

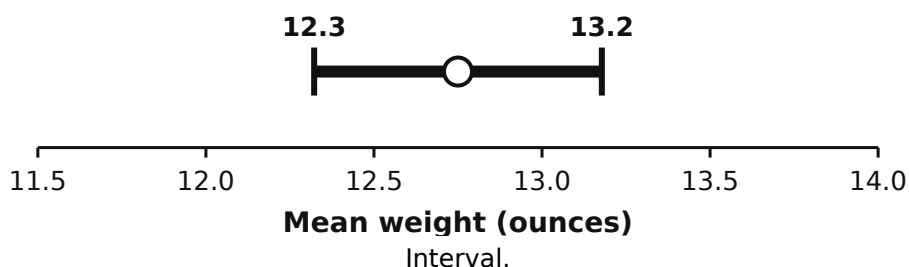
AP Statistics - t Intervals and t Tests for a Mean - Test Answer Key

Common Core AP STAT 7.1, AP STAT 7.2, AP STAT 7.3, AP STAT 7.4, AP STAT 7.5, HSS-IC.B.4 · maths-pdf.fr/en/

Each solution includes a scoring guide. Give credit for correct conditions and df, the interval or test statistic, and a conclusion that names the parameter and the population.

AP Statistics · Common Core State Standards: **AP STAT 7.1, AP STAT 7.2, AP STAT 7.3, AP STAT 7.4, AP STAT 7.5, HSS-IC.B.4**

Question 1 - t interval [4 pts]

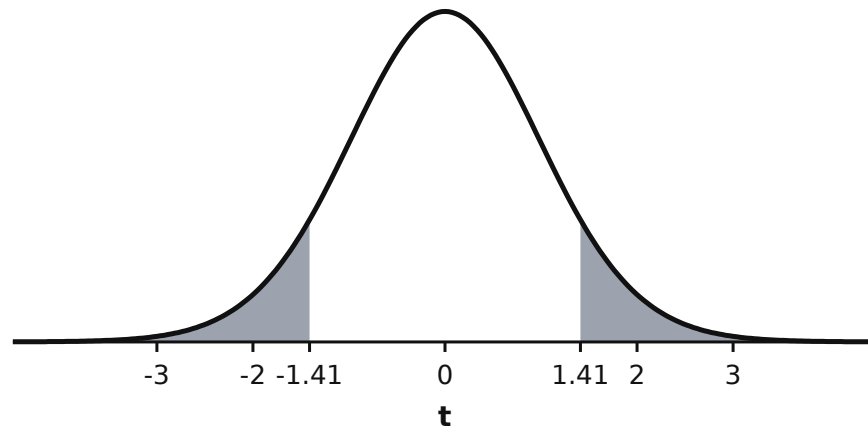


(a) Random sample (given); 10 is less than 10% of all packages; the dotplot shows no strong skew or outliers, so Normal is reasonable. (b) $\bar{x}=12.75$, $s=0.599$, $SE=0.189$, $t^*=2.262$, ME 0.428, interval (12.322, 13.178). (c) We are 95% confident that this interval captures the true mean weight of all packages.

(12.322, 13.178) ounces.

Scoring: 1 point for conditions (random, 10%, Normal from the graph), 1 point for SE/df/ t^* , 1 point for the interval, 1 point for the interpretation in context.

Question 2 - t test [4 pts]



Two-sided p-value.

$H_0: \mu = 15$, $H_a: \mu \neq 15$. Conditions: random, 32 is less than 10% of all commuters, n at least 30.
 $t = 1.41$, $df = 31$, p-value = 0.1685.

Fail to reject H_0 : not convincing evidence that the mean travel time differs from 15 minutes.

Scoring: 1 point for hypotheses with the parameter, 1 point for conditions, 1 point for t and the p-value, 1 point for the conclusion.

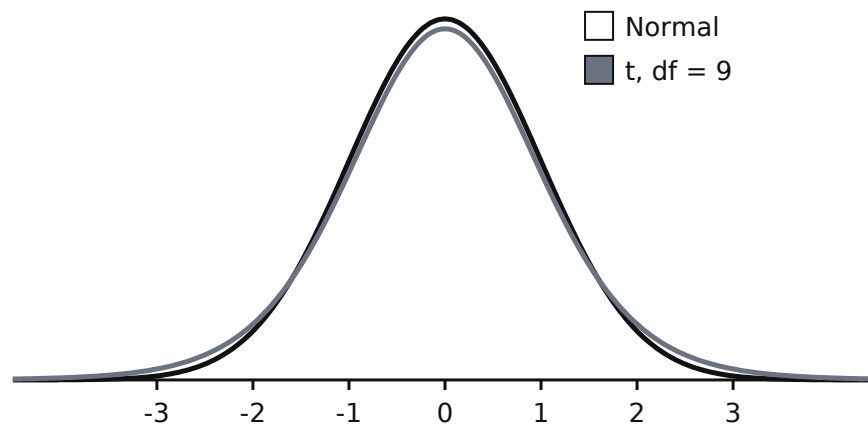
Question 3 - Matched pairs setup [2 pts]

The same students are measured twice, so the two measurements are dependent.

Use differences; the parameter is μ_d , the true mean difference in puzzle time (without music minus with music) for all students.

Scoring: 1 point for pairing, 1 point for defining μ_d .

Question 4 - t^* and z^* [2 pts]



Normal and t.

The t distribution has heavier tails, so a larger multiplier is needed for the same central area.

t* is larger; as n grows, t* approaches z*.

Scoring: 1 point for heavier tails, 1 point for the limit.

Question 5 - Effect of changes [2 pts]

$ME = t^* s/\sqrt{n}$.

(a) smaller; (b) larger.

Scoring: 1 point each.

Question 6 - Conditions [2 pts]

(a) No: small n with an outlier. (b) Yes: n is at least 30, so the CLT applies.

(a) no; (b) yes.

Scoring: 1 point each.

Question 7 - Interpret the p-value [2 pts]

The p-value is computed assuming H_0 is true.

If the true mean time were 20 minutes, there would be a 3% chance of getting a

sample mean at least as large as the one observed.

Scoring: 1 point for assuming H_0 true, 1 point for context.

Question 8 - Degrees of freedom [2 pts]
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$df = 17$ and $t^* = 2.110$.

$df = 17$; $t^* = 2.110$.

Scoring: 1 point for df , 1 point for t^* .

Total
20 points