

THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF NURSING
ACADEMIC YEAR 2023/2024 – SEMESTER I
MASTER OF SCIENCE IN NURSING
NGP9306 STATISTICS FOR EVIDENCE BASED NURSING PRACTICE- LEVEL 9
FINAL EXAMINATION

Date: 14.07.2023

Time: 9.30AM- 12.30PM

Index Number

Duration: 03 hours

Part B – Short Answer Questions (50 Marks)

Q1:

The following table shows data on height of 11 students in a school. Values are shown in centimetres.

1	2	3	4	5	6	7	8	9	10	11
150.0	139.0	148.0	148.0	146.5	147.0	146.5	149.0	148.0	148.5	149.0

- 1.1 Calculate the 1st Quartile (Q1) for height. (2.5 Marks)
- 1.2 Calculate the 2nd Quartile (Q2) for height. (2.5 Marks)
- 1.3 Calculate the 3rd Quartile (Q3) for height. (2.5 Marks)
- 1.4 Calculate the Interquartile Range (IQR) for height. (2.5 Marks)

(Total = 10 Marks)

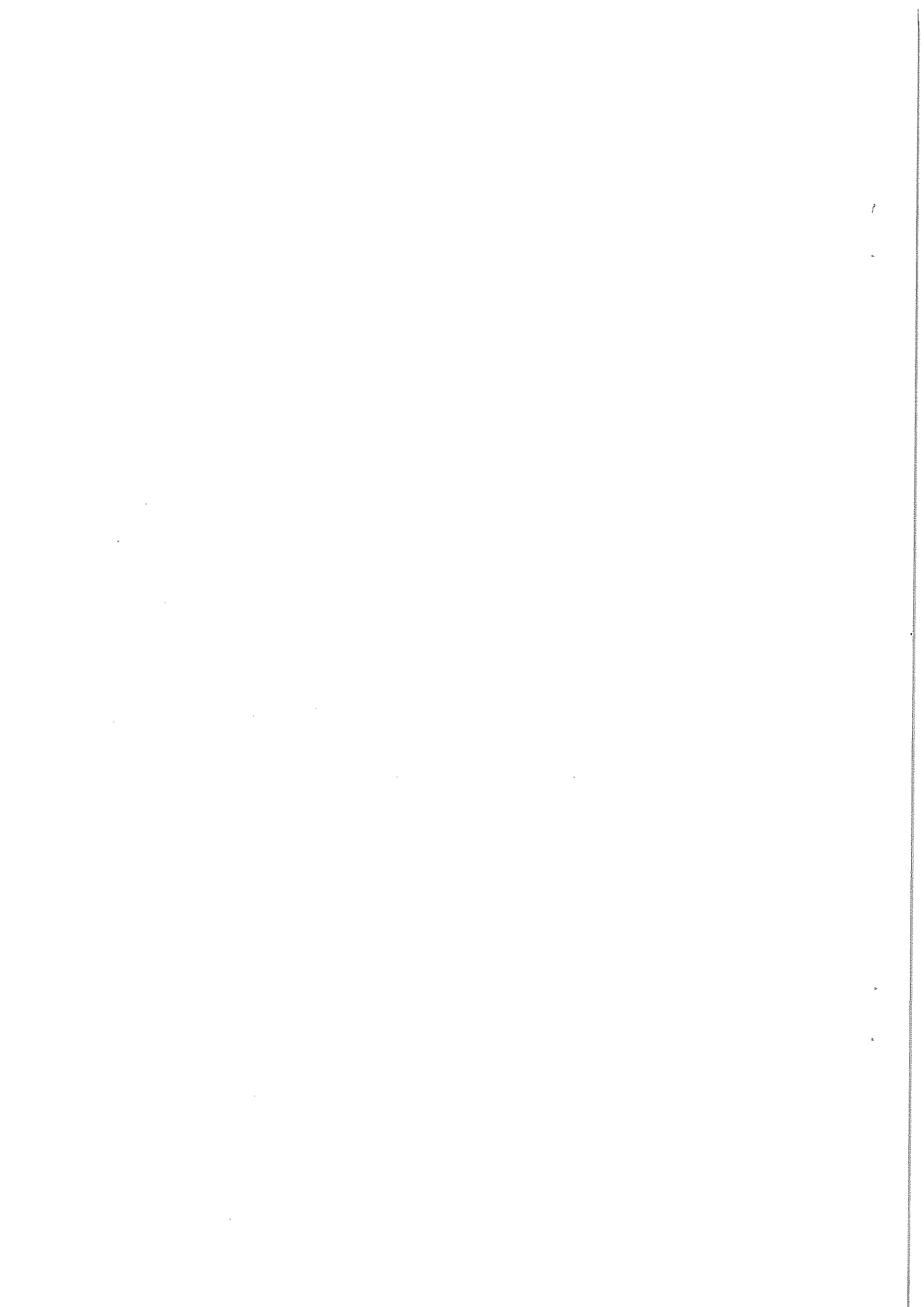
Q2:

The following table shows the association between gender and treatment default for tuberculosis drugs. Answer the following questions with relevant calculations using the given data in the table.

Gender			
	Male	Female	Total
Treatment default status for tuberculosis drugs			
Yes	75	25	100
No	70	80	150
Total	145	105	250

- 2.1 What are the odds of being a male for treatment default for tuberculosis drugs? (Round the answer to two decimal places)? (3 Marks)
- 2.2 What are the odds of being a female for treatment default for tuberculosis drugs? (Round the answer to two decimal places)? (3 Marks)
- 2.3 Compared to female, what is the odds ratio of being male for treatment default for tuberculosis drugs (Round the answer to two decimal places)? (2 Marks)
- 2.4 Write a conclusion by interpreting your final result. (2 Marks)

(Total = 10 Marks)



Q3:

The mean, median and mode are considered as measure of central tendency of a distribution. The Mean, Median and Mode of three distributions are as follows,

Distribution	Mean	Median	Mode
Distribution A	22	15	11
Distribution B	11	11	11
Distribution C	3	8	11

- 3.1 Name the positively skewed distribution, negatively skewed distribution and symmetric distribution using above table values **(6 Marks)**
- 3.2 The above symmetric distribution shows the distribution of Hemoglobin level of individuals in a sample. The variance of above symmetric distribution is $4 \text{ g}^2/\text{dL}^2$. Find the mean and standard deviation of haemoglobin level. **(2 Marks)**
- 3.3 Compute the percentage of individuals of hemoglobin level in between 11 g/dL and 14 g/dL. **(7 Marks)**

(Total = 15 Marks)

Q4:

The sample A has 100 cells and each cell consists with granules. The number of granules in a cell as follows.

Number of granules in a cell	Number of cells
1	5
2	15
3	55
4	15
5	10

- 4.1 The cell which has number of the granules more than 2 is considered as abnormal cell. Compute the proportion of abnormal cells in above sample. **(4 Marks)**
- 4.2 Compute the standard error of proportion of abnormal cells in above sample. **(4 Marks)**

$$SE = \sqrt{\frac{pq}{n}}$$

- 4.3 Compute the 95% Confidence Interval for proportion of abnormal cells in above sample. **(7 Marks)**

$$CI = p \pm Z_{1-\alpha/2} SE$$

(Total = 15 Marks)

Part C – Structured Essay Questions (20 Marks)

Q1:

A researcher calculated descriptive statistics for the variable age and obtained the following SPSS output. Using the statistics given, judge and justify the distribution (normal or not normal) of age (in years) with rules used to assess normality? **(5 Marks)**

Descriptives				
		Statistic	Std. Error	
Age in years	Mean	33.24	.251	
	95% Confidence Interval for Mean	Lower Bound	32.74	
		Upper Bound	33.73	
	5% Trimmed Mean	33.21		
	Median	33.00		
	Variance	12.563		
	Std. Deviation	3.544		
	Minimum	26		
	Maximum	40		
	Range	14		
	Interquartile Range	7		
	Skewness	.212	.172	
	Kurtosis	-1.142	.342	

Age (in years): (State the judgement with justification)

(Total = 5 Marks)

Q2:

A researcher intends to examine the relationship between working hospital and depression anxiety stress score among nurses measured by validated DAS-21 tool. Accordingly, data were collected from three hospitals: Hospital A, Hospital B and Hospital C.

- 2.1 Develop null hypothesis and alternate hypothesis for above research. **(3 Marks)**
- 2.2 Write **three (03)** assumptions that are used when performing ANOVA test. **(3 Marks)**
- 2.3 Upon completion of the data collection, the researcher analysed the data using ANOVA test to examine the relationship between working hospital and depression anxiety stress score among nurses. The SPSS output of statistical analysis is given below. $p < 0.05$ considered as statistically significant.

2.3.1 Write your statistical decision and a concluding statement based on Levene's test (Test of Homogeneity of Variances). (3 Marks)

Test of Homogeneity of Variances

DAS Total Score

Levene Statistic	df1	df2	Sig.
8.575	2	197	.000

2.3.2 Write your statistical decision and a concluding statement based on ANOVA or equivalent test. (3 Marks)

ANOVA

DAS Total Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3448.250	2	1724.125	6.458	.002
Within Groups	52596.870	197	266.989		
Total	56045.120	199			

Robust Tests of Equality of Means

DAS Total Score

	Statistic ^a	df1	df2	Sig.
Brown-Forsythe	7.108	2	167.395	.001

2.3.3 Next, the researcher performed Dunnett T3 post-hoc test to compare mean depression anxiety stress scores among nurses working in the three hospitals. Write a statistical interpretation summary regarding the appropriate results of the post-hoc test. (3 Marks)

Multiple Comparisons

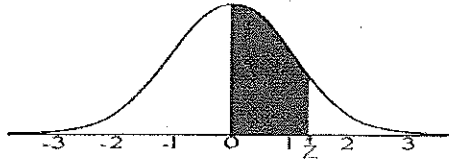
Dependent Variable: DAS_Total_Score

Dunnett T3

(I) Hospital	(J) Hospital	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Hospital A	Hospital B	-8.48438*	2.88079	.011	-15.4529	-1.5158
	Hospital C	-.30047	2.94742	.999	-7.4425	6.8416
Hospital B	Hospital A	8.48438*	2.88079	.011	1.5158	15.4529
	Hospital C	8.18391*	2.33117	.002	2.5309	13.8369
Hospital C	Hospital A	.30047	2.94742	.999	-6.8416	7.4425
	Hospital B	-8.18391*	2.33117	.002	-13.8369	-2.5309

*. The mean difference is significant at the 0.05 level.

(Total = 15 Marks)



STANDARD NORMAL TABLE (z)

Entries in the table give the area under the curve between the mean and z standard deviations above the mean. For example, for z = 1.25 the area under the curve between the mean (0) and z is 0.3944.

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0190	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2969	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3513	0.3554	0.3577	0.3529	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998