

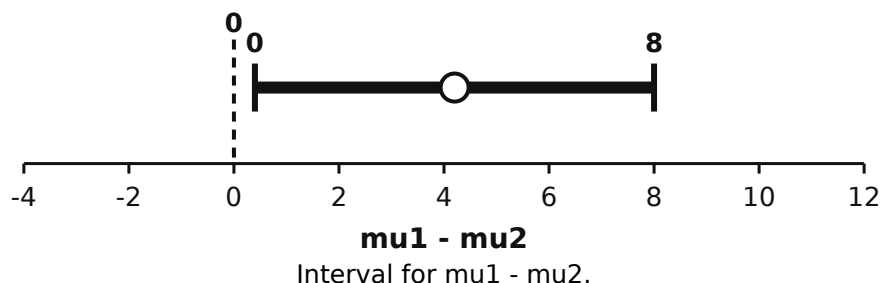
AP Statistics - Inference for the Difference of Two Means - Test Answer Key

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/

Each solution includes a scoring guide. Award points for correct conditions, the standard error, the test statistic or interval, and a conclusion that links to the context and mentions the direction of the difference.

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**

Question 1 - Two-sample interval [4 pts]

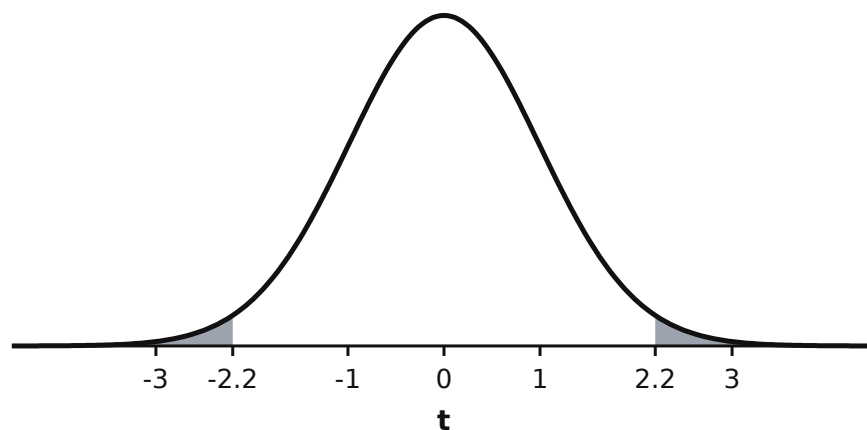


(a) Independent random samples; each under 10% of its population; both n at least 30. (b) $SE = 1.910$, $df \approx 82.8$, $t^* = 1.989$, $ME = 3.798$, interval $(0.402, 7.998)$. (c) We are 95% confident that the true mean weekly study time is between 0.402 and 7.998 hours higher for online students than for in-person students.

(0.402, 7.998) hours.

Scoring: 1 point for conditions, 1 point for the SE and t^* , 1 point for the interval, 1 point for the interpretation.

Question 2 - Two-sample test [4 pts]



Two-sided p-value.

$H_0: \mu_1 - \mu_2 = 0$, $H_a: \mu_1 - \mu_2 \neq 0$. $t = 2.20$, $df \approx 82.8$, $p\text{-value} = 0.0306$.

Reject H_0 : convincing evidence of a difference in the mean weekly study times.

Scoring: 1 point each for hypotheses, t statistic, p -value, and a conclusion in context.

Question 3 - Paired or two-sample [3 pts]

(a) Paired t procedure; parameter μ_d , the true mean change in cholesterol. (b) Two-sample t procedure; parameter $\mu_{\text{drivers}} - \mu_{\text{cyclists}}$.

(a) paired; (b) two-sample.

Scoring: 1 point per correct procedure, 1 point for correctly defining both parameters.

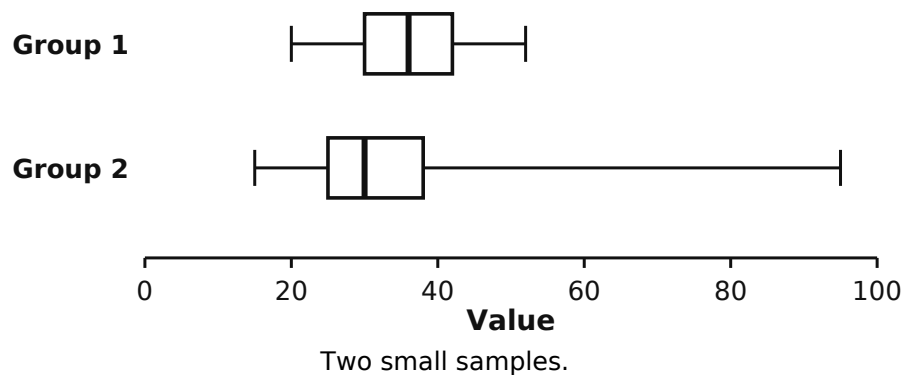
Question 4 - Standard error [2 pts]

$$\sqrt{\frac{36}{25} + \frac{81}{36}} = \sqrt{1.44 + 2.25} = \sqrt{3.69} = 1.921.$$

1.921.

Scoring: 1 point for the formula, 1 point for 1.921.

Question 5 - Normal condition [2 pts]



Group 2 has a very long upper whisker, indicating strong skew or an outlier, and n is small.

No: the Normal condition is questionable for Group 2.

Scoring: 1 point for the answer, 1 point for the reason.

Question 6 - Interpret p-value [2 pts]

If the two population means were equal, there would be a 0.3% chance of a difference in sample means this large or larger.

Since $0.003 < 0.01$, reject H_0 : convincing evidence the means differ.

Scoring: 1 point for the interpretation, 1 point for the conclusion.

Question 7 - Name the parameter [1 pt]

μ_1 is the true mean weekly study time of all online students; μ_2 that of all in-person students.

$\mu_1 - \mu_2$ is the difference between these two population means.

Scoring: 1 point for a definition in context.

Question 8 - Effect of changes [2 pts]

(a) narrower; (b) wider.

Narrower; wider.

Scoring: 1 point each.

Total
20 points