بسم الله الرحمن الرحيم

Azhar University –Gaza
culty of Science

Time :120 Minutes
Number of Questions: 5

Biostatistics
Final Exam

اسم الطالب/ة:

الرقم الجامعي:

NSWER ALL THE FOLLOWING QUESTIONS:

UESTION 1:

a) ***Determine whether the following statements are true (T) or false (F).***

-( ) Pearson's correlation coefficient can be obtained for quantitative variables only .

-( ) For binomial distribution, it is possible to have $\mu = \sigma^2$.

-( ) Convenience sample is less potential for bias compare to the systematic sample.

-( ) The sum of differences between ranks of two nominal correlated variables equals 0.

-( ) If A and B are independent events , then $P(A \cap B)=0$.

-( ) For any symmetric variable, we have $Q_1 < Q_2 < Q_3$.

-( ) The coefficient of variation for standard normal distribution equals 1.

-( ) Any two mutually exclusive events are independent events.

-( ) Inferential statistics deals with enumeration, presentation and description of data.

0-( ) There is an inverse relationship between sample size and population size.

b) The following table gives blood glucose levels (in mg/dl) of 40 students from certain school, Find:

Blood glucose	frequency
50- 54	8
55- 59	22
60- 64	10

1- Mean =

2- Variance =

3- Coefficient of variation =

QUESTION 2:

a) Compare with examples between the **random samples** and the **non-random samples**

Random Samples	Non-random Samples
Examples:	***Examples:***

b) In a certain population, 70% do not have a high blood pressure, 25% have a cholesterol level, and 10% have both high blood pressure and high cholesterol level. What is the probability that a person selected at random

i) has a high blood pressure,

ii) has high blood pressure but not high cholesterol level,

iii) does not have high blood pressure and does not have high cholesterol level.

iv) has high cholesterol level if we know that he has high blood pressure.

QUESTION 3:

It is known that 20% of adults are diabetic patients. If we select 9 persons at random and the let X be the number of diabetic patients. Answer the following questions:

a) What is the name and formula of the probability distribution of the random variable X?

b) What is the mean and standard deviation of the number of diabetic patients?

c) What is the probability that we find:

i) exactly 2 diabetic patients out of 9.

ii) at most 2 diabetic patients out of 9.

iii) at least 3 diabetic patients out of 9 .

QUESTION 4:

In a population of people, the body mass index (in kg/m^2) is normally distributed with m
$\mu = 25$ (kg/m^2) and standard deviation $\sigma = 2$ (kg/m^2).

a- What is the mode of the body mass index?

b- For a randomly chosen person, what is the probability of having

i) Body mass index equals 25 kg/m^2

ii) Body Mass Index more than 21 kg/m^2

iii) Body Mass Index more between 21 kg/m^2 and 29 kg/m^2

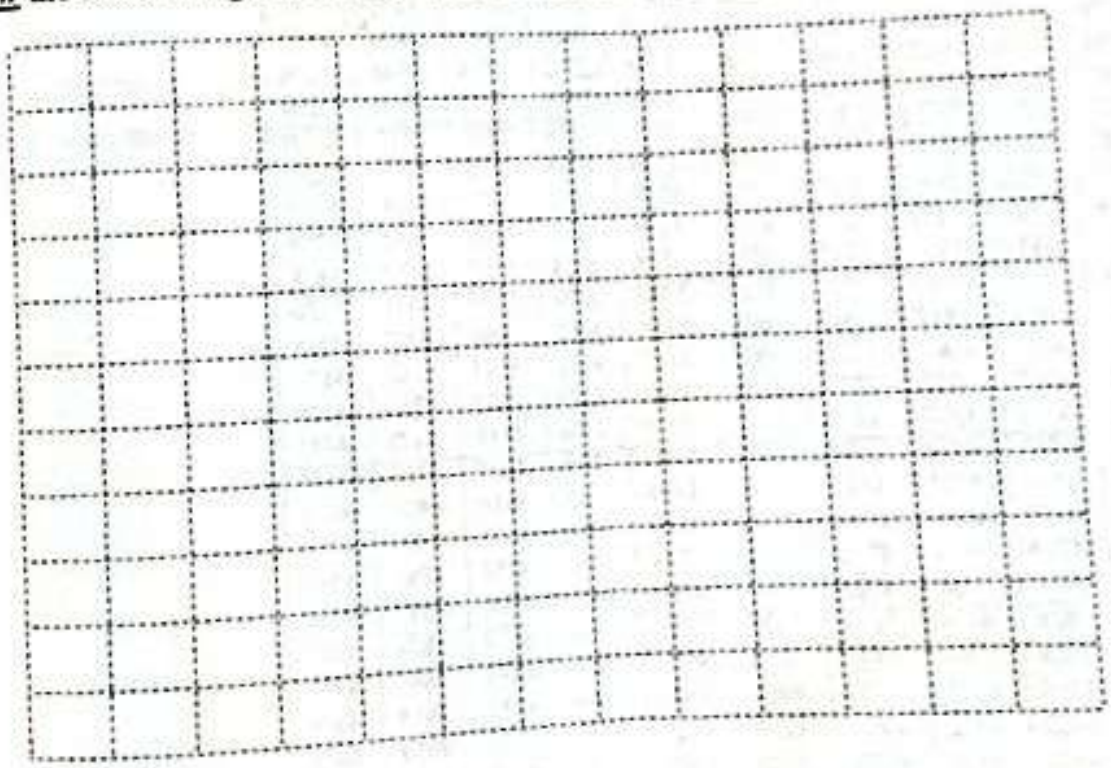
c- What is the first quartile (Q_1) of the Body Mass Index?

UESTION 5:

e values of Systolic and Diastolic Blood Pressure values for a random sample of 8 persons are ven in the following table:

No.	SBP	DBP
1	120	60
2	130	60
3	118	68
4	140	90
5	140	80
6	128	75
7	140	80
8	120	60

i) ***Draw*** the scatter diagram of DBP versus SBP and ***comment*** on the figure.



ii) ***Obtain*** the Spearman's correlation coefficient between them and ***interpret*** your findings.

Note: You can recourse the following statistical laws and information:

$$\bar{x}=\frac{\sum x_i f_i}{\sum f_i},\ Mode = L+\left[\frac{D_1}{D_1+D_2}\right]C,\ \sigma^2=\frac{\sum_{i=1}^{n}(x_i-\mu)^2}{N},\ s=\sqrt{\frac{\sum_{i=1}^{n} f_i x_i^2-\frac{\left(\sum_{i=1}^{n} f_i x_i\right)^2}{n}}{n-1}},\ Q_3=L_3+\left[\frac{\frac{2N}{4}-F_3}{f_3}\right]c,$$

$$t=\frac{\bar{X}-\mu}{s/\sqrt{n}},\ \hat{b}=\frac{\sum xy-\frac{\sum x\sum y}{n}}{\sum x^2-\frac{(\sum x)^2}{n}},\ s=\sqrt{\frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1}},\ r=\frac{\sum xy-\frac{\sum x\sum y}{n}}{\sqrt{\left(\sum x^2-\frac{(\sum x)^2}{n}\right)\left(\sum y^2-\frac{(\sum y)^2}{n}\right)}},\ r_s=1-\frac{6\sum(di)^2}{n(n^2-1)},$$

$$\hat{a}=\bar{y}-\hat{b}\bar{x},\ Z=\frac{\bar{X}-\mu}{\sigma/\sqrt{n}}$$

The values of the standard normal distribution; $P(0\le Z\le z)$

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0000	.0040	.0080	0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	0793	.0832	.0871	0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998

..:: GOOD LUCK ::...

Dr. ALI ABUZAID