

2 population tests (Lab 8 replacement – 10 pts)

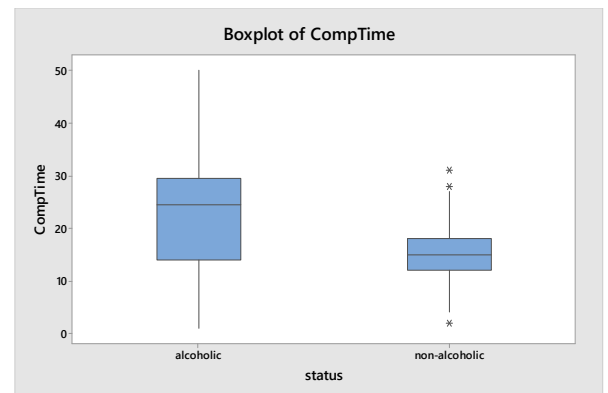
Name _____

1. A psychologist was interested in effect of alcoholism on the brain for women. 24 female alcoholics and 24 non-alcoholics were given a tactual test requiring a sense of touch to be able to solve the puzzle. You are going to conduct the appropriate hypothesis test to support the claim that alcoholics need more time to take the tactual test ($\alpha=.05$)

alcoholics
 34 28 26 28 19 26 14 10 1 10
 18 33 21 30 20 26 44 33 25 14
 9 50 24 13

non-alcoholics
 15 13 27 12 15 2 9 28 18 15
 23 23 12 18 31 7 8 4 14 15
 18 16 16 15

- a. Here is a box plot with groups of the completion time by status. Does there seem to be a difference in mean completion time between alcoholic and non-alcoholic women? Does there seem to be a difference in standard deviation between the two groups?



- b. State the hypotheses in words and population parameters.

- c. Is this independent or dependent sampling? Explain.

- d. We will assume population variances are equal. Here is the Minitab output for three versions of the pooled variance t-test. What is the correct p-value?

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status          N   Mean   StDev   SE Mean
alcoholic       24   23.2   11.3     2.3
non-alcoholic   24   15.58  7.16     1.5
Difference =  $\mu$  (alcoholic) -  $\mu$  (non-alcoholic)
Estimate for difference: 7.58 Both use Pooled StDev = 9.4813
Right tail: T-Test of difference = 0 (vs >): T-Value = 2.77 P-Value = 0.004 DF = 46
Left tail:  T-Test of difference = 0 (vs <): T-Value = 2.77 P-Value = 0.996 DF = 46
Two tail:   T-Test of difference = 0 (vs  $\neq$ ): T-Value = 2.77 P-Value = 0.008 DF = 46
  
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Correct p-value = _____

- e. Do you reject or fail to reject H_0 ? Then state your conclusion in the context of the problem.

2. A local in-home care service makes regular home visits. There are eight nurses and nurses aides in the company that visit patients' homes to provide assistance. The company director decides that a new visit scheduling system should be applied that organizes visits by location to increase the number of visits per day and thus the number of patients that can be served. The company's service region is divided into sectors, and homes located in the same sector are visited by one of the seven health aids on the same day. This table presents the number of visits before and after the new system is implemented. Conduct the test to support the claim that the new Schedule will increase mean number of visits. (Significance level of 1%)

ID# for Company's Health Aids	1	2	3	4	5	6	7	8
Visits - New Schedule (Group 1)	6	14	8	4	16	7	18	13
Visits - Old Schedule (Group 2)	3	8	4	6	10	2	12	11

- a. State the hypotheses in words and population parameters.

- b. Is this independent or dependent sampling? Explain.

- c. Here is the Minitab output for three versions of the matched pairs t-test. What is the correct p-value?

Paired T for VisitsNewSchedule - VisitsOldSchedule

	N	Mean	StDev	SE Mean
VisitsNewSchedule	8	10.75	5.15	1.82
VisitsOldSchedule	8	7.00	3.82	1.35
Difference	8	3.750	2.765	0.977

95% CI for mean difference: (1.439, 6.061)

Left Tail: T-Test of mean difference = 0 (vs < 0): T-Value = 3.84 P-Value = 0.997

Two Tail: T-Test of mean difference = 0 (vs ≠ 0): T-Value = 3.84 P-Value = 0.006

Right Tail: T-Test of mean difference = 0 (vs > 0): T-Value = 3.84 P-Value = 0.003

Correct p-value = _____

- d. Do you reject or fail to reject H_0 ? Then state your conclusion in the context of the problem.

- e. Here is a histogram of the differences. Since the sample size is small, this means the differences should be approximately normal to appropriately use the matched pairs t-test. Comment on this assumption based on the graph.

