<table>
<tr><th>Question Number</th><th>Scheme</th><th>Marks</th></tr>
<tr><td>1.(a)</td><td>$\frac{24+16+34+21+38+12+31+5+9+14+23}{60} = \frac{227}{60} = 3.78\ldots$
therefore 4 bins</td><td>M1
A1 (2)</td></tr>
<tr><td>(b)</td><td>Bin 1: 24 16 <u>12</u> <u>5</u>
Bin 2: 34 21
Bin 3: 38 9
Bin 4: <u>31</u> 14
Bin 5: 23</td><td>M1 <u>A1</u> A1(3)</td></tr>
<tr><td>(c)</td><td>
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</td><td>M1
A1
A1ft
A1
(4)</td></tr>
<tr><td>(d)</td><td>Bin 1: 38 21
Bin 2: 34 24
Bin 3: 31 23 5
Bin 4: 16 14 12 9</td><td>M1 A1(2)</td></tr>
<tr><td></td><td></td><td>11 marks</td></tr>
<tr><th></th><th>Notes for Question 1</th><th></th></tr>
<tr><td>a1M1</td><td>A correct lower bound calculation (accept awrt 3.78 without seeing the full calculation) Accept (227 +/- 38)/60</td><td></td></tr>
<tr><td>a1A1</td><td>CAO – 4 bins from a correct calculation. Note a lower bound of 4 without a correct calculation or 3.78 seen scores M0. Do not award if any incorrect working seen</td><td></td></tr>
<tr><td>b1M1</td><td>The correct first five items placed correctly (the bold values) and at least eight values placed in bins (allow repeated values). Condone cumulative totals throughout for M1 only</td><td></td></tr>
<tr><td>b1A1</td><td>First eight values placed correctly (the bold and underlined values) with all eleven correct values only placed in bins. This mark cannot be awarded if any</td><td></td></tr>
</table>

Question Number	Scheme	Marks
	repeated values or incorrect values are seen (even if the first eight values have been placed correctly)	
b2A1	CSO – no additional or repeated values (dependent on both previous marks)	
c1M1	Bubble sort into descending order, either left to right with smallest item (5) correctly positioned, or right to left with largest item (38) correctly positioned. (Condone one item error or omission). **Special Case** Ascending order is M1 per the main scheme A1 for a fully correct sort then A0 A0 even if the list is reversed. See below. Quick sort M0	
c1A1	First and second passes correct	
c2A1ft	Third, fourth and fifth passes correct following through from their second pass	
c3A1	CSO (correct solution only – all previous marks in this part **must** have been awarded) including a final pass with no changes	
d1M1	**Their** seven largest items placed correctly and at least nine values placed in bins (if correct this will be the bold items but must check **their** packing if any of **their** seven largest values are incorrect – note that the maximum weight of a bin is 60). Condone cumulative totals for M1 only. First-fit increasing scores no marks in this part. If no sort seen in (c) then mark (d) assuming the correct ordered list is being used	
d1A1	CAO	

Ascending left to right (M1 A1 A0 A0 if fully correct)

24	16	34	21	38	12	31	5	9	14	23
16	24	21	34	12	31	5	9	14	23	38
16	21	24	12	31	5	9	14	23	34	38
16	21	12	24	5	9	14	23	31	34	38
16	12	21	5	9	14	23	24	31	34	38
12	16	5	9	14	21	23	24	31	34	30
12	5	9	14	16	21	23	24	31	34	38
5	9	12	14	16	21	23	24	31	34	38
5	9	12	14	16	21	23	24	31	34	38

Ascending right to left (M1 A1 A0 A0 if fully correct)

24	16	34	21	38	12	31	5	9	14	23
5	24	16	34	21	38	12	31	9	14	23
5	9	24	16	34	21	38	12	31	14	23
5	9	12	24	16	34	21	38	14	31	23
5	9	12	14	24	16	34	21	38	23	31
5	9	12	14	16	24	21	34	23	38	31
5	9	12	14	16	21	24	23	34	31	38
5	9	12	14	16	21	23	24	31	34	38
5	9	12	14	16	21	23	24	31	34	38