Researchers asked student volunteers to use a machine that simulated driving situations. At irregular intervals, a target would flash red or green. Participants were instructed to press a “brake button” as soon as possible when they detected a red light. The machine would calculate the mean reaction time to the red flashing targets for each student in milliseconds.

The students were given a warm-up period to familiarize themselves with the driving simulator. Then the researchers had each student use the driving simulation machine while talking on a cell phone about politics to someone in another room and then again with music playing in the background (control). The students were randomly assigned as to whether they used the cell phone or the control setting for the first trial.

The following Minitab output summarizes the differences in reaction time (cell phone group minus music control group):

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SE Mean</th>
<th>StDev</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>diff (phone - music)</td>
<td>16</td>
<td>47.1</td>
<td>12.8</td>
<td>51.3</td>
<td>30.5</td>
</tr>
</tbody>
</table>

1. State the appropriate null and alternative hypotheses (in symbols) for testing whether the data provide strong evidence that talking on a cell phone tends to lengthen reaction times, on average, as compared to listening to music.

2. Calculate the value of the test statistic.

3. Determine the p-value, as accurately as possible from the relevant table. Also indicate which table you use and how many degrees of freedom (if applicable).

4. Determine a 95% confidence interval for the relevant parameter.

5. Summarize what this study and your analysis have revealed about the question of whether talking on a cell phone causes poorer reaction times. Include the results of both the hypothesis test and confidence interval in your summary.