<table>
<tr><td>Question Number</td><td>Scheme</td><td>Marks</td></tr>
<tr><td>1. (a)</td><td>$\frac{177}{45} = 3.933...$ so lower bound is 4</td><td>M1 A1 (2)</td></tr>
<tr><td>(b)</td><td>Container 1: 16 23 4
Container 2: 18 9 <u>5</u> 13
Container 3: <u>20</u> 17 6
Container 4: <u>35</u>
Container 5: 11</td><td>M1 <u>A1</u> A1 (3)</td></tr>
<tr><td>(c)</td><td>
<table>
<tr><td>16</td><td>23</td><td>18</td><td>9</td><td>4</td><td>20</td><td>35</td><td>5</td><td>17</td><td>13</td><td>6</td><td>11</td></tr>
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</table>
</td><td>M1
A1
A1ft
A1cso (4)</td></tr>
<tr><td>(d)</td><td>Container 1: 35 <u>9</u>
Container 2: 23 20
Container 3: 18 17 6 4
Container 4: 16 <u>13</u> <u>11</u> 5</td><td>M1 <u>A1</u> A1 (3)</td></tr>
<tr><td></td><td></td><td>12 marks</td></tr>
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Notes for Question 1

a1M1: Attempt to find the lower bound $(177 \pm 35)/45$. A value of 3.9 or better (for example, 3.93, 3.933, 3.9333…, $\frac{59}{15}$, etc.) seen with no corresponding calculation can imply this mark. Allow this mark for a clear intention of adding **all twelve** values and dividing by 45, for example, $\frac{16+23+18+9+4+20+35+5+17+13+6+11}{45}$ scores M1

a1A1: CAO (correct answer only) - correct calculation seen followed by 4 **or** the correct value of 3.9 or better stated (see note above for mark **a1M1**) followed by 4. However, an answer of 4 with no working scores no marks in this part

b1M1: First five items placed correctly and at least eight values placed in containers. The first five values are those in bold. Condone cumulative totals for M1 only (e.g. for Crate 1: 16 39 43)
b1A1: First eight items placed correctly (the underlined **and** bold values). This mark cannot be awarded if you see **any** repeated values or more than twelve items placed in crates (even if the first eight items have been placed correctly)
b2A1: CSO (correct solution only). No additional or repeated values

c1M1: Bubble sort. Consistent direction, end number (4) in place and the list beginning with the correct first four numbers (23 18 16 9). Do check these carefully as some candidates show the result of each comparison and swap in their first pass. Consider the placement of the candidate's numbers, rather than what the candidate labels each line of their pass. For example, assume that the first time that the 4 appears at the end of the list is the end of their first pass
c1A1: The first, second **and** third passes correct – so end three numbers in place

Question Number	Scheme	Marks

c2A1ft: Fourth and fifth passes correct following through from the candidate's third pass – so end five numbers in place

c3A1: CSO (correct solution only – so previous three marks must have been awarded in this part). Must show a 7^{th} pass showing no swaps/changes. Condone if the sort continues until an 11^{th} pass has been completed (but there should be no changes in the 8^{th} to 11^{th} passes) **or** if the pass stops betweeen an 8^{th} and 11^{th} pass (provided there are no changes in the values in any pass after the 6^{th} pass)

d1M1: Must be using correct sorted list in descending order (so no follow through or misreads from an incorrect list from (c)). First six items placed correctly and at least eight values placed in containers. Note that the first six items are the bold values. Condone cumulative totals for M1 only. First-fit increasing scores no marks in this part

d1A1: First nine items placed correctly (the underlined and bold values). No additional or repeated values

d2A1: CSO. So no additional or repeated values

Sorting into ascending order in (c)

- If the candidate sorts the list into ascending order and reverses the list they can score full marks
- If the list is not reversed in (c) then mark as a misread (so mark according to the main scheme and then subtract the final two A marks earned). If the candidate says that the list needs reversing but doesn't actually show the reversed list then remove the final A mark earned

Misreads for part (c) only – if there is a 'misread' of a single number (this could take the form of an extra number, a number missing, or a number changed, for example, 42 rather than 23) before starting the sort in (c) then mark as a misread. If they 'misread' more than one number then M0. If they miscopy one of their own numbers during the sort then this is an accuracy error and loses the corresponding A mark(s) according to the scheme. No misreads permitted in (a), (b) and (d) (so mark to the main scheme)

For reference the sort in ascending order is:

16	23	18	9	4	20	35	5	17	13	6	11
16	18	9	4	20	23	5	17	13	6	11	**35**
16	9	4	18	20	5	17	13	6	11	**23**	**35**
9	4	16	18	5	17	13	6	11	**20**	**23**	**35**
4	9	16	5	17	13	6	11	**18**	**20**	**23**	**35**
4	9	5	16	13	6	11	**17**	**18**	**20**	**23**	**35**
4	5	9	13	6	11	**16**	**17**	**18**	**20**	**23**	**35**
4	5	9	6	11	**13**	**16**	**17**	**18**	**20**	**23**	**35**
4	5	6	9	**11**	**13**	**16**	**17**	**18**	**20**	**23**	**35**
4	5	6	**9**	**11**	**13**	**16**	**17**	**18**	**20**	**23**	**35**