

CHUKA



UNIVERSITY

## UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN  
NURSING

NURU 272: BIOSTATISTICS

STREAMS: B.SC (NURSING) Y2T1

TIME: 2 HOURS

DAY/DATE: MONDAY 12/07/2021

11.30 A.M. – 1.30 P.M.

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### INSTRUCTIONS:

- Answer **ALL** questions
- Do not write anything on the question paper
- This is a **closed book exam**, no reference materials are allowed in the examination room
- **No** use of mobile phones or any other unauthorized materials
- Write your answers legibly and **use your time wisely**
- You are required to **show all** your workings

### SECTION A: MULTIPLE CHOICE QUESTIONS [ONE MARK EACH] [20 MARKS]

1. Which of the following would indicate that a dataset is not bell-shaped?
  - A. The range is equal to 5 standard deviations.
  - B. The range is larger than the interquartile range.
  - C. The mean is much smaller than the median.
  - D. There are no outliers.
2. Let A and B be the two possible outcomes of an experiment and suppose  $P(A) = 0.4$ ,  $P(A \cup B) = 0.7$  and  $P(B) = p$ . For what choice of p are A and B mutually exclusive?
  - A. 0.5
  - B. 0.2
  - C. 0.3
  - D. 0.6
3. What is the name given to a variable whose values can theoretically take on an infinite number of values within a given range of values?
  - A. Discrete
  - B. Continuous
  - C. Fixed
  - D. Random

4. The data that categories patients as males or females are known as:
  - A. Nominal data
  - B. Ordinal data
  - C. Interval data
  - D. Random data
5. The specific statistical methods that can be used to summarize or to describe a collection of data is called:
  - A. Descriptive statistics
  - B. Inferential statistics
  - C. Analytical statistics
  - D. Conclusive statistics
6. For a sample to be truly representative of the population, it must truly be?
  - A. Fixed
  - B. Random
  - C. Specific
  - D. Casual
7. When an investigator uses the data which has already been collected by others, such data is called?
  - A. Primary data
  - B. Collected data
  - C. Processed data
  - D. Secondary data
8. The magnitude of the class is the:
  - A. The product of lower limit and upper limit
  - B. The sum of lower limit and upper limit
  - C. The difference of upper limit and lower limit
  - D. The difference between the largest and the smallest value
9. The mode of a frequency distribution can be determined graphically by:
  - A. Histogram
  - B. Frequency curve
  - C. Frequency polygon
  - D. Ogive A
10. In a moderately symmetric distribution mean, median and mode are connected by:
  - A.  $\text{Mode} = 2 \text{ median} - 3 \text{ mean}$
  - B.  $\text{Mode} = 3 \text{ median} - 4 \text{ mean}$
  - C.  $\text{Mode} = 3 \text{ median} - 2 \text{ mean}$
  - D.  $\text{Mode} = 2 \text{ median} - 4 \text{ mean}$
11. The standard deviation of some measurements is 4.41. What is the variance of the measurements
  - A. 2.1
  - B. 8.82
  - C. 19.45
  - D. 17.64
12. A frequency distribution table of four classes is to be constructed using the following data set; 14, 16, 16, 14, 22, 13, 15, 24, 12, 23, 14, 20, 17, 21, 22, 18, 18, 19, 20, 17, 16, 15, 11, 12, 21, 20, 17, 18, 19, 23. Find the class limit of each of the four classes
  - A. 2
  - B. 3

- C. 4  
D. 5
13. The set of all possible outcomes of a random experiment is known as?  
A. Permutation  
B. Combination  
C. Probability  
D. Sample space
14. Classifying continuing educational experience into categories including “strongly agree,” “agree,” and “disagree,” is an example of which type of variable or data?  
A. Nominal  
B. Ordinal  
C. Interval  
D. Ratio
15. Which of the following statements is TRUE about the standard deviation (SD)?  
A. It is used to calculate confidence intervals.  
B. It is used to determine variability of a sample around a sample mean.  
C. It is used to display bimodal or skewed data.  
D. A large SD shows that individual data points are clustered closer to the mean.
16. In a study examining the relationship between the drinking a coffee in the late evening and the likelihood of insomnia, the  $r^2$  value for the regression line is 1.0. What does this indicate?  
A. For each additional cup of coffee, chances of occurring insomnia increase by 1.0%.  
B. Since  $r^2$  equals 1.0, this indicates there is no relationship between drinking coffee and developing insomnia.  
C. Since  $r^2$  equals 1.0, the regression line perfectly fits the data  
D. For each additional cup of coffee, there is no effect on sleep.
17. Which one of these statistics is unaffected by outliers?  
A. Mean  
B. Standard deviation  
C. Range  
D. Interquartile range
18. A list of 5 patients pulse rates is: 70, 64, 80, 74, 92. What is the median of the pulse rate among the patients?  
A. 74  
B. 76  
C. 77  
D. 80
19. Which of the following describe the middle part of a group of numbers?  
A. Measures of central tendency  
B. Measures of variation  
C. Measures of association  
D. Measures of skewness
20. Which of the following is a measure of spread in a given data set?  
A. Mean  
B. Mode  
C. Median  
D. Range

**SECTION B:****[20 MARKS]**

1. Explain the following concepts as used in biostatistics [2 marks]
  - i. Sample
  - ii. Positive skewness
  
2. A sample of 8 women seeking antenatal care at Chuka County Referral Hospital agree to participate in a study to assess the quality of antenatal care. After recruitment into the study, some background characteristics about the women was collected including their age in years. The data on their age is shown below; 22, 20, 18, 37, 23, 36, 32, 25. Calculate the standard deviation of their ages and determine if the largest age value is an outlier (use  $\alpha=0.01$ ). [6 marks]
  
3. The mean length of hospital stay of 12 critically ill patients was 18 days and a standard deviation of 4.4 days. Attach 99% levels of confidence to the mean of the population [3 marks]
  
4. A study was undertaken to establish whether there is an association between the presence of depressive disorder and epilepsy diagnosis. Using the table below, determine whether there is an association between the two conditions [6 marks]

<b>Epilepsy diagnosis</b>	<b>Depressive disorder</b>	
	<b>Present (Yes)</b>	<b>Absent (No)</b>
Epilepsy diagnosed	35	49
No epilepsy	22	76

5. The analysis of variance to test for significance difference in the efficacy of some treatment programs produced an ANOVA table entry as shown below;

<b>Source</b>	<b>df</b>	<b>SS</b>	<b>MS</b>	<b>F</b>
<b>Treatments</b>	4	64.8		
<b>Residue</b>	18		1.36	
<b>Total</b>	<b>22</b>			

Complete the ANOVA table [3 marks]

**SECTION C:****[30 MARKS]**

1. Explain with examples the types of statistical data that can be collected to answer a given health research question [10 marks]
  
2. A study was conducted among 200 post-natal mothers at Kenyatta National Hospital to evaluate their knowledge regarding immunization. Their scores were normally distributed with a mean of 60 and a standard deviation of 8. [10 marks]
  - a) Determine the proportion of mothers who scored between 50 and 70
  - b) Determine the proportion of mothers who scored below 30 and above 80
  
3. Two random samples have been selected and a two sample t-test for the difference in population means is conducted with  $H_0: \mu_1 = \mu_2$ . The results are  $s_1 = 2.4$ ,  $\bar{X}_1 = 9.8$ ,  $n_1$

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= 6,  $s_2 = 2.8$ ,  $\bar{X}_2 = 9.2$ , and  $n_2 = 8$ . Determine if there is a significant difference between the two means and indicate if the hypothesis is to be accepted or rejected (use  $\alpha = 0.01$ ). [10 marks]

**TABLE 1**

**t Distribution: Critical Values of t**

Degrees of freedom	Two-tailed test: One-tailed test:	Significance level					
		10% 5%	5% 2.5%	2% 1%	1% 0.5%	0.2% 0.1%	0.1% 0.05%
1		6.314	12.706	31.821	63.657	318.309	636.619
2		2.920	4.303	6.965	9.925	22.327	31.599
3		2.353	3.182	4.541	5.841	10.215	12.924
4		2.132	2.776	3.747	4.604	7.173	8.610
5		2.015	2.571	3.365	4.032	5.893	6.869
6		1.943	2.447	3.143	3.707	5.208	5.959
7		1.894	2.365	2.998	3.499	4.785	5.408
8		1.860	2.306	2.896	3.355	4.501	5.041
9		1.833	2.262	2.821	3.250	4.297	4.781
10		1.812	2.228	2.764	3.169	4.144	4.587
11		1.796	2.201	2.718	3.106	4.025	4.437
12		1.782	2.179	2.681	3.055	3.930	4.318
13		1.771	2.160	2.650	3.012	3.852	4.221
14		1.761	2.145	2.624	2.977	3.787	4.140
15		1.753	2.131	2.602	2.947	3.733	4.073
16		1.746	2.120	2.583	2.921	3.686	4.015
17		1.740	2.110	2.567	2.898	3.646	3.965
18		1.734	2.101	2.552	2.878	3.610	3.922
19		1.729	2.093	2.539	2.861	3.579	3.883
20		1.725	2.086	2.528	2.845	3.552	3.850
21		1.721	2.080	2.518	2.831	3.527	3.819
22		1.717	2.074	2.508	2.819	3.505	3.792
23		1.714	2.069	2.500	2.807	3.485	3.768
24		1.711	2.064	2.492	2.797	3.467	3.745
25		1.708	2.060	2.485	2.787	3.450	3.725
26		1.706	2.056	2.479	2.779	3.435	3.707
27		1.703	2.052	2.473	2.771	3.421	3.690
28		1.701	2.048	2.467	2.763	3.408	3.674
29		1.699	2.045	2.462	2.756	3.396	3.659
30		1.697	2.042	2.457	2.750	3.385	3.646
32		1.694	2.037	2.449	2.738	3.365	3.622
34		1.691	2.032	2.441	2.728	3.348	3.601
36		1.688	2.028	2.434	2.719	3.333	3.582
38		1.686	2.024	2.429	2.712	3.319	3.566
40		1.684	2.021	2.423	2.704	3.307	3.551
42		1.682	2.018	2.418	2.698	3.296	3.538
44		1.680	2.015	2.414	2.692	3.286	3.526
46		1.679	2.013	2.410	2.687	3.277	3.515
48		1.677	2.011	2.407	2.682	3.269	3.505
50		1.676	2.009	2.403	2.678	3.261	3.496
60		1.671	2.000	2.390	2.660	3.232	3.460
70		1.667	1.994	2.381	2.648	3.211	3.435
80		1.664	1.990	2.374	2.639	3.195	3.416

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<b>90</b>	1.662	1.987	2.368	2.632	3.183	3.402
<b>100</b>	1.660	1.984	2.364	2.626	3.174	3.390

$v_1$	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	
$v_2$	1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.36	246.46	247.32	248.01

TABLE 2

F Distribution: Critical Values of F (5% significance level)

<b>2</b>	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.42	19.43	19.44	19.45
<b>3</b>	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.71	8.69	8.67	8.66
<b>4</b>	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.87	5.84	5.82	5.80
<b>5</b>	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.64	4.60	4.58	4.56
<b>6</b>	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.96	3.92	3.90	3.87
<b>7</b>	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.53	3.49	3.47	3.44
<b>8</b>	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.24	3.20	3.17	3.15
<b>9</b>	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.03	2.99	2.96	2.94
<b>10</b>	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.86	2.83	2.80	2.77
<b>11</b>	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.74	2.70	2.67	2.65
<b>12</b>	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.64	2.60	2.57	2.54
<b>13</b>	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.55	2.51	2.48	2.46
<b>14</b>	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.48	2.44	2.41	2.39
<b>15</b>	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.42	2.38	2.35	2.33
<b>16</b>	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.37	2.33	2.30	2.28
<b>17</b>	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.33	2.29	2.26	2.23
<b>18</b>	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.29	2.25	2.22	2.19
<b>19</b>	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.26	2.21	2.18	2.16
<b>20</b>	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.22	2.18	2.15	2.12
<b>21</b>	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.20	2.16	2.12	2.10
<b>22</b>	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.17	2.13	2.10	2.07
<b>23</b>	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.15	2.11	2.08	2.05
<b>24</b>	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.13	2.09	2.05	2.03
<b>25</b>	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.11	2.07	2.04	2.01
<b>26</b>	4.22	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.09	2.05	2.02	1.99
<b>27</b>	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.08	2.04	2.00	1.97
<b>28</b>	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.06	2.02	1.99	1.96
<b>29</b>	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.05	2.01	1.97	1.94
<b>30</b>	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.04	1.99	1.96	1.93
<b>35</b>	4.12	3.27	2.87	2.64	2.49	2.37	2.29	2.22	2.16	2.11	2.04	1.99	1.94	1.91	1.88
<b>40</b>	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.95	1.90	1.87	1.84
<b>50</b>	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.03	1.95	1.89	1.85	1.81	1.78
<b>60</b>	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.86	1.82	1.78	1.75
<b>70</b>	3.98	3.13	2.74	2.50	2.35	2.23	2.14	2.07	2.02	1.97	1.89	1.84	1.79	1.75	1.72
<b>80</b>	3.96	3.11	2.72	2.49	2.33	2.21	2.13	2.06	2.00	1.95	1.88	1.82	1.77	1.73	1.70
<b>90</b>	3.95	3.10	2.71	2.47	2.32	2.20	2.11	2.04	1.99	1.94	1.86	1.80	1.76	1.72	1.69
<b>100</b>	3.94	3.09	2.70	2.46	2.31	2.19	2.10	2.03	1.97	1.93	1.85	1.79	1.75	1.71	1.68

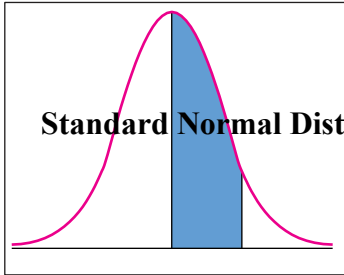
**TABLE 3** **$\chi^2$  (Chi-Squared) Distribution: Critical Values of  $\chi^2$** 

<i>Degrees of freedom</i>	<i>Significance level</i>		
	5%	1%	0.1%
<b>1</b>	3.841	6.635	10.828
<b>2</b>	5.991	9.210	13.816
<b>3</b>	7.815	11.345	16.266
<b>4</b>	9.488	13.277	18.467
<b>5</b>	11.070	15.086	20.515
<b>6</b>	12.592	16.812	22.458
<b>7</b>	14.067	18.475	24.322
<b>8</b>	15.507	20.090	26.124
<b>9</b>	16.919	21.666	27.877
<b>10</b>	18.307	23.209	29.588

Table 4

Critical Values for the $Q$ -Test of a Single Outlier ( $Q_{10}$ )					
$\alpha \Rightarrow$	0.1	0.05	0.04	0.02	0.01
$n \Downarrow$					
3	0.941	0.970	0.976	0.988	0.994
4	0.765	0.829	0.846	0.889	0.926
5	0.642	0.710	0.729	0.780	0.821
6	0.560	0.625	0.644	0.698	0.740
7	0.507	0.568	0.586	0.637	0.680
8	0.468	0.526	0.543	0.590	0.634
9	0.437	0.493	0.510	0.555	0.598
10	0.412	0.466	0.483	0.527	0.568



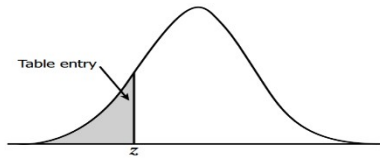


**Standard Normal Distribution Tables**

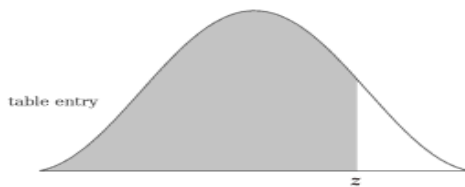
<b>z</b>	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.04</b>	<b>0.05</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.09</b>
<b>0.0</b>	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
<b>0.1</b>	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
<b>0.2</b>	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
<b>0.3</b>	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
<b>0.4</b>	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
<b>0.5</b>	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
<b>0.6</b>	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
<b>0.7</b>	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
<b>0.8</b>	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
<b>0.9</b>	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
<b>1.0</b>	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
<b>1.1</b>	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
<b>1.2</b>	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
<b>1.3</b>	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
<b>1.4</b>	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
<b>1.5</b>	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
<b>1.6</b>	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
<b>1.7</b>	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
<b>1.8</b>	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
<b>1.9</b>	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
<b>2.0</b>	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
<b>2.1</b>	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
<b>2.2</b>	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
<b>2.3</b>	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
<b>2.4</b>	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
<b>2.5</b>	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
<b>2.6</b>	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
<b>2.7</b>	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
<b>2.8</b>	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
<b>2.9</b>	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
<b>3.0</b>	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
<b>3.1</b>	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
<b>3.2</b>	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
<b>3.3</b>	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997

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<b>3.4</b>	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
<b>3.5</b>	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
<b>3.6</b>	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
<b>3.7</b>	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
<b>3.8</b>	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999



<b>z</b>	<b>0</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.04</b>	<b>0.05</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.09</b>
<b>-0</b>	.50000	.49601	.49202	.48803	.48405	.48006	.47608	.47210	.46812	.46414
<b>-0.1</b>	.46017	.45620	.45224	.44828	.44433	.44034	.43640	.43251	.42858	.42465
<b>-0.2</b>	.42074	.41683	.41294	.40905	.40517	.40129	.39743	.39358	.38974	.38591
<b>-0.3</b>	.38209	.37828	.37448	.37070	.36693	.36317	.35942	.35569	.35197	.34827
<b>-0.4</b>	.34458	.34090	.33724	.33360	.32997	.32636	.32276	.31918	.31561	.31207
<b>-0.5</b>	.30854	.30503	.30153	.29806	.29460	.29116	.28774	.28434	.28096	.27760
<b>-0.6</b>	.27425	.27093	.26763	.26435	.26109	.25785	.25463	.25143	.24825	.24510
<b>-0.7</b>	.24196	.23885	.23576	.23270	.22965	.22663	.22363	.22065	.21770	.21476
<b>-0.8</b>	.21186	.20897	.20611	.20327	.20045	.19766	.19489	.19215	.18943	.18673
<b>-0.9</b>	.18406	.18141	.17879	.17619	.17361	.17106	.16853	.16602	.16354	.16109
<b>-1</b>	.15866	.15625	.15386	.15151	.14917	.14686	.14457	.14231	.14007	.13786
<b>-1.1</b>	.13567	.13350	.13136	.12924	.12714	.12507	.12302	.12100	.11900	.11702
<b>-1.2</b>	.11507	.11314	.11123	.10935	.10749	.10565	.10383	.10204	.10027	.09853
<b>-1.3</b>	.09680	.09510	.09342	.09176	.09012	.08851	.08692	.08534	.08379	.08226
<b>-1.4</b>	.08076	.07927	.07780	.07636	.07493	.07353	.07215	.07078	.06944	.06811
<b>-1.5</b>	.06681	.06552	.06426	.06301	.06178	.06057	.05938	.05821	.05705	.05592
<b>-1.6</b>	.05480	.05370	.05262	.05155	.05050	.04947	.04846	.04746	.04648	.04551
<b>-1.7</b>	.04457	.04363	.04272	.04182	.04093	.04006	.03920	.03836	.03754	.03673
<b>-1.8</b>	.03593	.03515	.03438	.03362	.03288	.03216	.03144	.03074	.03005	.02938
<b>-1.9</b>	.02872	.02807	.02743	.02680	.02619	.02559	.02500	.02442	.02385	.02330
<b>-2</b>	.02275	.02222	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831
<b>-2.1</b>	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
<b>-2.2</b>	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
<b>-2.3</b>	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	.00866	.00842
<b>-2.4</b>	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
<b>-2.5</b>	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
<b>-2.6</b>	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
<b>-2.7</b>	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
<b>-2.8</b>	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
<b>-2.9</b>	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
<b>-3</b>	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
<b>-3.1</b>	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
<b>-3.2</b>	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
<b>-3.3</b>	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
<b>-3.4</b>	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
<b>-3.5</b>	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
<b>-3.6</b>	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
<b>-3.7</b>	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
<b>-3.8</b>	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
<b>-3.9</b>	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
<b>-4</b>	.00003	.00003	.00003	.00003	.00003	.00003	.00002	.00002	.00002	.00002



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<b>z</b>	<b>0</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.04</b>	<b>0.05</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.09</b>
<b>+0</b>	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
<b>+0.1</b>	.53983	.54380	.54776	.55172	.55567	.55966	.56360	.56749	.57142	.57535
<b>+0.2</b>	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
<b>+0.3</b>	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
<b>+0.4</b>	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
<b>+0.5</b>	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
<b>+0.6</b>	.72575	.72907	.73237	.73565	.73891	.74215	.74537	.74857	.75175	.75490
<b>+0.7</b>	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
<b>+0.8</b>	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
<b>+0.9</b>	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
<b>+1</b>	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
<b>+1.1</b>	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
<b>+1.2</b>	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
<b>+1.3</b>	.90320	.90490	.90658	.90824	.90988	.91149	.91308	.91466	.91621	.91774
<b>+1.4</b>	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189
<b>+1.5</b>	.93319	.93448	.93574	.93699	.93822	.93943	.94062	.94179	.94295	.94408
<b>+1.6</b>	.94520	.94630	.94738	.94845	.94950	.95053	.95154	.95254	.95352	.95449
<b>+1.7</b>	.95543	.95637	.95728	.95818	.95907	.95994	.96080	.96164	.96246	.96327
<b>+1.8</b>	.96407	.96485	.96562	.96638	.96712	.96784	.96856	.96926	.96995	.97062
<b>+1.9</b>	.97128	.97193	.97257	.97320	.97381	.97441	.97500	.97558	.97615	.97670
<b>+2</b>	.97725	.97778	.97831	.97882	.97932	.97982	.98030	.98077	.98124	.98169
<b>+2.1</b>	.98214	.98257	.98300	.98341	.98382	.98422	.98461	.98500	.98537	.98574
<b>+2.2</b>	.98610	.98645	.98679	.98713	.98745	.98778	.98809	.98840	.98870	.98899
<b>+2.3</b>	.98928	.98956	.98983	.99010	.99036	.99061	.99086	.99111	.99134	.99158
<b>+2.4</b>	.99180	.99202	.99224	.99245	.99266	.99286	.99305	.99324	.99343	.99361
<b>+2.5</b>	.99379	.99396	.99413	.99430	.99446	.99461	.99477	.99492	.99506	.99520
<b>+2.6</b>	.99534	.99547	.99560	.99573	.99585	.99598	.99609	.99621	.99632	.99643
<b>+2.7</b>	.99653	.99664	.99674	.99683	.99693	.99702	.99711	.99720	.99728	.99736
<b>+2.8</b>	.99744	.99752	.99760	.99767	.99774	.99781	.99788	.99795	.99801	.99807
<b>+2.9</b>	.99813	.99819	.99825	.99831	.99836	.99841	.99846	.99851	.99856	.99861
<b>+3</b>	.99865	.99869	.99874	.99878	.99882	.99886	.99889	.99893	.99896	.99900
<b>+3.1</b>	.99903	.99906	.99910	.99913	.99916	.99918	.99921	.99924	.99926	.99929
<b>+3.2</b>	.99931	.99934	.99936	.99938	.99940	.99942	.99944	.99946	.99948	.99950
<b>+3.3</b>	.99952	.99953	.99955	.99957	.99958	.99960	.99961	.99962	.99964	.99965
<b>+3.4</b>	.99966	.99968	.99969	.99970	.99971	.99972	.99973	.99974	.99975	.99976
<b>+3.5</b>	.99977	.99978	.99978	.99979	.99980	.99981	.99981	.99982	.99983	.99983
<b>+3.6</b>	.99984	.99985	.99985	.99986	.99986	.99987	.99987	.99988	.99988	.99989
<b>+3.7</b>	.99989	.99990	.99990	.99990	.99991	.99991	.99992	.99992	.99992	.99992
<b>+3.8</b>	.99993	.99993	.99993	.99994	.99994	.99994	.99994	.99995	.99995	.99995
<b>+3.9</b>	.99995	.99995	.99996	.99996	.99996	.99996	.99996	.99996	.99997	.99997
<b>+4</b>	.99997	.99997	.99997	.99997	.99997	.99997	.99998	.99998	.99998	.99998