

AP Statistics - Inference for the Difference of Two Proportions - Quiz

Common Core AP STAT 6.8, AP STAT 6.9, AP STAT 6.10, AP STAT 6.11, HSS-IC.B.5 · maths-pdf.fr/en/

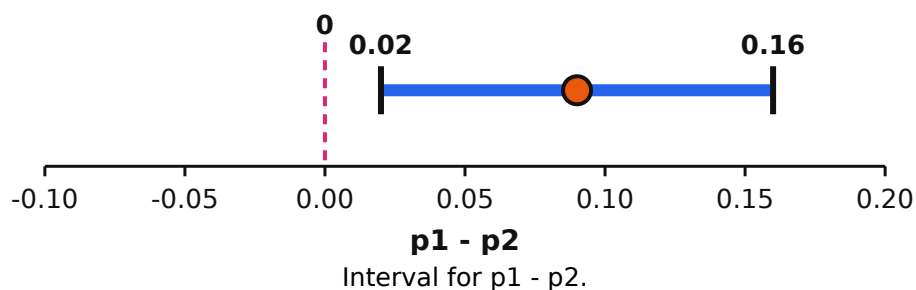
Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions test pooled versus unpooled standard errors, conditions, and interpretation. Read each explanation before you move on.

AP Statistics · Common Core State Standards: **AP STAT 6.8, AP STAT 6.9, AP STAT 6.10, AP STAT 6.11, HSS-IC.B.5**

Questions

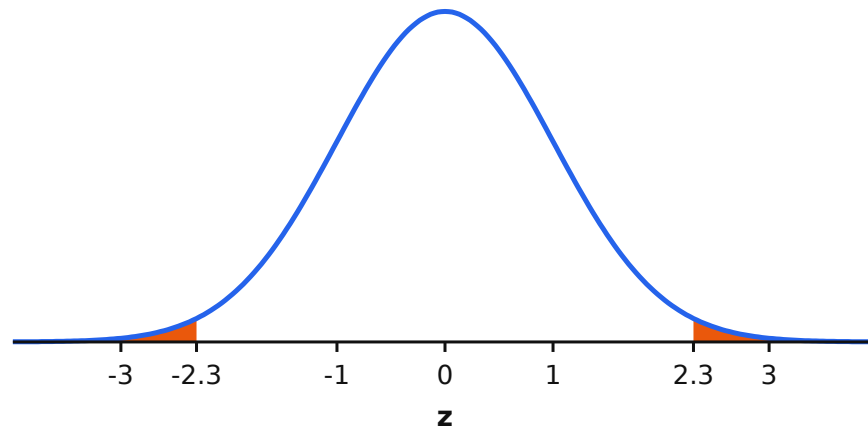
Question 1



What does this 95% interval for $p_1 - p_2$ suggest?

- A. No difference
- B. p_2 is greater than p_1
- C. A convincing difference, with p_1 greater than p_2
- D. The sample is biased

Question 2



Two-sided p-value.

What is the two-sided p-value for $z = 2.3$?

- A. About 0.011
- B. About 0.989
- C. About 0.021
- D. About 0.5

Question 3

	Yes	No
A	40	60
B	30	70

Two groups.

What is the pooled proportion?

- A. 0.40
- B. 0.35
- C. 0.30
- D. 0.70

Question 4

The standard error in a two-proportion confidence interval uses:

- A. each group's own sample proportion
- B. the pooled proportion
- C. $p = 0.5$ always
- D. the difference only

Question 5

When $H_0: p_1 = p_2$, the standard error uses:

- A. only $\hat{p}_1$
- B. only $\hat{p}_2$
- C. $p = 0.5$
- D. the pooled proportion

Question 6

An experiment's two groups were formed by random assignment. For a two-proportion procedure, the 10% condition is:

- A. not required
- B. required for each group
- C. required for the pooled group
- D. replaced by $n \geq 30$

Question 7

A 95% interval for $p_1 - p_2$ is $(-0.05, 0.03)$. Which statement is correct?

- A. p_1 is definitely greater
- B. 0 is a plausible value for the difference
- C. p_2 is definitely greater
- D. the samples are dependent

Question 8

Which is a valid use of a two-sample z procedure?

- A. Compare before and after rates for the same 30 students
- B. Compare 5 and 8 successes
- C. Compare one sample with a known value
- D. Compare vaping rates in two independent random samples of teens

Question 9

A smaller standard error gives:

- A. a narrower interval
- B. a wider interval
- C. a larger $\hat{p}$
- D. a larger α

Question 10

If $p\text{-value} = 0.003$ for $H_0: p_1 = p_2$, then at $\alpha = 0.05$:

- A. fail to reject H_0

- B. reject H_0
- C. accept H_0
- D. increase the sample size

Answers

1. **C** – The interval is entirely positive, so 0 is not plausible and p_1 is larger.
2. **C** – Right tail 0.0107 doubled is 0.0214.
3. **B** – $(40 + 30)/(100 + 100) = 0.35$.
4. **A** – Intervals do not assume equality, so each sample's p -hat is used.
5. **D** – H_0 says there is one common proportion; pooling estimates it.
6. **A** – With random assignment, independence comes from the randomization, not from sampling less than 10%.
7. **B** – An interval containing 0 means no convincing evidence of a difference.
8. **D** – The samples must be independent and have enough successes and failures.
9. **A** – Margin of error is z^* times the standard error.
10. **B** – 0.003 is less than 0.05, which is strong evidence against H_0 .

Remember

- Parameter: $p_1 - p_2$; statistic: $\hat{p}_1 - \hat{p}_2$.
- Interval: $(\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\hat{p}_1(1 - \hat{p}_1)/n_1 + \hat{p}_2(1 - \hat{p}_2)/n_2}$.
- Test: pooled $\hat{p}_c = (x_1 + x_2)/(n_1 + n_2)$; $z = (\hat{p}_1 - \hat{p}_2)/\sqrt{\hat{p}_c(1 - \hat{p}_c)(1/n_1 + 1/n_2)}$.
- Conditions: independent random samples (or random assignment); 10% condition; at least 10 successes and 10 failures in each group.
- If the interval contains 0, a difference of 0 is plausible; if it does not, there is evidence of a difference.