NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF AGRICULTURAL SCIENCES AND AGRIBUSINESS

QUALIFICATION : BACHELOR OF SCIENCE IN AGRICULTURE	
QUALIFICATION CODE: 07BAGA	**LEVEL: 7**
COURSE CODE: AGS520S	**COURSE NAME**: AGRICULTURAL STATISTICS
SESSION: JULY 2024	**PAPER:** 2
DURATION: 3 HOURS	**MARKS:** 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER(S)	DR DAVID UCHEZUBA
MODERATOR:	MR ANDREW ROUX

INSTRUCTIONS

1. This paper consists of two sections: Section A has 15 multiple-choice questions and 5 True or False questions. Section B is made up of four essay-type questions.
2. Answer ALL questions in blue or black ink.
3. Start each question on a new page in your answer booklet.
4. Questions relating to this paper may be raised in the initial 30 minutes after the start of the examination. Thereafter, students must use their initiative to deal with any perceived error or ambiguities & any assumption made should be clearly stated.

THIS MEMO CONSISTS OF 13 PAGES (Including this front page)

SECTION A

QUESTION 1 (20 Marks)

Consider a random variable X with the following probability distribution.

X	2	4	5	8	9
P(X)	0.40	0.20	0.10	0.15	0.10

Use the table to answer questions 1.1 to 1.5.

1.1. Find P($X < 4$)

A. 0.50

B 0.70

C 0.60

D 0.40

1.2 Find P($X \geq 8$)

A. 0.25

B 0.40

C 0.30

D 0.10

1.3 $X < 5$

A. 0.00

B 0.50

C 0.60

D 0.70

1.4 Assume the claim that the mean weight of airline passengers (including hand luggage) is greater than 43 kg per person. Identify the null and alternative hypothesis used to verify this claim.

A. $H_O : \mu \geq 43\ kg, H_a : \mu > 43\ kg$

B $H_O : \mu \geq 43\ kg, H_a : \mu < 43\ kg$

C $H_O : \mu \leq 43\ kg, H_a : \mu > 43\ kg$

D $H_O : \mu \leq 43\ kg, H_a : \mu \geq 43\ kg$

1.5 How many per cent under the normal curve lies between $\mu \pm 2\sigma$

A. 95

B 68

C 90

D 97

1.6 We committed a type II error, which means we.

A. Rejected a true null hypothesis

B. fail to reject a false null hypothesis

C. Rejected a false alternative hypothesis

D. fail to reject a true null hypothesis

Consider a random variable X with the following probabilities. Use the table to answer questions 1.7 to 1.10.

X	2	4	6	9	12
P(X)	0.1	0.4	X	0.35	0.11

1.7 Find the probability that represents (x)

A. 0.02

B. 0.04

C. 0.14

D. 0.03

Given a random variable X which is normally distributed with mean 15 and variance 100. Answer questions 1.8 and 1.10. Find

1.8 $P(X < 20)$

A. 0.3125

B. 0.5140

C. 0.0235

D. 0.6915

1.9 $P(X > 20)$

A. 0.3085

B. 0.4415

C. 0.1235

D. 0.9120

1.10 $P(12 < X < 20)$

A. 0.1110

B. 0.1022

C. 0.3094

D. 0.2120

1.11 Which of the following measures of central tendency can be used when a dataset has an outlier?

A. Mean

B. Median

C. Mode

D. Variance

1.12 The weight of an object is an example of

A. A continuous random variable

B. A discrete random variable

C. Ordinal random variable

D. Both discrete and continuous random variables.

1.13 When do we collect data from the entire population in statistical research? Which statement is incorrect?

A. When the population is small

B. When the population is available

C. When a fund is available

D. We never use the entire population

1.14 The narrower the confidence interval.

A. The higher the probability of committing a type I or II error.

B. The lesser the probability of committing a type I or II error.

C. The larger the t-statistics

D. The larger the critical value

1.15 The skewness and kurtosis of a normal probability distribution are.

A. $S = 3; K = 0$

B. $S = 0; K = 3$

C. $S = 0; K = 0$

D. $S = 1; K = 3$

TRUE OR FALSE QUESTION

Indicate whether the following statements are true or false.

1.16. The variable weight is an example of a continuous random variable. **True or False**

1.17. If A is an event that a seed sown will germinate and B is an event that a seed sown will not germinate, then events A and B are mutually exclusive. **True or False**

1.18. The z-distribution table has both negative and positive values. **True or False.**

1.19 The mean is sensitive to extreme values (outliers). **True or False**.

1.20 If the null is rejected, the alternative is true. **True or False**

SECTION B

QUESTION 2 (20 Marks)

2.1. The term test scores of students enrolled in statistics classes were recorded as follows.

2	13	14	11	9	15
3	11	14	26	24	11

Calculate the following

2.1.1 Arithmetic mean (2 Marks)

2.1.2. Mode (2 Marks)

2.1.3. Variance (2 Marks)

2.1.4. Standard deviation (2 Marks)

2.1.5. Coefficient of variation (2 Marks)

2.2. How high should a doorway be if 95% of men will fit through it without bending or bumping their heads? Find the 95^{th} percentile of heights of men that pass through the average doorway if the heights of men are normally distributed with a mean of 69 inches and a standard deviation of 2.8 inches. (5 Marks)

2.3. Assume that the readings on the thermometers are normally distributed with a mean of 0°C- and a standard deviation of 1°c. Find the indicated probabilities, where z is the reading in degrees.

2.3.1. $P(-1.96 < Z < 1.96)$ (1 Mark)

2.3.2. $P(z < 1.645)$ (1 Mark)

2.3.3. $P(z < -2.575 \text{ or } z > 2.75)$ (1 Mark)

2.3.4. $P(z < -1.96 \text{ or } z > 1.96)$ (1 Mark)

2.3.5. $P(z < -1.00 \text{ or } z < -0.50)$ (1 Mark)

QUESTION 3 (20 Marks)

3.1. A manufacturing company estimates that its maximum daily demand for electricity during the coming few weeks can be approximated by a normal distribution with mean 1000 kw and standard deviation of 10 Kw

3.1.1. Find the probability that the maximum demand for electricity will exceed 120 Kw on a given day. (5 Marks)

3.1.2. Find the probability that, on a given day, the maximum demand for electricity is less than 85 Kw. (5 Marks)

3.2. Find the probability that a given day's demand for electricity will exceed 95 Kw. (5 Marks)

3.3. Find the probability that the maximum dailydemand for electricity will fall between 90 Kw and 95 Kw (5 Marks)

QUESTION 4 (20 Marks)

4.1. The frequency distribution table below gives the number of iPods sold by a shop on each of 30 days.

iPods sold	***f***
5 - 9	3
10 - 14	6
15 - 19	8
20 -24	8
25 -29	5
	30

Calculate the following.

4.1.1 The class mid-points. (2 Marks)

4.1.2. The relative frequency. (2 Marks)

4.1.3. The cumulative frequencies. (2 Marks)

4.1.4. The relative frequency percentages. (2 Marks)

4.1.5. The cumulative frequency percentages. (2 Marks)

4.2. In a sample of 200 people, 84 had blood type O, 88 had blood type A, 20 had blood type B, and 8 had blood type AB. Set up a probability distribution table and answer the following.

4.2.1. What is the probability that a person has blood type O? (2 Marks)

4.2.2. What is the probability that a person has blood type A or blood type B? (2 Marks)

4.2.3. What is the probability that a person has neither blood type A nor blood type O? (2 Marks)

4.2.4. What is the probability that a person does not have blood type AB? (2 Marks)

4.2.5. What is the probability that a person has a blood type A? (2 Marks)

QUESTION 5 (20 Marks)

5.1. An experiment to determine the level of potency of two pesticide labels was conducted. An analysis of the variance table for the experiment is given below. Calculate the values of the missing highlighted blocks.

Source of variation	Sum of squares	Degrees of Freedom	Mean square	F-Test
Treatment	60.40	2	C	E
Error	437.60	4	D	
Total	A	B		

(10 Marks)

5.2.

Company officials were concerned about the length of time a particular drug product retained its potency. A random sample of $n_1 = 10$ bottles of the product was drawn from the production line and analysed for potency. A second sample of $n_2 = 10$ bottles was obtained and stored in a regulated environment for one year. Readings obtained from each sample were recorded. Suppose we let μ_1 denote the mean potency for all bottles that might be sampled coming off the production line and μ_2 denote the mean potency for all bottles that may be retained for one year.

5.2.1 Estimate the differences in the mean $\mu_1 - \mu_2$ by using a 95 % confidence interval. Use the following summary of the data>

Summary	Fresh	Stored
n	10	10
$\bar{x}$	10.37	9.83
s	0.3234	0.2406

(8 Marks)

5.2.2. Interpret your result (2 Marks)

STATISTICAL FORMULA

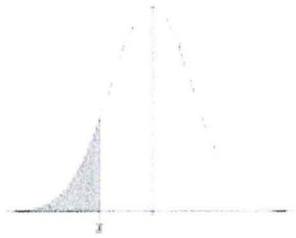
$$\mu = \frac{\sum x}{N}, \qquad \sigma^2 = \frac{(x-\bar{x})^2}{N-1} \qquad \sigma = \sqrt{\frac{(x-\bar{x})^2}{N-1}}, \qquad \sigma = \sqrt{\frac{(x-\bar{x})^2}{N-1}}$$

$$z = \frac{x-\mu}{\sigma}, \qquad z = \frac{\bar{x}-\mu_{\bar{x}}}{\sigma_{\bar{x}}} = \frac{\bar{x}-\mu_{\bar{x}}}{\frac{\sigma}{\sqrt{n}}}, \qquad z = \frac{\bar{x}-\mu_{\bar{x}}}{\frac{\sigma}{\sqrt{n}}}, \qquad t = \frac{\bar{x}-\mu}{S/\sqrt{n}}$$

$$\sigma^2 = \frac{(x-\bar{x})}{N-1}, \qquad t = \frac{(\bar{x}-\mu)}{S/\sqrt{n}}, \qquad \sigma = \frac{x-\bar{x}}{n-1}, \qquad z = \frac{\bar{x}-\mu}{\sigma}$$

$$t = \frac{(\bar{x}_1-\bar{x}_2)-D_0}{S_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}, \qquad t = \frac{(x_1-\bar{x}_2)-D_0}{S_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}$$

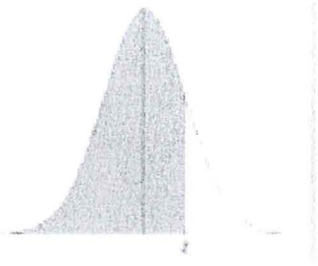
Standard Normal Cumulative Probability Table



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

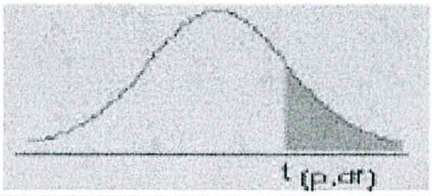
Standard Normal Cumulative Probability Table



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

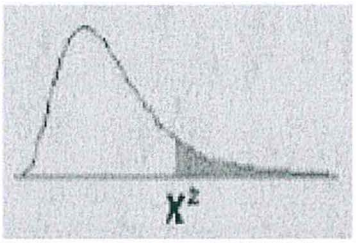
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	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
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

The t-distribution



df p	0.40	0.25	0.10	0.05	0.025	0.01	0.005	0.0005
1	0.324920	1.000000	3.077684	6.313752	12.70620	31.82052	63.65674	636.6192
2	0.288675	0.816497	1.885618	2.919986	4.30265	6.96456	9.92484	31.5991
3	0.276671	0.764892	1.637744	2.353363	3.18245	4.54070	5.84091	12.9240
4	0.270722	0.740697	1.533206	2.131847	2.77645	3.74695	4.60409	8.6103
5	0.267181	0.726687	1.475884	2.015048	2.57058	3.36493	4.03214	6.8688
6	0.264835	0.717558	1.439756	1.943180	2.44691	3.14267	3.70743	5.9588
7	0.263167	0.711142	1.414924	1.894579	2.36462	2.99795	3.49948	5.4079
8	0.261921	0.706387	1.396815	1.859548	2.30600	2.89646	3.35539	5.0413
9	0.260955	0.702722	1.383029	1.833113	2.26216	2.82144	3.24984	4.7809
10	0.260185	0.699812	1.372184	1.812461	2.22814	2.76377	3.16927	4.5869
11	0.259556	0.697445	1.363430	1.795885	2.20099	2.71808	3.10581	4.4370
12	0.259033	0.695483	1.356217	1.782288	2.17881	2.68100	3.05454	4.3178
13	0.258591	0.693829	1.350171	1.770933	2.16037	2.65031	3.01228	4.2208
14	0.258213	0.692417	1.345030	1.761310	2.14479	2.62449	2.97684	4.1405
15	0.257885	0.691197	1.340606	1.753050	2.13145	2.60248	2.94671	4.0728
16	0.257599	0.690132	1.336757	1.745884	2.11991	2.58349	2.92078	4.0150
17	0.257347	0.689195	1.333379	1.739607	2.10982	2.56693	2.89823	3.9651
18	0.257123	0.688364	1.330391	1.734064	2.10092	2.55238	2.87844	3.9216
19	0.256923	0.687621	1.327728	1.729133	2.09302	2.53948	2.86093	3.8834
20	0.256743	0.686954	1.325341	1.724718	2.08596	2.52798	2.84534	3.8495
21	0.256580	0.686352	1.323188	1.720743	2.07961	2.51765	2.83136	3.8193
22	0.256432	0.685805	1.321237	1.717144	2.07387	2.50832	2.81876	3.7921
23	0.256297	0.685306	1.319460	1.713872	2.06866	2.49987	2.80734	3.7676
24	0.256173	0.684850	1.317836	1.710882	2.06390	2.49216	2.79694	3.7454
25	0.256060	0.684430	1.316345	1.708141	2.05954	2.48511	2.78744	3.7251
26	0.255955	0.684043	1.314972	1.705618	2.05553	2.47863	2.77871	3.7066
27	0.255858	0.683685	1.313703	1.703288	2.05183	2.47266	2.77068	3.6896
28	0.255768	0.683353	1.312527	1.701131	2.04841	2.46714	2.76326	3.6739
29	0.255684	0.683044	1.311434	1.699127	2.04523	2.46202	2.75639	3.6594
30	0.255605	0.682756	1.310415	1.697261	2.04227	2.45726	2.75000	3.6460
inf	0.253347	0.674490	1.281552	1.644854	1.95996	2.32635	2.57583	3.2905

The Chi-Square Distribution



df/p	.995	.990	.975	.950	.900	.750	.500	.250	.100	.050	.025	.010	.005
1	0.00004	0.00016	0.00098	0.00393	0.01579	0.10153	0.45494	1.32330	2.70554	3.84146	5.02389	6.63490	7.87944
2	0.01003	0.02010	0.05064	0.10259	0.21072	0.57536	1.38629	2.77259	4.60517	5.99146	7.37776	9.21034	10.59663
3	0.07172	0.11483	0.21580	0.35185	0.58437	1.21253	2.36597	4.10834	6.25139	7.81473	9.34840	11.34487	12.83816
4	0.20699	0.29711	0.48442	0.71072	1.06362	1.92256	3.35669	5.38527	7.77944	9.48773	11.14329	13.27670	14.86026
5	0.41174	0.55430	0.83121	1.14548	1.61031	2.67460	4.35146	6.62568	9.23636	11.07050	12.83250	15.08627	16.74960
6	0.67573	0.87209	1.23734	1.63538	2.20413	3.45460	5.34812	7.84080	10.64464	12.59159	14.44938	16.81189	18.54758
7	0.98926	1.23904	1.68987	2.16735	2.83311	4.25485	6.34581	9.03715	12.01704	14.06714	16.01276	18.47531	20.27774
8	1.34441	1.64650	2.17973	2.73264	3.48954	5.07064	7.34412	10.21885	13.36157	15.50731	17.53455	20.09024	21.95495
9	1.73493	2.08790	2.70039	3.32511	4.16816	5.89883	8.34283	11.38875	14.68366	16.91898	19.02277	21.66599	23.58935
10	2.15586	2.55821	3.24697	3.94030	4.86518	6.73720	9.34182	12.54886	15.98718	18.30704	20.48318	23.20925	25.18818
11	2.60322	3.05348	3.81575	4.57481	5.57778	7.58414	10.34100	13.70069	17.27501	19.67514	21.92005	24.72497	26.75685
12	3.07382	3.57057	4.40379	5.22603	6.30380	8.43842	11.34032	14.84540	18.54935	21.02607	23.33666	26.21697	28.29952
13	3.56503	4.10692	5.00875	5.89186	7.04150	9.29907	12.33976	15.98391	19.81193	22.36203	24.73560	27.68825	29.81947
14	4.07467	4.66043	5.62873	6.57063	7.78953	10.16531	13.33927	17.11693	21.06414	23.68479	26.11895	29.14124	31.31935
15	4.60092	5.22935	6.26214	7.26094	8.54676	11.03654	14.33886	18.24509	22.30713	24.99579	27.48839	30.57791	32.80132
16	5.14221	5.81221	6.90766	7.96165	9.31224	11.91222	15.33850	19.36886	23.54183	26.29623	28.84535	31.99993	34.26719
17	5.69722	6.40776	7.56419	8.67176	10.08519	12.79193	16.33818	20.48868	24.76904	27.58711	30.19101	33.40866	35.71847
18	6.26480	7.01491	8.23075	9.39046	10.86494	13.67529	17.33790	21.60489	25.98942	28.86930	31.52638	34.80531	37.15645
19	6.84397	7.63273	8.90652	10.11701	11.65091	14.56200	18.33765	22.71781	27.20357	30.14353	32.85233	36.19087	38.58226
20	7.43384	8.26040	9.59078	10.85081	12.44261	15.45177	19.33743	23.82769	28.41198	31.41043	34.16961	37.56623	39.99685
21	8.03365	8.89720	10.28290	11.59131	13.23960	16.34438	20.33723	24.93478	29.61509	32.67057	35.47888	38.93217	41.40106
22	8.64272	9.54249	10.98232	12.33801	14.04149	17.23962	21.33704	26.03927	30.81328	33.92444	36.78071	40.28936	42.79565
23	9.26042	10.19572	11.68855	13.09051	14.84796	18.13730	22.33688	27.14134	32.00690	35.17246	38.07563	41.63840	44.18128
24	9.88623	10.85636	12.40115	13.84843	15.65868	19.03725	23.33673	28.24115	33.19624	36.41503	39.36408	42.97982	45.55851
25	10.51965	11.52398	13.11972	14.61141	16.47341	19.93934	24.33659	29.33885	34.38159	37.65248	40.64647	44.31410	46.92789
26	11.16024	12.19815	13.84390	15.37916	17.29188	20.84343	25.33646	30.43457	35.56317	38.88514	41.92317	45.64168	48.28988
27	11.80759	12.87850	14.57338	16.15140	18.11390	21.74940	26.33634	31.52841	36.74122	40.11327	43.19451	46.96294	49.64492
28	12.46134	13.56471	15.30786	16.92788	18.93924	22.65716	27.33623	32.62049	37.91592	41.33714	44.46079	48.27824	50.99338
29	13.12115	14.25645	16.04707	17.70837	19.76774	23.56659	28.33613	33.71091	39.08747	42.55697	45.72229	49.58788	52.33562
30	13.78672	14.95346	16.79077	18.49266	20.59923	24.47761	29.33603	34.79974	40.25602	43.77297	46.97924	50.89218	53.67196