6. Inference for Categorical Data: Proportions

Starter Quiz · 课前小测

AP Statistics Name: ______________________ Score: ________

1. Inference about a proportion mainly does what?
   - ☐ quantifies the uncertainty in a sample statistic
   - ☐ removes all uncertainty
   - ☐ guarantees the true p
   - ☐ makes the sample bigger

2. $n = 100$, $\hat{p} = 0.60$. Compute the standard error $\sqrt{(\hat{p}(1-\hat{p})/n)}$. Two decimals.

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3. The correct interpretation of a 95% confidence level is...
   - ☐ about 95% of intervals built this way capture p over many samples
   - ☐ there's a 95% probability p is in this one interval
   - ☐ 95% of the data lie in the interval
   - ☐ the sample is 95% accurate

4. The null hypothesis for a one-proportion test has the form...
   - ☐ H0: $p = p0$
   - ☐ Ha: $p \neq p0$
   - ☐ H0: $\hat{p} = 0$
   - ☐ Ha: $p > 1$

5. The p-value is the probability of a result at least as extreme as observed, assuming...
   - ☐ H0 is true
   - ☐ Ha is true
   - ☐ the sample is biased
   - ☐ $\hat{p} = 0.5$

6. The decision rule for a significance test is: reject H0 when...
   - ☐ p-value $\leq \alpha$
   - ☐ p-value $> \alpha$
   - ☐ $z = 0$
   - ☐ $\hat{p} = p0$

7. $\hat{p}1 = 0.60$, $\hat{p}2 = 0.50$. Find the point estimate $\hat{p}1 - \hat{p}2$.

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8. $\hat{p}1 = 0.30$, $\hat{p}2 = 0.20$, pooled SE ≈ 0.061. Compute $z = (\hat{p}1 - \hat{p}2)/SE$. Two decimals.

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9. The large counts condition ($n\hat{p} \geq 10$ and $n(1-\hat{p}) \geq 10$) justifies using a normal model.

☐ True ☐ False

10. With SE ≈ 0.049 and $z^* = 1.96$, find the margin of error $z^* \cdot SE$. Two decimals.

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AP Statistics

1. **quantifies the uncertainty in a sample statistic**

   Inference measures uncertainty honestly — it doesn't remove it.

2. **0.05**

   $\sqrt{(0.6 \cdot 0.4/100)} = \sqrt{0.0024} \approx 0.049 \approx 0.05$.

3. **about 95% of intervals built this way capture p over many samples**

   Confidence describes the method over repeated sampling.

4. **H0: p = p0**

   H0 states a specific value p0 (the status quo).

5. **H0 is true**

   p-value is computed under the assumption that H0 is true.

6. **p-value** $\leq \alpha$

   Reject when the p-value is at most the significance level.

7. **0.1**

   $0.60 - 0.50 = 0.10$.

8. **1.64**

   $0.10 / 0.061 \approx 1.64$.

9. **True**

   Large counts make the sampling distribution roughly normal.

10. **0.1**

    $1.96 \times 0.049 \approx 0.096 \approx 0.10$.