

Practice: Two Dependent Samples (matched pairs or paired data)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Assume that you want to test the claim that the paired sample data come from a population for which the mean difference is $\mu_D = 0$. Compute the value of the t test statistic. Round intermediate calculations to four decimal places as needed and final answers to three decimal places as needed.

1)

x	29	31	23	27	26	26	34	30
y	27	27	29	27	27	31	34	29

- A) $t = 0.690$ B) $t = -0.185$ C) $t = -1.480$ D) $t = -0.523$

1) _____

- 2) A farmer has decided to use a new additive to grow his crops. He divided his farm into 10 plots and kept records of the corn yield (in bushels) before and after using the additive. The results are shown below.

Plot:	1	2	3	4	5	6	7	8	9	10
Before	9	9	8	7	6	8	5	9	10	11
After	10	9	9	8	7	10	6	10	10	12

You wish to test the following hypothesis at the 10 percent level of significance.

$H_0: \mu_D = 0$ against $H_1: \mu_D \neq 0$.

What is the value of the appropriate test statistic?

- A) 2.536 B) 1.584 C) 2.033 D) 5.014

2) _____

Determine the decision criterion for rejecting the null hypothesis in the given hypothesis test; i.e., describe the values of the test statistic that would result in rejection of the null hypothesis.

- 3) A farmer has decided to use a new additive to grow his crops. He divided his farm into 10 plots and kept records of the corn yield (in bushels) before and after using the additive. The results are shown below.

Plot:	1	2	3	4	5	6	7	8	9	10
Before	9	9	8	7	6	8	5	9	10	11
After	10	9	9	8	7	10	6	10	10	12

You wish to test the following hypothesis at the 10 percent level of significance.

$H_0: \mu_D = 0$ against $H_1: \mu_D \neq 0$.

What decision rule would you use?

- A) Reject H_0 if test statistic is greater than -1.833 or less than 1.833.
 B) Reject H_0 if test statistic is less than -1.833 or greater than 1.833.
 C) Reject H_0 if test statistic is greater than 1.833.
 D) Reject H_0 if test statistic is less than -1.833.

3) _____

- 4) A farmer has decided to use a new additive to grow his crops. He divided his farm into 10 plots and kept records of the corn yield (in bushels) before and after using the additive. The results are shown below.

4) _____

Plot:	1	2	3	4	5	6	7	8	9	10
Before	9	9	8	7	6	8	5	9	10	11
After	10	9	9	8	7	10	6	10	10	12

You wish to test the following hypothesis at the 10 percent level of significance.

$$H_0: \mu_d = 0 \text{ against } H_1: \mu_d > 0.$$

What decision rule would you use?

- A) Reject H_0 if test statistic is less than 1.383.
- B) Reject H_0 if test statistic is greater than -1.383.
- C) Reject H_0 if test statistic is greater than 1.383.
- D) Reject H_0 if test statistic is greater than -1.383 or less than 1.383.

Construct a confidence interval for μ_d , the mean of the differences d for the population of paired data. Assume that the population of paired differences is normally distributed.

- 5) If $\bar{d} = 3.125$, $S_d = 2.911$, and $n = 8$, determine a 90 percent confidence interval for μ_d .

5) _____

- A) $1.175 < \mu_d < 3.815$
- B) $2.435 < \mu_d < 5.075$
- C) $1.175 < \mu_d < 5.075$
- D) $2.435 < \mu_d < 3.815$

- 6) Using the sample paired data below, construct a 90% confidence interval for the population mean of all differences $x - y$.

6) _____

x	3.3	6.8	5.9	4.3	7.6
y	3.0	5.6	5.5	5.0	5.3

- A) $0.22 < \mu_d < 7.48$
- B) $-0.37 < \mu_d < 1.77$
- C) $-0.07 < \mu_d < 1.47$
- D) $-0.31 < \mu_d < 1.71$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the traditional method of hypothesis testing to test the given claim about the means of two populations. Assume that two dependent samples have been randomly selected from normally distributed populations.

- 7) Five students took a math test before and after tutoring. Their scores were as follows.

7) _____

Subject	A	B	C	D	E
Before	76	68	68	70	71
After	80	77	66	73	83

Using a 0.01 level of significance, test the claim that the tutoring has an effect on the math scores.

- 8) The table below shows the weights of seven subjects before and after following a particular diet for two months.

8) _____

Subject	A	B	C	D	E	F	G
Before	175	174	170	196	167	190	184
After	168	165	168	201	153	192	172

Using a 0.01 level of significance, test the claim that the diet is effective in reducing weight.