In a study designed to investigate the energy expenditure related to certain “life” behaviors, scientists measured the oxygen consumption rates (µL/g•hr) for two small samples of salamanders. One group was actively engaged in courtship behaviors and the other was not. Output 1 provides some relevant descriptive statistics for the two samples and Figure 1 is a multiple boxplot that illustrates the distributions of oxygen consumption rates in the two samples.

Output 1: Descriptive statistics for energy expenditure study

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SE Mean</th>
<th>StDev</th>
<th>Minimum</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-courting</td>
<td>11</td>
<td>70.12</td>
<td>1.37</td>
<td>4.53</td>
<td>63.22</td>
<td>67.18</td>
<td>69.33</td>
<td>75.80</td>
<td>76.23</td>
</tr>
<tr>
<td>courting</td>
<td>14</td>
<td>97.98</td>
<td>1.44</td>
<td>5.39</td>
<td>87.91</td>
<td>94.66</td>
<td>98.84</td>
<td>102.73</td>
<td>104.93</td>
</tr>
</tbody>
</table>

Figure 1: Multiple boxplot illustrating O$_2$ consumption levels for courting and non-courting salamanders

1) The total number of degrees of freedom in this study is (Use the calculated df method discussed in class):
2) The point estimate for the true difference in average energy expenditure for courting versus non-courting salamanders is:
   (Let the difference = Courting – Non-Courting)

3) Investigator want to construct a 98% CI for the true difference in average energy expenditure of courting versus non-courting salamanders. The table value needed to compute the 98% bound is:

4) Let the confidence level be 98%, the associated bound for the true difference in average energy expenditure of courting versus non-courting salamanders is:

5) Use the values obtained in problems 3 and 4 to construct a 98% CI for the true difference in average energy expenditure of courting versus non-courting salamanders.

6) Interpret the CI developed in problem 5.