

Multiple Samples Inference Examples

1. In a pediatric clinic study, researchers wish to see how effective aspirin is in reducing temperature. Use the following data to test if the aspirin is reducing the temperature, at 5% level of significance.

Temperature F°			
Child	Before	After	Diff
1	101.1	99.8	1.3
2	103.2	101.1	2.1
3	102.9	100.4	2.5
4	103.1	101.2	1.9
5	102.4	100.8	1.6
6	102.5	100.2	2.3
7	101.9	100.3	1.6

Which test can be used:

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

2. Researchers wish to see if there is difference between two dosage levels of aspirin in reducing temperature. Use the following data to test if there is significant difference in the average temperature reduction among two dosage levels, at 5% level of significance.

Reduction in Temperature F°	
Dose 1	Dose 2
1.3	0.8
2.1	1.1
2.5	0.4
1.9	1.2
1.6	0.8
2.3	-0.2
1.6	0.3

Which test can be used?

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

3. Researchers wish to see if there is difference among three dosage levels of aspirin in reducing temperature.
- a) Use the following data to test if there is significant difference in the average temperature reduction among the three dosage levels of aspirin, at 5% level of significance.

Reduction in Temperature F°		
Dose 1	Dose 2	Dose 3
1.3	0.8	0.1
2.1	1.1	0.9
2.5	0.4	1.1
1.9	1.2	0.6
1.6	0.8	0.6
2.3	-0.2	0.8
1.6	0.3	1.3

Which test can be used?

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

- b) Use Tukey's multiple comparison method to compare the difference among the outcome from the three dosage levels.

Multiple Samples Inference Examples

4. A sample of 8 from a female population is taken at random and data is the following:

Data: 26, 38, 26, 21, 32, 32, 23, 31

- a) A researcher hypothesized that the average lean body mass of this female population is **different from 33**. If the distribution of the sampled population is symmetric, use the sign test to test the statistical significance at 5% level. (- Drop ties.)

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

- b) A researcher hypothesized that the average lean body mass of this female population is **less than 33**. If the distribution of the sampled population is symmetric, use the sign test to test the statistical significance at 5% level.

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

5. In a pediatric clinic study, researchers wish to see how effective aspirin is in reducing temperature. Use the following data to test if the aspirin is reducing the temperature, at 5% level of significance using a nonparametric test.

Temperature F°			
Child	Before	After	Diff
1	101.1	99.8	1.3
2	103.2	101.1	2.1
3	102.9	100.4	2.5
4	103.1	101.2	1.9
5	102.4	100.8	1.6
6	102.5	100.2	2.3
7	101.9	100.3	1.6

Which test can be used?

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

6. Use the following data to test if there is significant difference in the average temperature reduction among two dosage levels, at 5% level of significance using a nonparametric test.

Reduction in Temperature F°	
Dose 1	Dose 2
1.3	0.8
2.1	1.1
2.5	0.4
1.9	1.2
1.6	0.8
2.3	-0.2
1.6	0.3

Which test can be used?

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

7. Use the following data to test if there is significant difference in the average temperature reduction among the three dosage levels of aspirin, at 5% level of significance with a nonparametric test.

Reduction in Temperature F°		
Dose 1	Dose 2	Dose 3
1.3	0.8	0.1
2.1	1.1	0.9
2.5	0.4	1.1
1.9	1.2	0.6
1.6	0.8	0.6
2.3	-0.2	0.8
1.6	0.3	1.3

Which test can be used?

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

8. One claimed that the percentage of middle school students in population A that had adequate exercise is **less than 30%**. A random sample of 500 middle school students from this population is surveyed, and 120 of them had adequate exercise. At 5% level of significance, test to see if the evidence support that less than 30% of the middle school students in population A had adequate exercise.

Which test can be used?

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion:

Multiple Samples Inference Examples

9. For testing difference between the percentages of middle school students that had adequate exercise from populations A and B, 500 students were randomly surveyed from each of the two populations. The data is collected and listed below.

	Adequate Exercise	Inadequate Exercise
A	120	380
B	180	320

- a) Find the 95% confidence interval estimate for the difference in percentages.

- b) Perform the test at 5% significance level.

Null hypothesis (H_0):

Alternative hypothesis (H_A):

Test Statistic:

p-value:

Conclusion: