Disclaimer

Chapter 9 Homework

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1. Fill in the blank. Two samples are said to be _____ if the subjects in group 1 are completely different from the subjects in group 2.

2. Fill in the blank. Two samples are said to be _____ if the subjects in group 1 and group 2 are the same subjects, have a relationship (e.g. twins, siblings, married couples), or matched for specific characteristics.

3. A researcher believes that the average number of hours spent on the Internet each day for men is different from women. He samples 100 men and determines the mean to be 150 minutes with a standard deviation of 15 minutes. From a sample of 90 women, the mean is 135 minutes with a standard deviation of 30 minutes. Perform a test at the 1% level of significance. Assume the samples were taken from normal populations.

4. Given the following data, test $\mu_1 \neq \mu_2$ at the 5% level of significance and state the decision. Assume the samples were taken from normal populations.

   Group 1: Sample mean: 45
   Sample standard deviation: 8
   Sample size: 14 subjects
   Group 2: Sample mean: 38
   Sample standard deviation: 4
   Sample size: 11 subjects

5. Below is a set of data from a matched-pairs design. At the 5% level of significance, test $\mu_D > 0$ and state the decision. Assume normality. (*Hint: D = After – Before*)

Subject	1	2	3	4
Before	40	42	29	31
After	70	98	73	49

6. Below is a set of data from a matched-pairs design. At the 10% level of significance, test $\mu_D \neq 0$ and state the decision. Assume normality.

Subject	1	2	3	4	5
Before	299	298	313	340	374
After	338	361	388	391	401

7. In a sample of 200 college men who have student loan debt, 105 of them worry about repaying it. In a sample of 200 college women who have student loan debt, 130 of them worry about repaying it. Is there a difference in proportions? Perform a test at the 5% level of significance. Also, construct a 95% confidence interval for $p_1 - p_2$.

8. Given the following data, test $p_1 \neq p_2$ at the 1% level of significance and state the decision. Also, construct a 99% confidence interval for $p_1 - p_2$.

Group 1: Number of successes: 87
           Sample size: 129
Group 2: Number of successes: 94
           Sample size: 121 subjects

Answers

1. Independent
2. Dependent
3. H_0: $\mu_1 = \mu_2$, H_A: $\mu_1 \neq \mu_2$. t = 4.29. Reject the null hypothesis. There is sufficient evidence to suggest that the average number of hours spent on the Internet each day for men is different from women.
4. H_0: $\mu_1 = \mu_2$, H_A: $\mu_1 \neq \mu_2$. t = 2.85. Reject the null hypothesis.
5. H_0: $\mu_D = 0$, H_A: $\mu_D > 0$. t = 4.48. Reject the null hypothesis. There is sufficient evidence to suggest that a new innovative homework software program helped improve average test scores.
6. H_0: $\mu_D = 0$, H_A: $\mu_D \neq 0$. t = −6.01. Reject the null hypothesis.
7. H_0: $p_1 = p_2$, H_A: $p_1 \neq p_2$. z = −2.54. Reject the null hypothesis. There is sufficient evidence to suggest that the proportion of men who worry about repaying their student loan debt is different from the proportion of women who worry about repaying their student loan debt. 95% confidence interval: (−0.2207, −0.0293).
8. H_0: $p_1 = p_2$, H_A: $p_1 \neq p_2$. z = −1.81. Do not reject the null hypothesis. 99% confidence interval: (−0.2467, 0.0418).