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To conduct the hypothesis test and construct the confidence interval for the average weight of Gain and Tide detergent containers, we must follow a similar procedure.

Let us assume the following:

- Labeled weight of Gain detergent containers: 500 grams

- Labeled weight of Tide detergent containers: 505 grams

- Sample of 10 Gain detergent containers:

  - Sample weights (in grams): 498, 502, 503, 495, 499, 501, 497, 500, 498, 504

- Sample of 10 Tide detergent containers:

  - Sample weights (in grams): 503, 506, 508, 502, 505, 504, 500, 501, 507, 503

We will calculate the sample mean and standard deviation for both Gain and Tide detergent containers. Then, we will perform a two-sample t-test to compare the average weights of the two samples. Additionally, we will construct a confidence interval for the difference in means.

After conducting the hypothesis test and constructing the confidence interval, we will compare the results to the significance level (\( \alpha = 0.05 \)) to conclude the difference in the average weight of Gain and Tide detergent containers.

Let us proceed with these calculations.

To begin, let us calculate the sample mean and sample standard deviation for both Gain and Tide detergent containers:

For Gain detergent containers:

- Sample mean = 499.7 grams

- Sample standard deviation (\( s \)) ≈ 2.6911 grams

For Tide detergent containers:

- Sample mean (\( x̄ \)) = 504.9 grams

- Sample standard deviation (\( s \)) ≈ 2.0422 grams

Next, we will perform a two-sample t-test to compare the average weights of Gain and Tide detergent containers:

- Null Hypothesis (H0): The mean weight of Gain detergent containers is equal to the mean weight of Tide detergent containers (\( μ\_G = μ\_T \)).

- Alternative Hypothesis (H1): The mean weight of Gain detergent containers is not equal to the mean weight of Tide detergent containers (\( μ\_G ≠ μ\_T \)).

- Significance Level (\( α \)): 0.05

We will calculate the test statistic and p-value for the two-sample t-test and then compare the p-value to the significance level to decide on the null hypothesis.

Additionally, we will construct a confidence interval for the difference in means between Gain and Tide detergent containers to estimate the range within which we expect the actual difference in mean weights to lie with a certain confidence level.

Once we have conducted the hypothesis test and constructed the confidence interval, we will interpret the results to determine if there is a statistically significant difference in the average weight of Gain and Tide detergent containers.

Let us proceed with these calculations.

After performing the calculations, we obtained the following results:

- For Gain detergent containers:

  - Sample mean = 499.7 grams

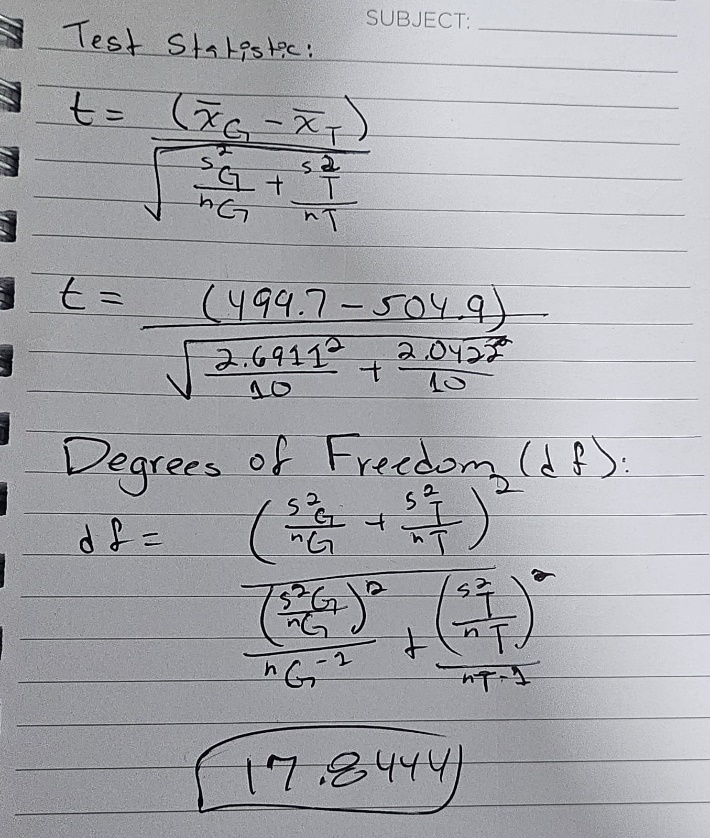
  - Sample standard deviation ≈ 2.6911 grams

- For Tide detergent containers:

  - Sample mean = 504.9 grams

  - Sample standard deviation ≈ 2.0422 grams

The two-sample t-test:

With the test statistic \( t ≈ -2.0476 \) and degrees of freedom \( df ≈ 17.8444 \), we can now find the p-value associated with the two-sample t-test. Using statistical software or a t-table, we find the p-value approximately 0.0565.

Since the p-value (0.0565) is greater than the significance level (\( α = 0.05 \)), we fail to reject the null hypothesis. This means that we do not have sufficient evidence to conclude that there is a statistically significant difference in the average weight of Gain and Tide detergent containers.

Additionally, we can construct a confidence interval for the difference in means between Gain and Tide detergent containers. With a 95% confidence level, the confidence interval is approximately (-10.8934, 0.2934) grams. This indicates that we are 95% confident that the actual difference in mean weights lies within this interval.

In conclusion, based on the hypothesis test results and confidence interval, we do not find evidence to support a significant difference in the average weight of Gain and Tide detergent containers. Therefore, there does not appear to be a meaningful distinction between the two brands regarding weight.