

Discussion: Week 7

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This discussion will be focused on working problems from the book. We will do problems related to

- finding a necessary sample size,
- confidence intervals, and
- hypothesis testing.

The document on identifying the confidence intervals and tests will be used and discussed.

Some problems that will be looked at (unless there are particular requests):

- p446, #31a&c; 140.91 \rightarrow 141. 563.65 \rightarrow 564.
- p492, #27; (0.218, 0.302). 0.20 not in CI, so not consistent.
- p571, #33; $T = -1.36, df = 20.00, p\text{-value} = 0.0945$. Fail to reject (one-sided*: $H_0 : \mu_{no} - \mu_{rap} = 0; H_A : \mu_{no} - \mu_{rap} > 0$). We did not find a significant difference in the mean number of objects recalled between listening to rap or no music at all.
* in practice, this probably should be two-sided since it is unclear what they believed *prior to collecting the data*. in this class, if it hints at one-sided, use a one-sided test.
- p588, #13 (same setup, different question). Suppose it is thought that the average change in temperature from January to July is 43 degrees in European countries. Setup and run a hypothesis test to check whether this claim.

$H_0 : \mu_{July} - \mu_{Jan} = 43; H_A : \mu_{July} - \mu_{Jan} \neq 43$. The data is paired, so we work with the differences in each city (so 12 data points). For differences, $(mean, sd) = (36.83, 8.66)$. $T = \frac{36.83-43}{8.66/\sqrt{12}} = 2.47$ on $df = 12 - 1$. So the p-value is 0.031, so we reject H_0 and conclude that the difference is not actually 43 degrees but somewhat lower than that.