Statistics (Chapter 10: Introduction to Estimation)

Answer Key by Michael Reimer

1) "Normally Distributed" \( z = 0.32 \) \( CI = \frac{90}{100} = 0.90 \)

Four Commonly Used Confidence Levels = 2

- \( 90\% = 1.645 \)
- \( 95\% = 1.96 \)
- \( 98\% = 2.33 \)
- \( 99\% = 2.575 \)

To Find \( z \) using Tables B-8

\( 1 - CI = 0.0500 \) look up on \( z \) chart

\( 1 - 0.90 = 0.10 = 0.0500 \) look up on \( z \) table

\( \frac{0.0500}{2} = 0.0250 \)

\( z = 1.64 \) \( 2 = -1.65 \) Now we average the 2 \( z \) scores

\( \frac{-1.64 + (-1.65)}{2} = -1.645 \)

Now solve for \( \bar{X} \):

\[ \bar{X} = \frac{4.55 + 6.95 + 15.25 + 9.95 + 5.95 + 4.95 + 6.75 + 4.85 + 5.65 + 8.95}{10} = 6.38 \]

Now plug into CI Formula

\[ \bar{X} \pm \frac{z}{\sqrt{N}} = 6.38 \pm 0.32 \]

\[ 6.38 \pm 1.645(0.10119.2885) = 6.38 \pm 0.17 \]

\[ 6.38 - 0.17 = 6.21 \]

\[ 6.38 + 0.17 = 6.55 \]

we are 90% confidence that the average value of all greeting cards is between $6.21 and $6.55
2) "How large a sample" - Finding "n"

Also: \( \alpha \), confidence level and \( \beta \) are known.

\( \alpha = 0.05 \), \( 1 - \alpha = 95\% \), \( \beta = 0.20 \)

\( \beta = \text{Bound on the error of estimation} \)

To find \( z = 1 - 0.95 = 0.05 = 0.0250 \) look up on \( z \) table

\[ 0.0250 = 1.96 \]

\[ n = \left( \frac{z + \sqrt{z}}{\frac{2}{\beta}} \right)^2 = \left( \frac{1.96 \times 100}{20} \right)^2 = \left( \frac{196}{20} \right)^2 = (9.8)^2 = 96.04 \]

\[ n = 97 \]