

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.

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...

- ☐ $H_0: p = p_0$
- ☐ $H_a: p \neq p_0$
- ☐ $H_0: \hat{p} = 0$
- ☐ $H_a: p > 1$

5. The p-value is the probability of a result at least as extreme as observed, assuming...

- ☐ H_0 is true
- ☐ H_a is true
- ☐ the sample is biased
- ☐ $\hat{p} = 0.5$

6. The decision rule for a significance test is: reject H_0 when...

- ☐ $p\text{-value} \leq \alpha$
- ☐ $p\text{-value} > \alpha$
- ☐ $z = 0$
- ☐ $\hat{p} = p_0$

7. $\hat{p}_1 = 0.60$, $\hat{p}_2 = 0.50$. Find the point estimate $\hat{p}_1 - \hat{p}_2$.

8. $\hat{p}_1 = 0.30$, $\hat{p}_2 = 0.20$, pooled $SE \approx 0.061$. Compute $z = (\hat{p}_1 - \hat{p}_2)/SE$. Two decimals.

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

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**

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