

TUTOR MARKED ASSIGNMENT

MSTL-001: Basic Statistics Lab

Course Code: MSTL-001

Assignment Code: MSTL-001/TMA/2021

Maximum Marks: 100

Note:

1. All questions are compulsory.
2. Solve the following questions in MS Excel 2007.
3. Take the screenshots of the final output/spreadsheet.
4. Paste all screenshots in the assignment booklet with all necessary hypotheses, interpretation, etc.

Q 1) A mobile manufacturing company distributed a newly launched mobile to 100 retail stores. These stores also sell another famous brand of mobile having same features. The manager of the company wants to compare the popularity of the newly launched mobile (say, Brand A) with the other popular mobile (say, Brand B). For this purpose, she selects a sample of 100 stores and noted the total number of sold mobiles of each brand. The data are recorded in the following table:

Store No.	Brand A	Brand B	Store No.	Brand A	Brand B
1	204	462	51	521	239
2	328	454	52	327	284
3	262	211	53	531	225
4	364	284	54	490	175
5	478	168	55	427	365
6	368	304	56	310	384
7	506	162	57	433	182
8	362	328	58	313	505
9	151	484	59	424	270
10	371	256	60	295	183
11	522	159	61	288	463
12	328	362	62	239	517
13	532	178	63	244	435
14	491	230	64	270	495
15	428	392	65	224	449
16	311	322	66	484	440
17	434	349	67	173	418
18	314	339	68	256	498
19	425	312	69	416	410
20	296	446	70	233	546
21	289	352	71	323	409
22	240	467	72	279	529
23	245	392	73	340	214
24	271	293	74	464	262
25	225	500	75	383	216
26	485	239	76	423	461
27	174	283	77	351	497

28	257	380	78	404	271
29	417	295	79	226	475
30	234	466	80	164	511
31	324	365	81	205	274
32	280	449	82	329	295
33	341	189	83	263	326
34	465	218	84	365	157
35	384	530	85	479	368
36	424	321	86	369	256
37	352	485	87	507	272
38	405	369	88	363	226
39	227	457	89	163	334
40	165	420	90	372	218
41	203	293	91	523	184
42	327	315	92	329	437
43	261	399	93	533	206
44	363	409	94	492	177
45	477	213	95	429	173
46	367	256	96	177	502
47	505	190	97	435	406
48	361	238	98	315	358
49	161	495	99	426	381
50	370	428	100	297	408

Answer the following:

- i) Which mobile brand has more average sales?
- ii) Which mobile brand shows greater variability in the sales?
- iii) Compute the skewness and kurtosis for the given data and interpret the results.
- iv) Determine the correlation between both mobiles.
- v) Compute suitable width of the class intervals for both brands,
- vi) Construct the continuous frequency distribution for both brands.
- vii) Represent the raw data as well as grouped data using suitable diagram/graph.

(2+4+4+3+2+4+6)

Q 2 (i) Twenty operators are working in a particular department of a call centre. The long-serving operators feel that they should have a promotion based on length of service built into their job structure. For assessment of their efficiency, the personnel department produces a score of efficiency based on various parameters. The efficiency scores along with their length of service are given below:

S. No.	Length of Service	Efficiency Scores
1	2	72
2	9	90
3	5	74
4	9	88
5	4	70

6	5	77
7	6	77
8	5	78
9	7	87
10	6	80
11	4	72
12	8	83
13	8	84
14	7	84
15	8	85
16	7	90
17	3	69
18	5	89
19	7	90
20	5	79

Compute the Spearman's rank correlation coefficient between the length of service and efficiency scores? Also compare this coefficient with Pearson's correlation coefficient.

- (ii) A scientist wants to check the yield of wheat from different varieties of wheat. In this regards, the yields of wheat from 16 plots, all of approximately equal fertility, when 4 varieties of wheat (Say, A, B, C and D) were cultivated are recorded in the following table:

Plot No.	1	2	3	4	5	6	7	8
Variety:	A	B	D	C	B	C	A	D
Yield:	42	44	39	41	43	44	44	36
Plot No.:	9	10	11	12	13	14	15	16
Variety:	B	D	A	C	B	A	B	C
Yield:	46	40	43	45	47	45	45	42

Assuming that the yields of wheat are normally distributed in each variety with approximately equal variances, test the hypothesis that the average yields of wheat in all four varieties of wheat are the same at 1% level of significance.

(12+13)

- Q 3** For the data given in Question 1, the manager also wishes to compare both brands to get the answers of the following questions:

- i) Is there enough evidence that the average sales of mobile of Brand A is more than the average sales of the Brand B at 5 % level of significance?
- ii) Are the variances of the distributions of mobiles of Brand A and Brand B equal at 5 % level of significance?

(13+12)

- Q 4** Suppose that a customer service manager of a mall wants to evaluate the service of the eight food counters in the mall. She/he hires seven evaluators with varied experience in food-service evaluation to act as raters. To reduce the effect of the variability from rater to rater, a randomised block design is applied considering raters serving as the blocks. The seven raters evaluate the service of each of the eight food counters in a random

order. A rating scale from 0 (low) to 100 (high) is used. The following table summarises the results:

	Food Counters							
Raters	A	B	C	D	E	F	G	H
1	70	61	82	74	68	59	80	81
2	77	75	88	76	75	73	86	87
3	76	67	90	80	74	65	82	88
4	80	63	87	76	78	61	85	86
5	84	66	92	84	82	64	90	91
6	78	68	94	86	76	66	80	92
7	77	75	88	76	75	73	86	84

The effect of evaluation of each rater on the service of food counters is normally distributed with approximately equal variances.

- i) Analyse the design at 2% level of significance.
- ii) Is the average service of the eight food counters significantly different? If the difference between the averages services of the eight restaurants is significant, do the pair-wise comparison between them.

(25)