AP Statistics

2019-03-26 9.3 Assignment

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Pg. 587-593 71,73,75,77,89,94-97,99-104

Question 71

$\bar{x}$ = 1.02

s = 1.1961

H[0]: μ = 0

H[a]: μ > 0

The sample is normal and random, as stated.

The sample is independent as we can assume that more than ten batches of the soda exist.

The one-sample t statistic test can help us reject a hypothesis.

t = ($\bar{x}$ - μ)/(s/sqrt(n)) = 2.697

df = 10 - 1 = 9

Table B determines that the P-value is between 0.01 and 0.02. As our standard confidence interval α = 0.05, P < α. This gives us sufficient evidence to reject H[0] and support H[a], the claim made in the original question.

Question 73

Part A

Outliers lay between (Q1-IQR*1.5) and (Q3+IQR*1.5) which evaluates to -55 to 1777.8.

The minimum and maximum are within this range so we can prove that there are no outliers within the sample.

Part B

This P value (0.000) shows that it the probability for this sample to occur while μ equals 1200 is 0.000. If μ truly does equal 1200 mg, the chance of obtaining a different sample of 36 women with a mean of 856.2 or lower is impossible.

Part C

H[0]: μ = 1200

H[a]: $\mu < 1200$

p = 0.000

This is less than the standard confidence interval α of 0.05. Therefore, we have sufficient evidence to reject H[0] and support the researchers' claim.

Question 75

H[0]: $\mu = 0$

H[a]: $\mu > 0$

Independent: Unsure??

Random: No, entire population sampled??

Normal: Yes, stated

t = (0.34)/(0.83/sqrt(10)) = 1.295

df = 9

Table B shows that 0.10 < P < 0.15

Since P > the confidence level α = 0.05, we can not reject H[0].

Question 77

Part A

Type I: It is concluded that H[0] is false when it is true.

Type II: It is concluded that H[0] is true when it is false.

We could have committed a Type II error.

Part B

The power could be increased using a higher sample size or significance level.

Question 89

Part A

If they were not randomly assigned then the subjects could have shown bias/"first try" issues, confounding with the easiness of the knobs.

Part B

The sample was mapped to a single set of data points by taking the time for the right thread and subtracting the time for the left thread.

$\bar{x} = -13.36$

s = 22.9236

H[0]: $\mu = 0$

H[a]: $\mu < 0$ (we want right threads to be easier, so right is smaller making the difference negative).

t = -2.914

df = 24

Table B shows that P is between 0.0025 and 0.005. This value is below the significance level $\alpha = 0.05$ so we have sufficient evidence to reject the null hypothesis and support the claim that the right threads are easier to use.

Question 94

With such a large sample, the p-value will be very small. This means that a statistically significant difference may not correlate to a large real difference.

Question 95

A convenience sample was used

Question 96

Joe knows the entire population's data and thus has the population mean. Therefore, a significance test makes no sense as we already know the population mean.

Question 97

Part A

At the significance level 0.01, we expect 5 of the 500 subjects to do better from pure chance. Therefore, we can not confidently conclude that these people have ESP.

Part B

The procedure should be repeated again and determine whether they perform significantly better again (potentially above a more significant threshold as well)

Question 99: **B**

Question 100: **A**

Question 101: **D**

Question 102: **C**

Question 103: **A**

Question 104: **A**