

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

Common Core AP STAT 7.6, AP STAT 7.7, AP STAT 7.8, AP STAT 7.9, HSS-IC.B.5 · maths-pdf.fr/en/

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

Ten multiple-choice questions test the standard error formula, the conditions, and paired versus independent samples. Read every explanation before moving on.

AP Statistics · Common Core State Standards: **AP STAT 7.6, AP STAT 7.7, AP STAT 7.8, AP STAT 7.9, HSS-IC.B.5**

Questions

Question 1

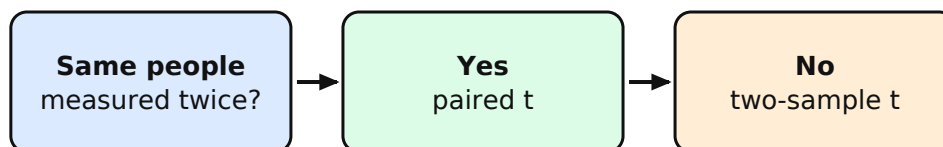
Group	n	Mean	Std dev
Group 1	30	20	4
Group 2	40	17	5

Summary statistics.

The standard error of $\bar{x}_1 - \bar{x}_2$ is:

- A. 1.08
- B. 0.89
- C. 2.28
- D. 9

Question 2

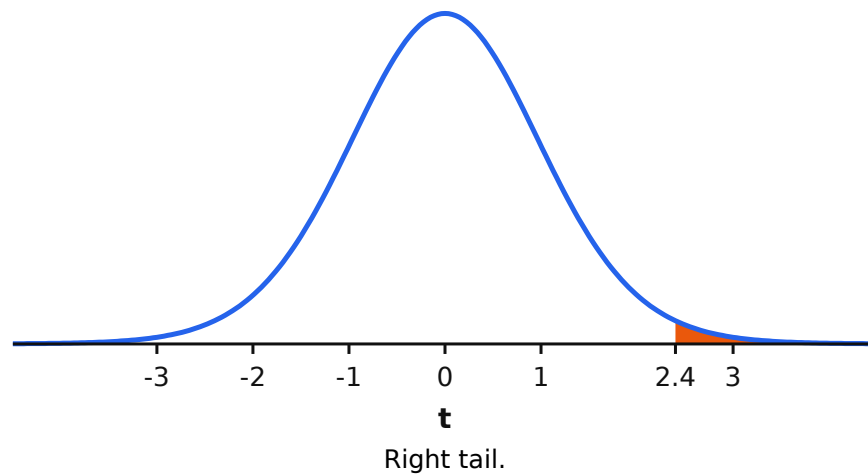


Choose the procedure by the design.

Twelve students take a quiz before and after a lesson. Which procedure applies?

- A. A two-sample t procedure
- B. A paired t procedure
- C. A two-proportion z procedure
- D. A chi-square test

Question 3



The shaded area is closest to:

- A. 0.026
- B. 0.5
- C. 0.987
- D. 0.013

Question 4

The Normal/Large Sample condition for a two-sample t procedure means:

- A. the groups must be equal in size
- B. the means are equal
- C. the sample proportions are at least 10
- D. each group is approximately normal or has n at least 30

Question 5

A 95% interval for $\mu_1 - \mu_2$ is (2.1, 7.9). Which conclusion is reasonable?

- A. μ_1 is larger than μ_2
- B. μ_2 is larger than μ_1
- C. the means are equal
- D. the samples were paired

Question 6

The standard error in a two-sample t procedure uses:

- A. a pooled proportion
- B. only the larger standard deviation
- C. each group's own standard deviation and sample size
- D. the sum of the standard deviations

Question 7

In a randomized experiment with two treatment groups, which condition replaces 'independent random samples'?

- A. The 10% condition
- B. Random assignment to the groups
- C. Equal sample sizes
- D. A paired design

Question 8

Which change makes a two-sample confidence interval narrower?

- A. A higher confidence level
- B. Larger standard deviations
- C. Larger samples
- D. Smaller sample sizes

Question 9

If the test statistic for $H_0: \mu_1 - \mu_2 = 0$ is $t = 0.4$ with a large df, the p-value (two-sided) is about:

- A. 0.69
- B. 0.35
- C. 0.04
- D. 0.96

Question 10

Twelve plants are randomly assigned to two fertilizers (6 each) and growth is compared. The appropriate test is:

- A. paired t
- B. two-sample t
- C. chi-square
- D. one-proportion z

Answers

1. **A** - $\sqrt{16/30 + 25/40} = \sqrt{0.5333 + 0.625} = 1.076$. Adding the standard deviations or the variances without dividing by n are common errors.
2. **B** - The same students are measured twice, so we analyze the differences.
3. **D** - With $df = 20$, $P(t > 2.4)$ is about 0.013.
4. **D** - Each group must satisfy the condition; equal sizes are not required.
5. **A** - The whole interval is positive, so 0 is not plausible and μ_1 is larger.
6. **C** - $SE = \sqrt{s_1^2/n_1 + s_2^2/n_2}$.
7. **B** - Random assignment provides the independence needed for the comparison.
8. **C** - A larger n reduces the standard error.
9. **A** - The tail area beyond 0.4 is about 0.345; doubling gives 0.69.
10. **B** - Different plants receive each treatment, so the groups are independent.

Remember

- Parameter: $\mu_1 - \mu_2$; statistic: $\bar{x}_1 - \bar{x}_2$.
- $SE = \sqrt{s_1^2/n_1 + s_2^2/n_2}$; df from the calculator, or $\min(n_1 - 1, n_2 - 1)$ conservatively.
- Interval: $(\bar{x}_1 - \bar{x}_2) \pm t^* SE$; test: $t = (\bar{x}_1 - \bar{x}_2)/SE$ with $H_0: \mu_1 - \mu_2 = 0$.
- Conditions: independent random samples or random assignment; 10%; each group normal or $n \geq 30$.
- Same subjects measured twice or matched pairs: use a one-sample t on the differences.