

**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**
Faculty of Health and Applied Sciences

Department of Mathematics and Statistics

QUALIFICATIONS: B. Business Admin, B. Marketing, B. Human Resource Management, B. Public Management and B. Logistics and Supply Chain Management	
QUALIFICATION CODES: 21BBAD / 07BMAR / 07BHR / 24BPN / 07BLSM	LEVEL: 6
COURSE: BASIC BUSINESS STATISTICS 1A	COURSE CODE: BBS111S
DATE: JUNE 2019	SESSION: 1
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MR EM MWAHI, DR G DIBABA, MR I NDADI, MR J AMUNYELA, MR R MUMBUU, MR A ROUX, MR G TAPEDZESA
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THIS QUESTION PAPER CONSISTS OF 5 PAGES

(Including this front page)

INSTRUCTIONS

1. Answer all the questions and number your solutions correctly.
2. **Question 1** of this question paper entails multiple choice questions with options **A** to **D**. Write down the letter corresponding to the best option for each question.
3. For **Question 2 & 3** you are required to show clearly all the steps used in the calculations.
4. All written work **MUST** be done in blue or black ink.
5. Untidy/ illegible work will attract no marks.

PERMISSIBLE MATERIALS

1. Non-Programmable Calculator without the cover

ATTACHMENTS

1. Standard normal Z-table

QUESTION 1 [14 MARKS]

- 1.1 Which of the following is a measure of central tendency? [2]
A. Variance B. Standard deviation C. Range D. Median
- 1.2 A Sample of a population is: [2]
A. A subset of the population B. An experiment in the population
C. An outcome of the population D. A variable in the population
- 1.3 In a frequency distribution, the midpoint value of a class is 10 and the width of the class is 6. The upper limit of the class is: [2]
A. 7 B. 10 C. 13 D. 20
- 1.4 Fill in the blank to make the following sentence true. "Height is a _____ measurement scale variable." [2]
A. Ordinal B. Interval C. Ratio D. Nominal
- 1.5 In a sample study of 1285 people, it was found that 514 people have a high school certificate. If a person is selected at random, the probability that the person has no high school certificate is: [2]
A. $\frac{3}{5}$ B. $\frac{2}{5}$ C. $\frac{1}{5}$ D. 1
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- 1.6 On the average, 1.8 customers per minute arrive at any one of the checkout counters at Shoprite. What type of probability distribution can be used to find out the probability that there will be no customer arriving at a checkout counter? [2]
A. Uniform distribution B. Binomial distribution
C. Poisson distribution D. Normal distribution
- 1.7 The following observations are arranged in ascending order: 26, 29, 42, 53, x , $x+2$, 70, 75, 82, 93. If the median is 65, find the value of x . [2]
A. 56 B. 66 C. 64 D. 69

QUESTION 2 [38 MARKS]

2.1 Weights of Carry-On Luggage in Kilograms for a random sample of 40 passengers returning from a vacation to Windhoek are listed below.

30 27 12 42 35 47 38 36 27 35
22 29 17 3 21 8 38 32 41 33
26 45 18 43 18 32 31 32 19 21
33 31 28 29 51 12 14 21 18 26

2.1.1 Construct an **ordered** stem and leaf display of the data. [5]

2.1.2 What shape of the distribution do you observe from the stem and leaf display? [2]

2.1.3 Using classes 0 to less than 10, 10 to less than 20, 20 to less than 30 etc..., construct a frequency distribution table for the data. [6]

2.1.4 What percentage of passengers recorded the weight of less than 35 Kilograms? [2]

2.2 The following data set lists the midterm scores received by 20 students in a Statistics class:

45 85 92 99 37 97 100 82 49 54
31 77 81 83 98 99 85 85 64 92

2.2.1 Calculate the mean score. [3]

2.2.2 Find the median score. [3]

2.2.3 Find the modal score. [2]

2.3 Consider the following distribution of daily wages of 50 workers of a factory.

Daily wages (in N\$)	10-<20	20-<40	40-<60	60-<80	80-<100
Number of workers	12	14	8	6	10

2.3.1 Calculate the mean daily wages. [3]

2.3.2 Compute the variance. [4]

2.3.3 Calculate the median daily wages. [4]

2.3.4 Calculate the modal daily wages. [4]

QUESTION 3 [48 MARKS]

3.1 A bag contains 3 black balls and 5 white balls. Paul picks a ball at random from the bag and not replaces it back in the bag. He mixes the balls in the bag and then picks another ball at random from the bag.

3.1.1 What is the probability that Paul picks two black balls? [2]

3.1.2 What is the probability that Paul picks a black ball in his second draw? [3]

3.2 A large corporation has 250 employees. They are classified according to their sex and their opinion on a proposal to emphasize fridge benefits rather than wage increases in pending wage discussions. The table below shows some of the proportions of employees being in various categories.

Sex	Opinion			Total
	Approval (A)	Neutral (N)	Opposed (O)	
Female (F)	0.20	0.28	...	0.74
Male (M)	0.18	...
Total	...	0.36

3.2.1 Copy the table and fill in all the missing probabilities. [7]

3.2.2 If a person is picked at random, find:

(a) $P(M \text{ given } N)$ [3]

(b) $P(F \text{ or } M)$ [2]

3.3 Among Namibian registered voters, 30% are RDP, 50% are SWAPO, and 20% are Others. The percentages that support (S) the president among these groups are respectively 0.10, 0.80 and 0.20.

3.3.1 If a person is picked at random, what is the probability that he/she support (S) the president? [5]

3.3.2 If one is SWAPO, what is the chance that he/she supports the president? [4]

3.4 The probability function of a discrete random variable X is given by

$X = x$	1	2	3
$P(X = x)$	k	$\frac{2}{7}$	$\frac{9}{14}$

3.4.1 Find the value of k [3]

3.4.2 Find $E(X)$ [5]

3.4.3 Find $Var(1 + 5X)$ [6]

3.5 Weekly purchases of petrol at a garage are normally distributed with a mean of 55 litres and a standard deviation of 22 litres. What is the probability that in a given week, the purchases will be:

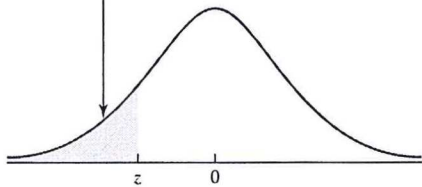
3.5.1 Between 40 and 60 litres? [5]

3.5.2 More than 80 litres? [3]

=====END OF EXAMINATION=====

The Standard Normal Distribution

e.g., for $z = -1.34$, refer to the -1.3 row and the 0.04 column to find the cumulative area, 0.0901 .

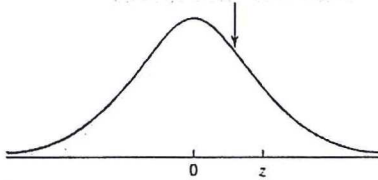


z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

Source: Cumulative standard normal probabilities generated by Minitab, then rounded to four decimal places.

The Standard Normal Distribution

e.g., for $z = 1.34$, refer to the 1.3 row and the 0.04 column to find the cumulative area, 0.9099.



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990