This quiz includes material from section ISI 1.5 and possibly from some preceding sections.

**ISI expl. 1.5, heads, pp.68-70**

When asked to call the outcome of the toss of a fair coin, are people equally likely to choose heads or tails? In a statistics class, 54 out of 83 students picked heads. Carry out a theory-based hypothesis test to investigate this situation.


We will develop a \( z \) test for one proportion.

**HT**

1. State the research question (precisely enough to clearly determine the form of the alternative hypothesis).

2-4. Report the values of the sample statistics.

\[ n = \]

\[ x = \]

\[ \hat{p} = x/n = \]

5-8. Define \( \pi \) in words, state the appropriate hypotheses, and report the value of \( \pi \).

Define \( \pi \).

\[ H_0 : \]

\[ H_a : \]

\[ \pi = \]

9-10. Validity conditions. Are the appropriate validity conditions satisfied for justifying theory-based inference for this problem?

Calculate the expected number of successes and failures.

\[ \pi \ast n = \]

\[ (1 - \pi) \ast n = \]
11. Are the appropriate validity conditions satisfied? Explain.

12-13. Use the Theory-based Inference applet to determine the values of the standardized test statistic, \( z \), and \( p\text{-value} \). Send in a screenshot of the applet labeled 1.5 heads showing all appropriate values.

\[
z = \quad p\text{-value} =
\]

14. Evaluate the strength of evidence against the null hypothesis indicated by \( p\text{-value} \).

\[
\text{strength of evidence (indicated by } p\text{-value} ) =
\begin{array}{cccc}
\text{not much} & 0.10 & \text{moderate} & 0.05 & \text{strong} & 0.01 & \text{very strong}
\end{array}
\]

15. Evaluate the strength of evidence against the null hypothesis indicated by \( z \).

\[
\text{strength of evidence (indicated by } z ) =
\begin{array}{cccc}
\text{not much} & 1.5 & \text{moderate} & 2 & \text{strong} & 3 & \text{very strong}
\end{array}
\]

16. Assume \( \alpha = 0.05 \).

State the formal conclusion of this HT.

( R ) I reject the null hypothesis

( F ) I fail to reject the null hypothesis

17. State the relationship between \( p\text{-value} \) and \( \alpha \), and then justify your formal conclusion.

18. Conclusion in context. What does this HT tell you about the research question? Be sure to include your level of confidence in your statement.

19-20. Reserved for applet image(s).