

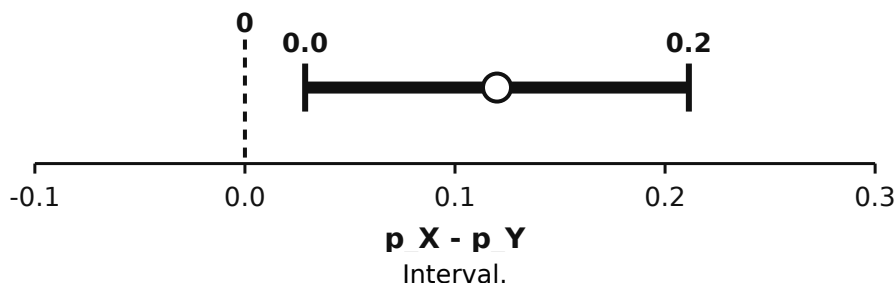
AP Statistics - Inference for the Difference of Two Proportions - Test Answer Key

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/

Each solution includes a scoring guide. Award points for the conditions, the correct standard error, the interval or z statistic, and a conclusion linked to the context.

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**

Question 1 - Two-sample interval [4 pts]



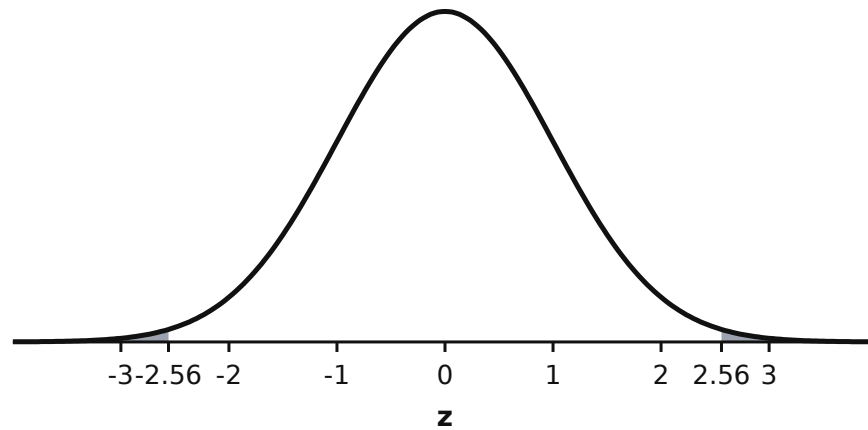
(a) Counts 84, 116, 66, 154 are all at least 10. (b)

$\hat{p}_X = 0.42$, $\hat{p}_Y = 0.30$, $SE = 0.0466$, $ME = 0.0914$, interval (0.029, 0.211). (c) We are 95% confident that the interval captures the true difference in the proportions of successes between populations X and Y. (d) 0 is not in the interval: convincing evidence of a difference.

(0.029, 0.211).

Scoring: 1 point for (a); 1 point for the SE and margin of error; 1 point for the interval; 1 point for the interpretation and the conclusion about 0.

Question 2 - Two-sample test [4 pts]



Two-sided p-value.

$$\hat{p}_c = \frac{150}{420} = 0.3571. SE = 0.0468, z = \frac{0.12}{0.0468} = 2.56. \text{ p-value} = 0.0105.$$

p-value < 0.05, so reject H0: convincing evidence that the success proportions differ between X and Y.

Scoring: 1 point for the pooled proportion, 1 point for z, 1 point for the p-value, 1 point for the conclusion in context.

Question 3 - Hypotheses [2 pts]

	Improved	Not improved
Drug	56	24
Placebo	40	40

Randomized experiment results.

p_D = true proportion who would improve with the drug; p_P = true proportion who would improve with the placebo.

H0: $p_D = p_P$; Ha: $p_D > p_P$.

Scoring: 1 point for defining the parameters in context, 1 point for the hypotheses.

Question 4 - Sample difference [1 pt]

Drug: $\frac{56}{80} = 0.70$. Placebo: $\frac{40}{80} = 0.50$.

0.70 and 0.50.

Scoring: 1 point for both proportions.

Question 5 - Error type [1 pt]

Rejecting a true null hypothesis.

Type I error.

Scoring: 1 point for Type I.

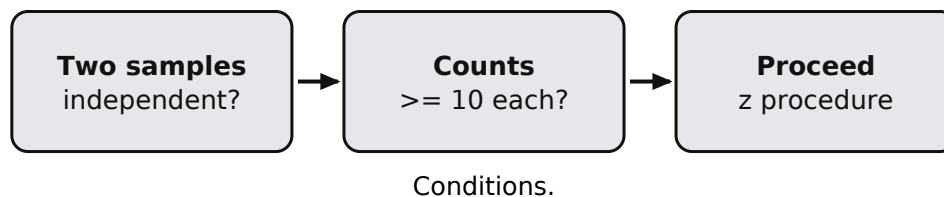
Question 6 - Pooled or not [2 pts]

The test assumes H_0 is true, which says both populations share one proportion, so combining the samples estimates it.

An interval does not assume equality, so it uses each sample proportion separately.

Scoring: 1 point for the test assumption, 1 point for the interval difference.

Question 7 - Conditions [3 pts]



- (a) The sophomores have only 6 successes, fewer than 10, so the large counts condition fails.
(b) Take larger samples.

Large counts fails; use larger samples.

Scoring: 2 points for identifying the condition and the count; 1 point for a fix.

Question 8 - Interpret the interval [3 pts]

- (a) We are 95% confident that the true on-time proportion of route A is between 0.04 less and 0.12 more than that of route B. (b) 0 is in the interval.

No convincing evidence of a difference.

Scoring: 2 points for the interpretation with direction and context; 1 point for the conclusion.

Total
20 points