Text: Stocks (1)

1. The standard error of the mean \( \sigma_Y \) refers to the standard deviation of the sampling distribution of means from samples of a particular size \( n \). We may estimate the standard error of the mean from sample data using

\[
\sigma_Y = \frac{s_Y}{\sqrt{n}}
\]

We have drawn a random sample of \( n = 9 \) individuals participating in senior center programs in this metropolitan area. We measured level of self-care competence using for each individual in the sample with a self-care competency questionnaire. Possible scores ranged from 0 to 100 where higher scores indicated greater competency at tasks necessary for independent living.

The statistics for the sample included a mean of \( \bar{Y} = 68 \) and a standard deviation of \( s_Y = 14 \).

What is the standard error of the mean?

Round your final answer to two decimal places and show your work on your worksheet.

\[ s_Y = \] ________________

2. We know that the national average for the Social Work Skills test is \( \mu_Y = 83 \). However, we do not know the population standard deviation.

We have initiated a new program that we believe will increase the level of skill shown by our undergraduates. One year after implementation, we randomly sampled \( n = 36 \) BSW students who entered the program after the change was implemented and administered the Social Work Skills test to them. The average score for this group was \( \bar{Y} = 86 \) with a standard error of the mean of \( s_Y = 2.1 \).

Construct a 95% confidence interval around the sample mean based upon our sample size and sample standard deviation. Remember to use a \( t \) at the appropriate \( \alpha \) level and degrees of freedom (\( df \)).

\[
CI_{95} = \bar{Y} \pm (t_{.05,df}) (s_Y)
\]

2.01. \( df \) = ________.
2.02. \( t_{.05,df} \) = ________.
2.03. Upper limit: \( \mu_{Upper} \) = ________.
2.04. Lower limit: \( \mu_{Lower} \) = ________.

Please round your final answer to two decimal places and show your work on your work sheet.
2.05. Based upon the evidence provided by the 95% confidence interval for our sample mean and standard deviation, can we justify an inductive inference that the students who entered our program when the program change was implemented tended to score higher than the national average ($\mu_Y = 83$) on the SWS test?

Support your answer by discussing how the value for the national average for the Social Work Skills test relates to the values contained within the 95% confidence interval that you just calculated.

3. Calculate the pooled variance ($s_{1,2}^2$) and pooled standard deviation ($s_{1,2}$) for the pair of independent samples shown in Table 11.20. Please use the following formulae.

$$\text{df} = n_1 + n_2 - 2$$
$$s_{1,2}^2 = \frac{SS_1 + SS_2}{df}$$
$$s_{1,2} = \sqrt{s_{1,2}^2}$$

Please show your work and round your final answer to one decimal place, but do not use rounded answers in calculations.

<table>
<thead>
<tr>
<th>Y₁</th>
<th>Y₂</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
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<td>8</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
</tbody>
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\[ \bar{Y} = \frac{5 + 8}{5 + 5} = 8 \]

\[ n = 5 \]

\[ SS = 20 \]

**Table 11.20: Samples**

4. Identify the level of measurement:
   Number of unexcused absent days during the most recent six-week grading period.

5. Identify the level of measurement:
   Social worker rating of client status at case closure as
   -2=deteriorated; -1=slightly deteriorated; 0=no change; +1=slightly improved; +2= improved

6. You wish to evaluate support for requiring parental notification before providing abortion services to a minor in a neighborhood served by a community clinic. You survey the $n = 78$ adults who came into the clinic over a one week period. What type of sample have you selected?
   - cluster sample
   - convenience sample
   - post hoc sample
   - quota sample
   - simple random sample
   - snowball sample
   - stratified sample
   - systematic sample