



UNIVERSITY of
RWANDA

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF BUSINESS

PROGRAM: ALL - HUYE CAMPUS

MODULE CODE AND TITLE: AST 1337 BUSINESS STATISTICS

NUMBER OF CREDITS: 10 / FUNDAMENTALS OF

STATISTICS

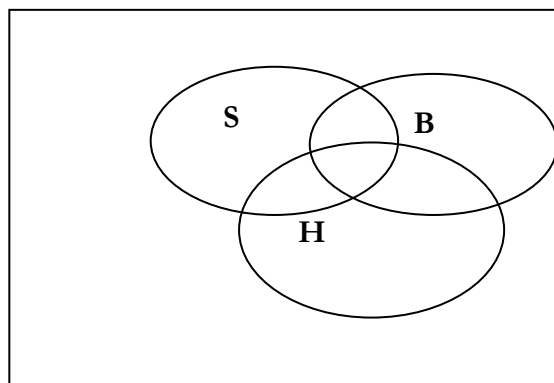
Assignment to be submitted on 10 May 2024 Maximum marks: 200 Marks

INSTRUCTIONS: Attempt all questions

Question One

Ninety (90) students were surveyed about their spring break plans, and the following data was collected.

- 29 students were doing a service project (S)
 - 19 were only going to the beach (H)
 - 12 were going home (H) and going to the beach (B)
 - 65 were doing a service project or going home
 - 4 were doing all three
 - 16 were doing exactly two of these three
 - 7 were doing a service project and going home
- a) Use the information to fill in the Venna diagram below



b) How many students that surveyed were not going home?

- i) 62 ii) 41 iii) 47 iv) 6 v) None of these

Question two

A ball is drawn at random from a box containing 8 green balls, 5 yellow balls and 7 red balls. Determine the probability that it is

- i. green. ii. Yellow. iii. Red. iv. not green v. green or yellow.

Question three

Compute harmonic mean from the given economic growth rates: 21%, 23%, 25%, 27% and 30%

Question Four

Explain five problems faced while constructing an Index number.

Question Five

The table below shows the prices (FRW) and quantities of 5 different commodities for the years 2022 and 2023 provided in different units. The year 2022 was considered to be the base year.

Commodity	2022		2023	
	Price (FRW)	Quantity	Price (FRW)	Quantity
Milk (tin)	60	24	80	30
Meat (kg)	50	2	70	4
Bread (loaf)	25	4	40	6
Butter (tin)	110	8	130	100
Eggs (create)	112	100	150	120

Required:

Using the year 2022, as the base year calculate

- Laspeyre's price index
- Paasche's price index
- Fischer's price index
- Marshall Edge-Worth's price index

Question Six

A manufacturer assures his customers that the probability of having defective item is 0.005. A sample of 1000 items was inspected and it is considered that the items are Poisson distributed with a mean of 5. Find the probabilities of having the following possible outcomes (**Hint: $e = 2.718$**)

$\mu = 5$, $e = 2.718$, $x = 0, 1, 2, \dots$

Question Seven

The table below shows the data about the value of fertilizer expenditure (X) and yield revenue (Y) in million Rwandan francs

X	3	5	6	8	10	11	13	16
Y	2	3	5	5	6	8	9	10

Required:

- Calculate the coefficients of correlation and give an interpretation for your answer.
- Find the regression equation from the data given above?
- What would be the value of yield (Y), if fertilizer expenditure (X) were 15 million Rwandan Francs and 20 million Rwandan Francs?

Question Eight

Average flight time of an aircraft pilot, before he retires, is normally distributed with an average of 8,000 hours of flight and a standard deviation of 1,200 hours. If an individual qualifies to be a pilot today what is the probability that:

- He will fly less than 6,000 hours before he retires?
- He will fly between 6,000 and 7,500 hours?
- He will fly between 7500 and 8,400 hours?
- He will fly between 8,400 and 9,600 hours?
- He will fly more than 9,600 hours?

Question Nine

The table below shows the results obtained by 50 students of Level Two BBA who sat for special exam in last Academic Year in Business Statistics Marks.

36	54	12	23	53	54	14	45	50	38
24	41	28	36	21	12	19	49	30	15
32	62	17	61	09	20	42	51	42	53
34	43	24	32	37	55	27	16	20	21
45	06	19	47	27	45	50	32	51	42

Required:

- Use the intervals 01 – 10, 11 – 20, 21 – 30,....., etc to construct the frequency distribution of the data above and indicate class limits, frequency, and class mid-points.
- Calculate the modal mark and geometric mean.
- Compute the arithmetic mean and mean absolute deviation from the given distribution.

Question Ten

Why is the range the most convenient measure of dispersion, yet the most imprecise measure of variability? When would you use the range?

Question Eleven

Explain how the knowledge of statistics may be applied in business situation.

Question Twelve

10 different teams played football over the summer. After the summer, the top goal scorers from each team scored the following number of goals:

18	12	18	18	13	12	13	16	12	x
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If the mean number of goals scored is **15**, complete the following table:

The value of X	Mode	Median	Range	Standard Deviation
?	?	?	?	?

N.B: Show all your workings properly!

Question Thirteen

By the using of graphs, explain the difference between a left skewed histogram from a right one.

Question Fourteen

20 Students of Level two BS Accounting Group one sat for Quantitative methods special CAT and obtained the following Marks out of 50:

6;10;31;35;23;19;4;30;42;6;11;48;8;20;34;45;47;4;40;13.

If the number of classes is 9, you are required to:

- (a) Construct class limits, class boundaries and class averages.
- (b) Determine class interval and modal class.
- (c) Compute:
 - (i) Variance; Standard deviation and MAD.
 - (ii) 75th Percentile and First Quartile.

Question Fifteen

Fred and Christine are newly married and wish to have six (6) children. In the genetic makeup of both Fred and Christine, the chance of having a boy and a girl is equally possible and in their family history there is no incidence of twins or other multiple births.

Required:

- (a) What is the probability of Christine giving birth to exactly 3 boys?
- (b) Develop a complete binomial distribution for this situation and
Interpret its meaning.

Question Sixteen

You toss a fair coin three times:

- i. What is the probability of three heads, HHH?
- ii. What is the probability that you observe exactly one head?
- iii. Given that you have observed *at least* one heads, what is the probability that you observe at least two heads?

Question Seventeen

A study was made to determine whether the length of time a person has been employed with a company (a proxy for experience) is related to how much the person is paid (compensation). The study resulted in the data found in the following table:

Compensation (In dollars per hour)	Number of months employed with the company
5	45
15	32
18	37
20	33
25	24
25	29
30	26
34	22
38	24
50	15

Required:

- Identify Independent and Dependent variables.
- Compute **TSS** and **RSS**
- Estimate the Number of months employed with the company when compensation is **51\$/hr.**
- Find and interpret the **coefficient of correlation** and the **coefficient of determination** (r and R^2).

Best of Luck !!!!!

Table of the standard normal distribution values ($z \leq 0$)

- z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325
-0.2	0.4207	0.4168	0.4129	0.4091	0.4052	0.4013	0.3974	0.3936
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843
-0.6	0.2743	0.2709	0.2676	0.2644	0.2611	0.2579	0.2546	0.2514
-0.7	0.2420	0.2389	0.2358	0.2327	0.2297	0.2266	0.2236	0.2207
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660
-1.0	0.1587	0.1563	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.121
-1.2	0.1151	0.1131	0.1112	0.1094	0.1075	0.1056	0.1038	0.1020
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0722	0.0708
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384
-1.8	0.0359	0.0352	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150
-2.2	0.0139	0.0136	0.0132	0.0129	0.0126	0.0122	0.0119	0.0116
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089
-2.4	0.0082	0.0080	0.0078	0.0076	0.0073	0.0071	0.0070	0.0068
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051
-2.6	0.0047	0.0045	0.0044	0.0043	0.0042	0.0040	0.0039	0.0038
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015
-3.0	0.0014	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011
-3.1	0.0001	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
-3.5	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002

Table of the standard normal distribution values ($z \geq 0$)

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06
0.0	0.5000	0.5040	0.5080	0.5118	0.5160	0.5199	0.5239
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123
0.6	0.7258	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454
0.7	0.7580	0.7612	0.7642	0.7673	0.7704	0.7734	0.7764
0.8	0.7881	0.7910	0.7939	0.7967	0.7996	0.8023	0.8051
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406
1.6	0.9452	0.9463	0.9474	0.9485	0.9495	0.9505	0.9515
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750
2.0	0.9773	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846
2.2	0.9861	0.9865	0.9868	0.9871	0.9875	0.9878	0.9881
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961
2.7	0.9966	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979
2.9	0.9981	0.9982	0.9983	0.9983	0.9984	0.9984	0.9985
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994
3.3	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998