Chapter 6 Formulas

For the standard normal distribution:

\[ z = \frac{X - \mu}{\sigma} \]

For the distribution of sample means:

\[ z = \frac{\bar{X} - \mu}{\left(\frac{\sigma}{\sqrt{n}}\right)} \]

For a binomial distribution: \( \mu = np \) \( \sigma = \sqrt{npq} \) ROUND to 2 decimal places

Chapter 7 Formulas

Confidence intervals for means, ROUND E to same place as \( \bar{X} \).

z confidence intervals for means:

\[ \bar{X} - E < \mu < \bar{X} + E \]

\[ E = z_{\alpha/2} \left(\frac{\sigma}{\sqrt{n}}\right) \]

T confidence intervals for means:

\[ \bar{X} - E < \mu < \bar{X} + E \]

\[ E = t_{\alpha/2} \left(\frac{s}{\sqrt{n}}\right) \]

Sample size for means:

\[ n = \left(\frac{z_{\alpha/2} \cdot \sigma}{E}\right)^2 \] where E is the maximum error of estimate.

Confidence interval for a proportion: \( \hat{p} - E < p < \hat{p} + E \)

\[ E = z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}} \]

Where \( \hat{p} = \frac{X}{n} \) and \( \hat{q} = 1 - \hat{p} \). ROUND \( \hat{p} \) and \( \hat{q} \) to 2 decimal places, E to 3 decimal places.

Sample size for proportions:

\[ n = \hat{p}\hat{q} \left(\frac{z_{\alpha/2}}{E}\right)^2 \]

Confidence intervals for variance and standard deviation: ROUND to the same place as the standard deviation.

\[ \frac{\chi_{\alpha/2}^2}{\chi_{\text{right}}^2} < \sigma^2 < \frac{\chi_{1 - \alpha/2}^2}{\chi_{\text{left}}^2} \]

\[ \sqrt{\frac{\chi_{\alpha/2}^2}{\chi_{\text{right}}^2}} < \sigma < \sqrt{\frac{\chi_{1 - \alpha/2}^2}{\chi_{\text{left}}^2}} \]