



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: Bachelor of science ; Bachelor of science in Applied Mathematics and Statistics	
QUALIFICATION CODE: 07BOSC	LEVEL: 5
COURSE CODE: IAS501S	COURSE NAME: INTRODUCTION TO APPLIED STATISTICS
SESSION: JANUARY 2020	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY / SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER	Mr ROUX, A.J
MODERATOR:	Dr Ntirampeba, D

<p style="text-align: center;">INSTRUCTIONS</p> <ol style="list-style-type: none">1. Answer ALL the questions in the booklet provided.2. Show clearly all the steps used in the calculations.3. All written work must be done in blue or black ink and sketches must be done in pencil.
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PERMISSIBLE MATERIALS

Non-programmable calculator without a cover.

ATTACHMENTS

The Standard Normal Probability Distribution Table

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

QUESTION 1 [20]

1.1 Which of the following measures of central tendency can reliably be used when dataset has outliers?

- a) Mean b) Median c) Mode d) Median and Mode [2]

1.2 A sample is

- a) An experiment in the population b) A subset of the population
c) A variable in the population d) An outcome of the population [2]

1.3 A parameter refers to

- a) Value computed from the sample b) Value computed from the population
c) A value observed in the experiment d) All of the above [2]

1.4 Weight is a _____ variable

- a) Continuous b) Discrete c) Ordinal d) Interval [2]

1.5 Researchers do sampling because of all of the following reasons except

- a) Reduce cost b) Can be done in a shorter time frame
c) Sampling is interesting d) Easy to manage due to logistics requirements [2]

1.6 Rating the quality of our magazine (excellent, good, fair or poor) is a _____ variable

- a) Qualitative b) Quantitative c) Ordinal d) Interval [2]

1.7 Which of the following is NOT a possible probability

- a) $\frac{65}{100}$ b) 1.16 c) 0 d) All of the provided [2]

1.8 A student is chosen at random from a class of 28 girls and 12 boys. What is the probability that the student is **NOT** a boy?

- a) $\frac{3}{10}$ b) $\frac{28}{12}$ c) 0 d) $\frac{7}{10}$ [2]

1.9 On a multiple choice test, each question has 4 possible answers. If you make a random guess on the first question, what is the probability that you are correct?

- a) 4 b) 0 c) 0.25 d) 1 [2]

1.10 A 6-sided die is rolled. What is the probability of rolling a 3 or a 6 ?

- a) $\frac{1}{2}$ b) $\frac{1}{6}$ c) $\frac{1}{3}$ d) 0.25 [2]

QUESTION 2 [17]

A tutor in the physics laboratories at NUST recorded the number of days students were absent from practicals during the first semester of 2019

Days absent	Number of students
$3 \leq X < 7$	14
$7 \leq X < 11$	22
$11 \leq X < 15$	11
$15 \leq X < 19$	6
$19 \leq X < 23$	33

Using the table above, answer the following questions.

- 2.1 Find the **median** number of days absent. [6]
2.2 Find the **modal** number of days absent [6]
2.3 Use the empirical relationship between the mean, median and mode to find the **mean** number of days absent from work. [5]

QUESTION 3 [53]

- 3.1 A variable is normally distributed with mean 6 and standard deviation 2. Find the probability that the variable will
- 3.1.1 lie between 1 and 7 (inclusive). [6]
 - 3.1.2 at least 5. [4]
 - 3.1.3 at most 4 [4]
- 3.2 The Office of the Registrar at The Namibia University of Science and Technology (NUST) has revealed that only 12 out of every 20 students graduate. Based upon this assumption, determine the probability that out of a random sample of 5 students
- 3.2.1 None will graduate [4]
 - 3.2.2 All will graduate. [4]
 - 3.2.3 At least one student will graduate [5]
 - 3.2.4 At most one student will graduate [5]
- 3.3) Suppose that the following contingency table was set up:

	C	D
A	10	30
B	25	35

What is the probability of:

- 3.3.1 Event A [3]
- 3.3.2 Event A and C [3]
- 3.3.3 Event A and B [3]
- 3.3.4 Event B or D [4]
- 3.3.5 Event C or D [4]
- 3.3.6 $P(A/D)$ [4]

QUESTION 4 [10]

The following table shows the information of house sales given in quarters.

	Period	Number of House sales
2003	Q1	54
	Q2	58
	Q3	94
	Q4	70
2004	Q1	55
	Q2	61
	Q3	87
	Q4	66
2005	Q1	49
	Q2	55
	Q3	95
	Q4	74
2006	Q1	60
	Q2	64
	Q3	99
	Q4	80

4.1 Use the least squares regression method to compute the estimated straight line trend equation starting with $x=1$ at 2003 - Q1. [7]

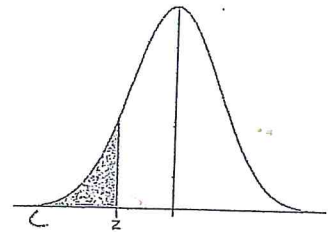
4.2 Use the trend line equation obtained in Question 4.1 to estimate the number of house sales for Q1 of 2007. [3]

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END OF EXAMINATION

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Standard Normal Cumulative Probability Table



Cumulative probabilities for NEGATIVE z-values are shown in the following table:

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-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