

Question 1

Two measuring machines are being compared. The results are given below:

machine I	5.6	4.3	6.4	6.7	15.1	
machine II	5.4	6.2	5.0	4.6	5.2	5.3

Do these results indicate at $\alpha = 0.05$ that machine I is more dispersed (less precise) than machine II?

Question 2

For the data given in Table 1, nine patients received tranquilizer T. The X value was taken at the first patient visit, and Y at the second visit. The measure used was "Hamilton dispersion scale factor". Use Wilcoxon-sign rank test.

<i>Patient i</i>	X_i	Y_i
1	1.83	0.87
2	0.50	0.64
3	1.62	0.59
4	2.48	2.05
5	1.68	1.06
6	1.88	1.29
7	1.55	1.06
8	3.06	3.14
9	1.30	1.29

Do the data support the claim that there is an improvement in nine patients (an improvement would correspond to lower factor values). Use $\alpha = 0.05$.

Question 3

The following table show the results of a study in which random samples of the members of two large unions were asked whether they are for or against a certain political candidate.

	<i>Union 1</i>	<i>Union 2</i>
<i>For the Candidate</i>	74	81
<i>Against the Candidate</i>	26	19

Test the null hypothesis that the two populations are homogenous. Use $\alpha = 0.05$

Question 4

The purely motivational effects of knowledge of performance in an industrial task is studied. 18 workers were divided randomly into three groups. The following table gives the number of pieces processed.

No information	Little information	Accurate information
40	38	48
35	40	40
38	47	45
43	44	43
44	40	46
41	42	44

Test at $\alpha = 0.1$ the hypothesis that the output increases with the increase in degree of knowledge performance.

Question 5

A study was conducted to compare the performance of rats, rabbits and cats on (EPT) test. The following table gives mean error scores by species for 12 problems.

Problem Number	Rats	Rabbits	Cats
1	1.5	1.7	0.3
2	1.1	1.5	1.0
3	1.8	8.1	3.6
4	1.9	1.3	0.0
5	4.3	4.0	0.6
6	2.0	4.6	5.5
7	8.4	4.0	1.0
8	6.6	5.1	3.1
9	2.4	2.5	0.1
10	6.5	6.9	1.6
11	2.6	2.5	4.3
12	6.5	6.8	1.0

Do these data support at $\alpha = 0.05$ the claim that the species are different? If so, conduct a multiple comparisons at $\alpha = 0.15$.

Question 6

In the following data, the interest is in the relationship between the weight of tapeworms(X) fed to cats and the weight of scoleces (Y) recovered from the cats

Cat	Cysticerci X	Worms Recovered Y
1	28.9	1.0
2	32.8	7.7
3	12.0	7.3
4	9.9	7.9
5	15.0	1.1
6	38.0	3.5
7	12.5	18.9
8	36.5	33.9
9	8.6	28.6
10	26.8	25.0

Do the data support the claim that the X and Y are associated? Use Spearman test with $\alpha = 0.05$

Question 7

An experiment was performed in Australia to investigate the effects of a particular method of cloud seeding on the amount of rainfall.

Table 1 gives the double ratio (Y_i) calculated for each year (X_i).

<i>Years Seeded</i> X_i	<i>Double ratio</i> Y_i
1	1.26
2	1.27
3	1.12
4	1.16
5	1.03

Test the hypothesis that $\beta_0 = 0$ against $\beta_0 \neq 0$. Use $\alpha = 0.05$