CH 7: CONFIDENCE INTERVALS AND SAMPLE SIZE

Confidence Intervals for the Mean and Proportion are calculated in Minitab using the following three functions:

CI for the Mean with \( \sigma \) known or or \( n \geq 30 \): \( \text{Stat } \rightarrow \text{Basic Statistics } \rightarrow \text{1-Sample Z} \)
CI for the Mean with \( \sigma \) not known and \( n < 30 \): \( \text{Stat } \rightarrow \text{Basic Statistics } \rightarrow \text{1-Sample t} \)
CI for Proportion \( \text{Stat } \rightarrow \text{Basic Statistics } \rightarrow \text{1-Proportion} \)

All three functions operate in very similar manner and they all provide for the input of either Summary Statistics or Raw data.

1-Sample Z

- If raw data, place appropriate column in the box for \textit{Samples in columns}.
- If only Summary data available, check the \textit{Summarized data} radius button and place the sample size and mean in the two boxes.
- Regardless of the data input method, enter the actual or estimated std dev in the \textit{Std Dev} box.
- Leave \textit{Test mean} empty.
- Click on \textit{Options}.
- Set the \textit{Confidence Level} to the desired number and make sure that the \textit{Alternative} value is set to \textit{Not Equal}.
- The output is placed in the Session window

\begin{figure} 
\centering 
\includegraphics[width=\textwidth]{OneSampleZ.png} 
\caption{One-Sample Z} 
\end{figure}

\begin{table} 
\centering 
\begin{tabular}{llll}
\hline
\text{One-Sample Z} & \\
\hline
The assumed standard deviation = 2 & \\
N & Mean & SE Mean & 95% CI \\
35 & 5.00000 & 0.33806 & (4.33741, 5.66259) \\
\hline
\end{tabular} 
\end{table}
1-Sample t

- If raw data, place appropriate column in the box for **Samples in columns**.
- If only Summary data available, check the **Summarized data** radius button and place the sample size, mean, and std dev in the three boxes.
- Leave **Test mean** empty.
- Click on **Options**.
- Set the **Confidence Level** to the desired number and make sure that the **Alternative** value is set to **Not Equal**.
- The output is placed in the Session window.

![Figure 7.2](image)

**One-Sample T**

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>StDev</th>
<th>SE Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>5.000</td>
<td>2.000</td>
<td>0.4000</td>
<td>(4.17444, 5.82556)</td>
</tr>
</tbody>
</table>
1-Proportion

- If raw data, place appropriate columns in the box for **Samples in columns**.
- If only Summary data available, check the **Summarized data** radius button and place the Number of trials and Number of events in the two boxes.
- Click on **Options**.
- Set the **Confidence Level** to the desired number and make sure that the **Alternative** value is set to **Not Equal**.
- Check the **Use test and interval based on normal distribution**
- The output is placed in the Session window.

![Image of Minitab 1-Proportion dialog box]

**Figure 7.3**

### Test and CI for One Proportion

Test of p = 0.5 vs p not = 0.5

<table>
<thead>
<tr>
<th>Sample</th>
<th>X</th>
<th>N</th>
<th>Sample p</th>
<th>95% CI</th>
<th>Z-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60</td>
<td>500</td>
<td>0.120000</td>
<td>(0.091516, 0.148484)</td>
<td>-16.99</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Minimum Sample Sizes** are calculated using the Calculator function and the appropriate formulas.