (7.5 – 2.7) × 5.7 or 10.2 × 2.7 + 4.8 × 5.7 or 27.54 + 27.36 or (5.7 + 4.5) × 7.5 – (7.5 – 2.7) × 4.5 or 10.2 × 7.5 – 4.8 × 4.5 or 76.5 – 21.6 or 54.9	M2 *Ra* *Rb*	M1 7.5 × 5.7 or 42.75 or 2.7 × 4.5 or 12.15 or (5.7 + 4.5) × 2.7 or 27.54 or 10.2 × 2.7 or 27.54 or (7.5 – 2.7) × 5.7 or 27.36 or 4.8 × 5.7 or 27.36 or (5.7 + 4.5) × 7.5 or 76.5 or 10.2 × 7.5 or 76.5 or (7.5 – 2.7) × 4.5 or 21.6 or 4.8 × 4.5 or 21.6
	their 54.9 × 300 ÷ 1000 or 16.47	M1 *Aa*	or A × 300 ÷ 1000 = 9 or 9 × 1000 ÷ 300 or 30
	their 16.47 ÷ 9 = 1.83 or 16.47 and 9 × 2 = 18 or their 16.47 and 9 + their 7.47 or their 16.47 ÷ 2 = their 8.2(35) or their 54.9 and their 30 × 2 or their 60	A1ft *Ia*	ft through their 16.47 if M1M1 scored with no arithmetic errors allow 1.8 with working allow 16.5 and 9 × 2 = 18 with working allow 16.5 and 9 + 7.5 with working allow 8.25 with working

	Additional Guidance
1 (a)	**First M2 or M1** Ignore any other work - award for 54.9 or any working that could lead to 54.9 if seen **Third M1** This mark is for substitution into the formula so their 54.9 can take any value including, for example, a value arising from an attempt at perimeter

Question	Answer	Mark	Comments
1 (b)	924 × 20 ÷ 100 or 184.8	M1 *Ra*	or 1 – 0.2 or 0.8
	924 – their 184.8	M1 *Aa*	or 924 × 0.8 or 924 × 80 ÷ 100 their 184.8 cannot be 20 or 0.2
	(£)739.2(0)	A1 *Aa*	does not have to be in correct money notation, e.g. allow £739.2p or 739.2
	Additional Guidance		
	allow equivalent methods for calculating 20% 184.8 scores M1M0A0 to award M0 M1 an incorrect or invalid method for calculating 20% **must be shown**		

Question	Answer	Mark	Comments
1 (c)	**Alternative method 1**		
	5.7 + 4.8 + 4.5 + 2.7 + 10.2 + 7.5 or 35.4	M1 *Ra*	allow one error or omission
	their 35.4 ÷ 0.15	M1 *Rc*	their 35.4 can be (the sum of) any of the outer edge lengths
	236	A1 *Aa*	
	232	A1ft *Aa*	ft their 236 with M2 scored SC3 230 or 231

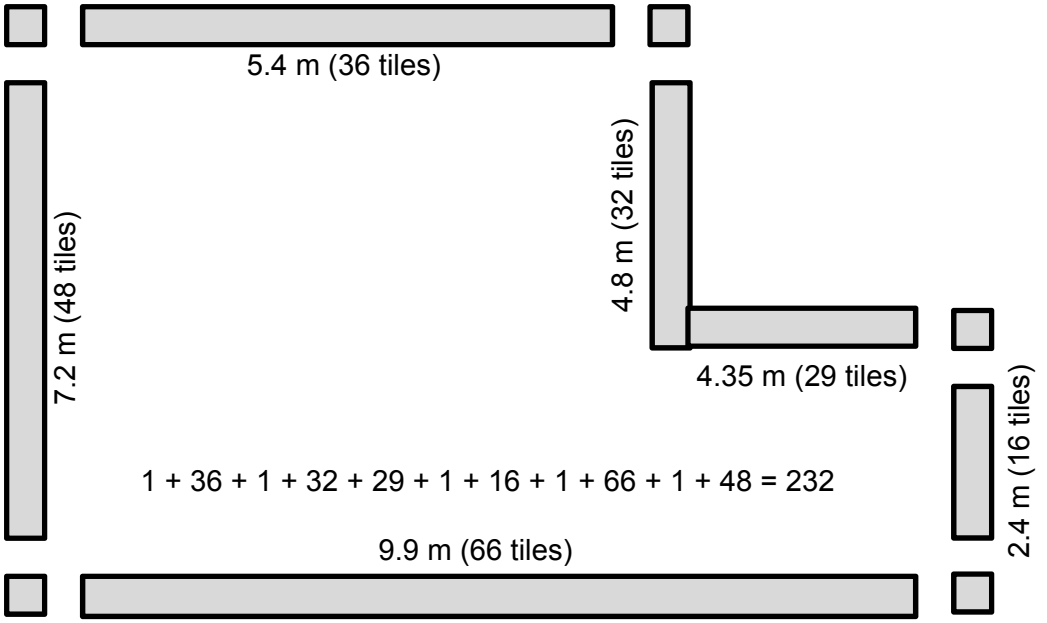
Question	Answer	Mark	Comments
1 (c) cont.	**Alternative method 2**		
	5.7 ÷ 0.15 or 38 or 4.8 ÷ 0.15 or 32 or 4.5 ÷ 0.15 or 30 or 2.7 ÷ 0.15 or 18 or 10.2 ÷ 0.15 or 68 or 7.5 ÷ 0.15 or 50	M1 *Ra*	
	their 38 + their 32 + their 30 + their 18 + their 68 + their 50	M1 *Rc*	allow one error or omission their 38 can be 9.5 (from, e.g. 5.7 ÷ 0.6) etc
	236	A1 *Aa*	
	232	A1ft *Aa*	ft their 236 with M2 scored SC3 230 or 231

Question	Answer	Mark	Comments
1 (c) cont.	**Alternative method 3**		
	5.7 – 0.15 or 5.55 or 2.7 – 0.15 or 2.55 or (5.7 + 4.5) – 0.15 or 10.05 or 7.5 – 0.15 or 7.35	M1 *Ra*	
	their 5.55 + (7.5 – 2.7) + 4.5 + their 2.55 + their 10.05 + their 7.35	M1 *Rc*	allow one error or omission
	34.8	A1 *Aa*	
	232	A1ft *Aa*	ft their 34.8 with M2 scored SC3 230 or 231

Question	Answer	Mark	Comments
1 (c) cont.	**Alternative method 4**		
	5.7 – 0.3 or 5.4 or (7.5 – 2.7) + 0.15 or 4.95 or 2.7 – 0.15 or 2.55 or 10.2 – 0.3 or 9.9	M1 *Ra*	
	their 5.4 + their 4.95 + 4.5 + their 2.55 + their 9.9 + 7.5	M1 *Rc*	allow one error or omission
	34.8	A1 *Aa*	
	232	A1ft *Aa*	ft their 34.8 with M2 scored SC3 230 or 231

Question	Answer	Mark	Comments
1 (c) cont.	**Alternative method 5**		
	7.5 – 2.7 – 0.3 or 4.65 or 2.7 – 0.3 or 2.4 or 5.7 + 4.5 or 10.2 or 7.5 – 0.15 or 7.35	M1 *Ra*	
	5.7 + their 4.65 + 4.5 + their 2.4 + their 10.2 + their 7.35	M1 *Rc*	allow one error or omission
	34.8	A1 *Aa*	
	232	A1ft *Aa*	ft their 34.8 with M2 scored SC3 230 or 231

Question	Answer	Mark	Comments
1 (c) cont	**Alternative method 6**		
	7.2 + 5.4 + 4.8 + 4.5 + 2.4 + 9.9 or 34.2	M1 *Ra*	allow one error or omission
	their 34.2 ÷ 0.15	M1 *Rc*	their 35.4 can be (the sum of) any of the inner edge lengths
	228	A1 *Aa*	
	232	A1ft *Aa*	ft their 228 with M2 scored SC3 230 or 231

	Additional Guidance
1 (c)	Incorrect attempts at perimeter or adjustment for corners can score M2A0A1ft Using area (not perimeter) → M0M0M0A0A0ft Division by 0.6 (not 0.15) can score M0M1A0A0ft or M1M0A0A0ft There are other alternative methods, e.g.  1 + 36 + 1 + 32 + 29 + 1 + 16 + 1 + 66 + 1 + 48 = 232

Question	Answer	Mark	Comments
1 (d)	24 squares shaded in any arrangement such that the whole grid has 4 lines of symmetry	B3 *Ra* *Ib* *Ib*	B2 24 squares shaded in any arrangement such that the whole grid has 2 lines of symmetry or from 12 to 36 squares shaded (not 24) in any arrangement such that the whole grid has 4 lines of symmetry B1 from 12 to 36 squares shaded (not 24) in any arrangement such that the whole grid has 2 lines of symmetry or 24 squares shaded in any arrangement such that the whole grid has 1 line of symmetry or 24 squares shaded in any arrangement such that the whole grid has rotational symmetry of order 4
	Additional Guidance		
	Mark the answer grid unless blank Mark the symmetry of the whole grid not the arrangement of shaded squares		

Question	Answer	Mark	Comments
2 (a)	48 × 131 or 6288 or 24 × 213 or 5112	M1 *Ra*	
	48 × their 131 – 24 × their 213 or 6288 – 5112	M1 *Rb*	their 131 can be 159, 115, 99 or 144 their 213 can be 381, 159. 161 or 248
	1176	A1 *Aa*	
Check	(48 × 130) – (24 × 210) = 1200 or 6240 – 5040 = 1200	B1ft *Ab*	ft their monthly loan repayments
2 (a)	**Additional Guidance**		
	Mark holistically i.e. Award up to M2A1 for working given in Check space Award B1ft for correct Check in main answer space		

Question	Answer	Mark	Comments
2 (b)	**Alternative method 1**		
	189 ÷ 36 or 5.25 (hours) or 5h 15 mins	M1 *Ra*	
	2(pm) + their 5h 15 min + 40 mins or 2 + their 5.25 + 0.66 (6 …)	M2 *Rb* *Aa*	M1 adding one time to 2(pm) must be consistent units their 5h 15 min can be 5h 25 min or an estimate with method seen
	7.55 pm and yes or 7.9 … and yes	A2 *Ib* *Ib*	A1 7.55 pm or 7.9 …. or A1ft correct conclusion for their value must score at least two M marks

Question	Answer	Mark	Comments

2 (b) cont.	**Alternative method 2**			
	189 ÷ 36 or 5.25 (hours) or 5h 15 mins		M1 *Ra*	
	their 5h 15 + 40 mins or 5.55 or their 5.25 + 0.66 (6 …) or [5.9, 5.92]		M1 *Rb*	must be consistent units their 5h 15 min can be 5h 25 min or an estimate with method seen
	2 + their 5h 55 min or 8 – their 5h 55 min or 8 – 2 or 6	2 + their [5.9, 5.92] or 8 – their [5.9, 5.92]	M1 *Aa*	
	7.55 pm and yes or 2 h 5 min and yes or 5h 55 min and 6 and yes	7.9 … and yes or [2.1, 2.12] and 2 and yes	A2 *Ib* *Ib*	A1 7.55 pm or 7.9 … or 2 h 5 min or {2.1, 2.12] or 5h 55 min and 6 or A1ft correct conclusion for their value must score at least two M marks

Question	Answer	Mark	Comments
2 (b) cont.	**Alternative method 3**		
	189 ÷ 36 or 5.25 (hours) or 5h 15 min	M1 *Ra*	
	2 + their 5h 15 or 7.15 or 2 + their 5.25 or 7.25	M1 *Rb*	must be consistent units their 5h 15 min can be 5h 25 min an estimate with method seen
	8 – 40 min or 7.20 or 8 – [0.66, 0.67] or 7.33(3 …)	M1 *Aa*	
	7.20 and 7.15 and yes or 7.33(…) and 7.25 and yes	A2 *Ib* *Ib*	A1 7.20 and 7.15 or 7.33(…) and 7.25 or A1ft correct conclusion for their value must score at least two M marks

Question	Answer	Mark	Comments

2 (b) cont.	**Alternative method 4**		
	8 – 2 or 6	M1 *Ra*	
	their 6 – 40 min or 5h 20 min or 5.33(3…)	M1 *Rb*	
	189 ÷ their 5.33(3…) or 189 ÷ 36 or 5.25 or 5h 15 min	M1 *Aa*	
	35.4 … and yes or 5h 20 min and 5h 15 min and yes or 5.33(3 …) and 5.25 and yes	A2 *Ib* *Ib*	A1 35.4 … or 5h 20 min and 5h 15 min or 5.33(3 …) and 5.25 or A1ft correct conclusion for their value must score at least two M marks

2 (b)	**Additional Guidance**		
	Misinterpreting decimal times can score method marks only. **Examples** 1 189 ÷ 36 = 5.25 M1 5h 25min + 40min = 6h 5min M1 2 + 6h 5min M1 8.05 pm and no A0 2 189 ÷ 36 = 5.25 M1 5.25 + 0.40 = 6.65 = 7.05 M1 2 + 6.65 or 2 + 7.05 M1 8.65 or 9.05 and no A0 Subtracting 40 minutes instead of adding can score M1M0M1A1ft		

<table>
<tr><th>Question</th><th colspan="2">Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="6">2 (c)</td><td colspan="4">Alternative method 1</td></tr>
<tr><td colspan="2">378 ÷ 42 × 4.5 × 1.2(0) or 48.6(0)</td><td>M2
Ra
Rb</td><td>M1 any two values combined with correct operation</td></tr>
<tr><td>(27 + 2 + 3.5) – 9 or 23.5(0)</td><td>27 × 5 or 135
or
2 × 5 or 10
or
3.5 × 5 or 17.5(0)
or
9 × 5 or 45</td><td>M1
Aa</td><td></td></tr>
<tr><td>5 × their 23.5(0) or 117.5(0)</td><td>27 × 5 + 2 × 5 + 3.5 × 5 – 9 (× 5) or 117.5(0)</td><td>M1
Rc</td><td>their 23.5(0) can be 32.5(0)
117.5(0) can be 162.5(0) or 153.5(0)</td></tr>
<tr><td colspan="2">their 48.6(0) + their 117.5(0) + 6 × 70
or
600 – 6 × 70
and
their 48.6(0) + their 117.5(0)</td><td>M1
Aa</td><td>must be petrol cost + fees + spending money
their 48.6 must be an amount of money
6 × 70 can be 2 × 6 × 70</td></tr>
<tr><td colspan="2">586.1(0) and yes
or
180 and 166.1(0) and yes</td><td>A2
Ib
Ib</td><td>13.9(0) implies 586.1(0)
A1 586.1(0)
or
180 and 166.1(0)
or
A1ft correct conclusion for their value
must score fifth M1</td></tr>
</table>

<table>
<tr><td rowspan="6">2 (c) cont.</td><td colspan="3">Alternative method 2 (includes £49 fee for membership of Caravan Society)</td></tr>
<tr><td colspan="2">378 ÷ 42 × 4.5 × 1.2(0) or 48.6(0)</td><td>M2
Ra
Rb</td><td>M1 any two values combined with correct operation</td></tr>
<tr><td>(27 + 2 + 3.5) – 9
or 23.5(0)</td><td>27 × 5 or 135
or
2 × 5 or 10
or
3.5 × 5 or 17.5(0)
or
9 × 5 or 45</td><td>M1
Aa</td><td></td></tr>
<tr><td>5 × their 23.5(0)
+ 49 or 166.5(0)</td><td>27 × 5 + 2 × 5 +
3.5 × 5 + 49
– 9 (× 5)
or 166.5(0)</td><td>M1
Rc</td><td>their 23.5(0) can be 32.5(0)
166.5(0) can be 211.5(0) or 202.5(0)</td></tr>
<tr><td colspan="2">their 48.6(0) + their 166.5(0) + 6 × 70
or
600 – 6 × 70
and
their 48.6(0) + their 166.5(0)</td><td>M1
Aa</td><td>must be petrol cost + fees + spending money
their 48.6(0) must be an amount of money
6 × 70 can be 2 × 6 × 70</td></tr>
<tr><td colspan="2">635.1(0) and no
or
180 and 215.1(0) and no</td><td>A2
Ib
Ib</td><td>35.1(0) implies 635.1(0)
A1 635.1(0)
or
180 and 215.1(0)
or
A1ft correct conclusion for their value
must score fifth M1</td></tr>
</table>

	Additional Guidance
2 (c)	Other ways of subtracting parts from 600 and comparing with the rest are possible For their 48.6(0) to be an amount of money it must have been calculated using £1.20 Adding 9's instead of subtracting can score M2M1M0M1A1ft

Question	Answer	Mark	Comments
3 (a)	$\frac{1}{5}$	B1 *Aa*	
	Additional Guidance		
3 (b)	24 ÷ 3 or 8 or 16	M1 *Ra*	
	standard ↔ 16 and luxury ↔ 8	A1 *Ia*	must see standard and luxury
	Additional Guidance		
	8 (standard) and/or 16 (luxury) scores M1A0 (not labelled or labelling reversed)		

Question	Answer	Mark	Comments
3 (c)	$18 \times \frac{5}{6}$ or 15 or 18 × 35 or 630 or $35 \times \frac{5}{6}$ or [29.16, 29.17] or 29.2 or 14 × 22 or 308	M1 *Ra*	
	$18 \times \frac{5}{6}$ × 35 (+) 14 × 22 or 525 (+) 308 or 833	M1 *Aa*	
	£833	A1 *Ia*	must see £ symbol
	Additional Guidance		
	Potential rounding errors 1 $35 \times \frac{5}{6}$ or [29.16, 29.17] M1 their [29.16, 29.17] × 18 + 14 × 22 M1 £833 A1 2 18 × [83.3, 83.34] ÷ 100 or 15 M1 their 15 × 35 + 14 × 22 M1 £833 A1 Must see £ symbol and exact value of 833 to score A1 **Alternatives to $\frac{5}{6}$** Allow 0.83 or better or 83% or better		

Question	Answer	Mark	Comments
3 (d)	155 ÷ 75 or 2. (06...) or 250 ÷ 35 or 7. (14...) or 250 ÷ 75 or 3. (33…) or 155 ÷ 35 = 4. (42...)	M1 *Ra*	allow if seen on diagram
	their 2 and their 7 or their 3 and their 4	M1 *Rb*	their 2 and their 7 or their 3 and their 4 must be rounded down to the nearest integer 14 and/or 12 seen or implied on diagram scores M2
	their 2 × their 7 × 3 or 14 × 3 or their 3 × their 4 × 3 or 12 × 3 or 36	M1 *Aa*	their 2 and their 7 or their 3 and their 4 need not be rounded down to the nearest integer 14 cannot be from comparison of base areas
	42 (bouquets) and yes	A2 *Ib* *Ib*	A1 42 or 36 and no or A1ft correct conclusion for their value must score M3
	Additional Guidance		
	Attempts based on comparison of base areas score zero – this can lead to 42 so check 'correct' answers for method		

Question	Answer	Mark	Comments
3 (e)	All criteria met Shortest valid route Clearly chosen Fully communicated Correct total mileage	B4 *Ra* *Ia* *Ia* *Ia*	(S)CBAS and 35 miles
	All criteria met Shortest valid route Clearly chosen Not fully communicated Not complete	B3 *Ra* *Ia* *Ia*	4.7 → 10.4 → 12.1 → 7.8 and 35 miles or (S)CBAS or (S)CBA(S) and 35
	Not shortest valid route Return to shop could be implied Different routes shown including shortest route but shortest route not clearly chosen Must give correct total distance for their route or Shortest valid route B3 response with total mileage not given	B2 *Ra* *Ia*	Examples (S)CAB(S) and 38.6 miles or 4.7 → 8.2 → 16.1 → 9.6 and 38.6 miles or (S)BCA(S) and 36 miles or 9.6 → 10.4 → 8.2→ 7.8 and 36 miles or 4.7 → 10.4 → 12.1 → 7.8 or (S)CBA(S)
	Not shortest valid route A response with one of a, b, c or d a A before C → must give 'correct' total mileage b The one-way system between A and B used incorrectly – must give their correct total mileage c Route given only by the mileage on each leg d Mileage for return to shop not included – must be valid route with their correct total mileage B0 Any two of a, b, c or d Any route visiting a house more than once	B1 *Ra*	Examples – see Additional Guidance

	Additional Guidance
3 (e)	**More than one attempt**: response not selected → mark the final response response selected → mark the selected response (even if another gains more marks) **One-way road used incorrectly** B1 max for either B → A and 16.1 or A → B and 12.1 **Valid route** For a route to be valid Anaya must go to C before A if going from B to A indicate 12.1 or give the correct total distance using 12.1 if going from A to B indicate 16.1 or give the correct total distance using 16.1 **B1 Examples** a A before C ABC and 39 ACB and 36 BAC and 34.6 b Incorrect use of one-way system CAB and 34.6 or 4.7 → 8.2 → 12.1 → 9.6 and 34.6 CBA and 39 or 4.7 → 10.4 → 16.1 → 7.8 → and 39 c Valid route given only by mileage on each leg 4.7 → 8.2 → 16.1 → 9.6 9.6 → 10.4 → 8.2 → 7.8 d Return to shop not included BCA and 28.2 or 9.6 → 10.4 → 8.2 and 28.2 CAB and 29 or 4.7 → 8.2 → 16.1 and 29 CBA and 27.2 or 4.7 → 10.4 → 12.1 and 27.2

Question	Answer	Mark	Comments
4 (a)	30 ÷ 360 × 120	M1 *Ra*	or 120 – (72 ÷ 3 + 117 ÷ 3 + 54 ÷ 3 + 87 ÷ 3)
	10	A1 *Aa*	
Check	10 ÷ 120 × 360 = 30	B1ft *Ab*	Reverse or alternative method
4 (a)	**Additional Guidance**		
	Mark holistically i.e. Award up to M1A1 for working given in Check space Award B1ft for correct Check in main answer space		

Question	Answer	Mark	Comments
4 (b)	**Alternative method 1**		
	87 ÷ (360 ÷ 120) or 87 ÷ 3 or 87 ÷ 3 or 29	M1 *Ra*	
	120 – 87 ÷ 3 or 120 – their 29 or 91	M1 *Aa*	or 120 × 75 ÷ 100 or 90
	91 and 90 and yes	A2 *Ib* *Ib*	A1 91 and 90 or A1ft correct decision for their values must score M2
4 (b) cont.	**Alternative method 2**		
	30 + 72 + 117 + 54 or 273	M1 *Ra*	
	(30 + 72 + 117 + 54) ÷ 3 or their 273 ÷ 3 or 91	M1 *Aa*	or 360 × 75 ÷ 100 or 270 or 120 × 75 ÷ 100 or 90
	91 and 90 and yes or 273 and 270 and yes	A2 *Ib* *Ib*	A1 91 and 90 or 273 and 270 or A1ft correct decision for their values must score M2

Question	Answer	Mark	Comments
4 (b) cont.	**Alternative method 3**		
	100 – 75 or 25	M1 *Ra*	or 30 + 72 + 117 + 54 or 273
	360 × 25 ÷ 100 or 90	M1 *Aa*	or 360 × 75 ÷ 100 or 270
	90 (and 87) and yes or 273 and 270 and yes	A2 *Ib* *Ib*	A1 90 (and 87) or 273 and 270 or A1ft correct decision for their values must score M2

Question	Answer	Mark	Comments
4 (b) cont.	**Alternative method 4**		
	87 ÷ (360 ÷ 120) or 87 ÷ 3 or 29	M1 *Ra*	
	1 – (their 29 ÷ 120)	M1 *Aa*	
	0.758… and yes	A2 *Ib* *Ib*	A1 0.758 or A1ft correct decision for their value must score M2

Question	Answer	Mark	Comments
4 (b) cont.	**Alternative method 5**		
	30 + 72 + 117 + 54 or 273	M1 *Ra*	
	((30 + 72 + 117 + 54) ÷ 3) ÷ 120 or (their 273 ÷ 3) ÷ 120 or their 91 ÷ 120	M1 *Aa*	or (30 + 72 + 117 + 54) ÷ 360 or 273 ÷ 360
	0.758… and yes	A2 *Ib* *Ib*	A1 0.758 or A1ft correct decision for their value must score M2

4 (b) cont.	**Alternative method 6**		
	87 ÷ 360 or 0.24(1…) or 0.242	M1 *Ra*	
	1 – their 0.24(1…)	M1 *Aa*	
	0.758… or 0.759 … or 0.76 and yes	A2 *Ib* *Ib*	A1 0.758 or 0.76 or A1ft correct decision for their value must score M2

Question	Answer	Mark	Comments

4 (b) cont.	**Alternative method 7**			
	$\frac{1}{4}$ × 120 or 30	87 ÷ 360 or 0.24	M1 *Ra*	
	87 ÷ 360 × 120 or 29	$\frac{1}{4}$ = 0.25	M1 *Aa*	
	30 and 29 and yes	0.24 and 0.25 and yes	A2 *Ib* *Ib*	A1 30 and 29 or 0.24 and 0.25 or A1ft correct decision for their values must score M2

4 (b) cont.	**Additional Guidance**
	Any response comparing the ratios 87:360 with 90:360 or 270:360 with 273:360 (or equivalent) is valid and could lead to the correct answer This includes comparing 90° with 87° or 270° with 273°

Question	Answer	Mark	Comments
4 (c)	**Alternative method 1**		
	9 or 8.5 hours on Monday or 8 or 7.5 hours on Tuesday, Wednesday and Friday or 5 hours on Thursday or 4 hours on Saturday	M1 *Ra*	implied by 42 (hours)
	their 8.5 + their 7.5 + their 7.5 + their 5 + their 7.5 + their 4 or their $42 - 4 \times \frac{1}{2}$ hour or 40	M1 *Rc*	must be the sum of 6 values their 42 is from their 9 + their 8 + their 8 + their 5 + their 8 + their 4
	37 × 8.64 or 319.68	M1 *Rb*	or their 40 × 8.64 or 345.6
	8.64 × 1.5 or 12.96	M1 *Aa*	or 8.64 ÷ 2 or 4.32
	(their 40 – 37) × their 12.96 or 38.88	M1 *Aa*	their 12.96 must be a multiple of 4.32 > 8.64 or (their 40 – 37) × their 4.32 or 12.96
	their 319.68 + their 38.88	M1 *Aa*	or their 345.6 + 12.96
	358.56 and yes	A2 *Ib* *Ib*	A1 358.56 or A1ft correct decision for their value must score 1st and 3rd M marks

Question	Answer	Mark	Comments
4 (c) cont.	**Alternative method 2**		
	(9 or 8.5) × 8.64 or 77.76 or 73.44 or (8 or 7.5) × 8.64 or 69.12 or 64.8 or 5 × 8.64 or 43.2 or 4 × 8.64 or 34.56	M1 *Ra*	Monday Tuesday, Wednesday and Friday Thursday Saturday
	(9 or 8.5) × 8.64 or 77.76 or 73.44 and (8 or 7.5) × 8.64 or 69.12 or 64.8 and 5 × 8.64 or 43.2 and 4 × 8.64 or 34.56	M1 *Rc*	Monday Tuesday, Wednesday and Friday Thursday Saturday
	their 73.44 + 3 × their 64.8 + their 43.2 + their 34.56 or their 77.76 + 3 × their 69.12 + their 43.2 + their 34.56 – 2 × 8.64 or 345.6	M1 *Rb*	must be the sum of 6 values
	their 8.5 + their 7.5 + their 7.5 + their 5 + their 7.5 + their 4 or their 345.6 ÷ 8.64 or 40	M1 *Aa*	
	(their 40 – 37) × 8.64 ÷ 2 or 12.96	M1 *Aa*	
	their 345.6 + their 12.96	M1 *Aa*	
	358.56 and yes	A2 *Ib* *Ib*	A1 358.56 or A1ft correct decision for their value must score 1st and 3rd M marks

Question	Answer	Mark	Comments
4 (c) cont.	**Alternative method 3**		
	9 or 8.5 hours on Monday or 8 or 7.5 hours on Tuesday, Wednesday and Friday or 5 hours on Thursday or 4 hours on Saturday	M1 *Ra*	implied by 42 (hours)
	their 8.5 + their 7.5 + their 7.5 + their 5 + their 7.5 + their 4 or their $42 - 4 \times \frac{1}{2}$ hour or 40	M1 *Rb*	must be the sum of 6 values their 42 is from their 9 + their 8 + their 8 + their 5 + their 8 + their 4
	their 40 – 37 or 3	M1 *Rc*	
	their 3 × 1.5 or 4.5	M1 *Aa*	or their 3 ÷ 2 or 1.5
	37 + their 4.5 or 41.5	M1 *Aa*	or their 40 + their 1.5 or 41.5
	their 41.5 × 8.64	M1 *Aa*	
	358.56 and yes	A2 *Ib* *Ib*	A1 358.56 or A1ft correct decision for their value must score 1st and 6th M marks

	Additional Guidance
4 (c)	**Not including 30 min break** Leads to 384.48 Can score M1M0M1M1M1M1A1ft max **Including 30 min break on all days** Leads to 345.60 Can score M1M0M1M1M1M1A1ft max **Not including overtime payment** Leads to 345.6 Can score M1M1M0M0M0M0A1ft max