PROBABILITY AND STATISTICAL METHODS
(MATH 2111)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) If X is random variable, then which one of the following is correct?
(a) $E|X| \leq |E(X)|$ (b) $E|X| \geq |E(X)|$
(c) $E|X| = \frac{|E(X)|}{2}$ (d) $E|X| \neq |E(X)|$

(ii) For standard normal distribution, the coefficient of skewness (γ_1) and kurtosis (γ_2) are:
(a) $\gamma_1 = 1, \gamma_2 = 0$. (b) $\gamma_1 = 0, \gamma_2 = 3$.
(c) $\gamma_1 = 0, \gamma_2 = 0$. (d) $\gamma_1 = 3, \gamma_2 = -3$.

(iii) The moment generating function $(M_X(t))$ of Exponential distribution with mean $\frac{1}{2}$ is
(a) $\frac{2}{2-t}$ (b) $\frac{2}{2-it}$ (c) $\frac{1}{1-2t}$ (d) $\frac{1}{1+2t}$

(iv) The regression lines between two random variables X and Y are given by $x + 4y + 3 = 0$ and $4x + 9y + 5 = 0$. Let $u = -2x + 5$, $v = -4y + 6$, then the correlation coefficient between u and v is:
(a) 0.75 (b) −0.75 (c) −0.5 (d) 0.5.

(v) Let the random variable that counts the number of times heads turns up when an unbiased coin is tossed n times. The probability that number of heads is at least $\frac{3n}{4}$ is at most (use Chebyshev's inequality)
(a) $\frac{n}{2}$ (b) $\frac{4}{n}$ (c) $\frac{1}{n}$ (d) $\frac{2}{3}$

(vi) If the joint p.d.f. is given by $f(x,y) = \begin{cases} cx(1-x), & 0 \leq x \leq y \leq 1 \\ 0, & \text{otherwise} \end{cases}$, then the value of c is
(a) 1 (b) 2 (c) 3 (d) 4.

(vii) While calculating stationary probability of a Markov process, it is assumed that
(a) there is a single absorbing state
(b) transition probabilities do not change
(c) there is a single non-absorbing state
(d) none of the above.

(viii) The probability of going from state 1 in period 2 to state 4 in period 3 is
(a) p_{12} (b) p_{23} (c) p_{14} (d) p_{43}

(ix) If the variance of $\overline{X}$ equals 25 and the sample size $n = 6$, the population variance is
(a) 4.167 (b) 2.041 (c) 150 (d) 12.247

(x) According to the central limit theorem, the sampling distribution of the sample mean can be approximated by the normal distribution as the
(a) number of samples gets large enough
(b) sample size gets large enough
(c) population standard deviation increases
(d) sample standard deviation decreases

Group–B

2. (a) Two computers A and B are to be marketed. A salesman who is assigned the job of finding customers for them has 60 per cent and 40 per cent chances, respectively of succeeding for computers A and B. The two computers can be sold independently. Given that he was able to sell at least one computer, what is the probability that computer A has been sold? [(CO1, CO2) (Apply/IOCQ)]

(b) Find the characteristic function of the probability density function
$f(x) = \frac{\alpha}{2} e^{-\alpha|x|}, \; -\infty < x < \infty, \alpha > 0.$
Hence find its mean and variance. [(CO1, CO2)(Understand/LOCQ)]

(c) The p. d. f. of the random variable X is given by
$$f(x) = \begin{cases} \frac{1}{4}, & 0 < x < 4 \\ 0, & \text{otherwise} \end{cases}$$
A random variable Z is defined as follows: $Z = \begin{cases} 1, & 0 < X < 3 \\ 2, & 3 \le X < 4 \end{cases}$
Find the mean and variance of Z. [(CO1, CO2) (Apply/IOCQ)]

4 + 4 + 4 = 12

3. (a) A variable X is always strictly larger than -15. It is given that $E(X^2) = 25$ and $Var(X) = 25$. Use Markov's inequality to find the upper bound of $P(X \geq -5)$.
[(CO1, CO2)(Understand/LOCQ)]

(b) A particular production process used to manufacture ferrite magnets used to operate reed switches in electronic meters is known to give 10% defective magnets on average. If 200 magnets are randomly selected, using normal approximation to binomial distribution to find the probability that the number of defective magnets is between 24 and 30? [(CO1, CO2)(Apply/IOCQ)]

(c) A factory uses tools of a particular type. From time-to-time failures in these tools occur and they need to be replaced. The number of such failures in a day has a Poisson distribution with mean 1.25. At the beginning of a particular day there are five replacement tools in stock. A new delivery of replacements will arrive after four days. If all five spares are used before the new delivery arrives then further replacements cannot be made until the delivery arrives. Find (a) the probability that three replacements are required over the next four days. (b) the expected number of replacements actually made over the next four days.

[(CO1, CO2)(Evaluate/HOCQ)]

3 + 4 + 5 = 12

Group - C

4. (a) The bivariate probability distribution of the random variables X and Y is given below:

X \ Y	1	2	3	4	5	6
0	0	0	$\frac{1}{32}$	$\frac{2}{32}$	$\frac{2}{32}$	$\frac{3}{32}$
1	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
2	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{64}$	$\frac{1}{64}$	0	$\frac{2}{64}$

Find

(i) the marginal probability mass functions of the random variables X and Y,

(ii) $P(X \leq 1)$, and

(iii) $P(Y \leq 3)$. [(CO1, CO2, CO3) (Understand/LOCQ)]

(b) If X and Y are two random variables having joint probability density function

$$f(x,y) = \begin{cases} k(6-x-y), & 0 \leq x \leq 2, \quad 2 \leq y \leq 4 \\ 0, & \text{otherwise} \end{cases},$$

(i) Determine the value of k

(ii) Find $P(X+Y<3)$

(iii) Find $P(X<1 \mid Y<3)$. [(CO1, CO2, CO3) (Apply/IOCQ)]

(2 + 2 + 2) + (2 + 2 + 2) = 12

5. (a) For the following transition probability matrix for states $\{0, 1, 2, 3\}$

$$\begin{bmatrix} 0 & 0.2 & 0.8 & 0 \\ 0.3 & 0.1 & 0 & 0.6 \\ 0.5 & 0 & 0 & 0.5 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

(i) draw the state transition diagram

(ii) identify the recurrent, transient and absorbing states, and the communicating classes. [(CO1, CO2, CO3)(Evaluate/HOCQ)]

(b) Let X_i represents the states of a day and it assumes value 0 if the day is rainy and 1 if the day is sunny. Let the state transition probability is given by $p_{00} = 0.7$ and $p_{10} = 0.4$. Suppose, there is rain on Monday, then what is the probability that there will be rain on Friday. [(CO1, CO2, CO3) (Apply /IOCQ)]

(4 + 2) + 6 = 12

Group - D

6. (a) Calculate skewness and kurtosis for the following distribution and comment on the nature of the distribution:

x	0	1	2	3	4	5	6	7	8
f	1	8	28	56	70	56	28	8	1

[(CO3, CO4, CO5, CO6) (Evaluate/HOCQ)]

(b) Use the method of least squares to obtain the equations of the regression lines from the following data. Also estimate the value of (i) Y, when X = 38 and (ii) X, when Y = 18.

X	22	26	29	30	31	31	34	35
Y	20	20	21	29	27	24	27	31

[(CO3, CO4, CO5, CO6) (Apply/IOCQ)]

6 + 6 = 12

7. (a) Find the moment-generating function of the Binomial distribution with parameters n and p. Hence use it to find the mean and variance of the distribution. [(CO3, CO4, CO5, CO6) (Apply/IOCQ)]

(b) Ten students obtained the following marks in Mathematics and Statistics. Calculate the Spearman's Rank Correlation coefficient between the marks of two subjects.

Student(Roll No.)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Marks in Mathematics	78	36	98	25	75	82	90	62	65	39
Marks in Physics	84	51	91	60	68	62	86	58	53	47

[(CO3, CO4, CO5, CO6) (Remember/LOCQ)]

6 + 6 = 12

Group – E

8. Consider the population of data {34, 36, 38}. For random samples of size 2 drawn with replacement from this population

(i) determine the mean and variance of the population,

(ii) determine the sampling distribution of the sample mean, and

(iii) determine the variance and standard deviation of the sample mean.

[(CO4, CO5, CO6) (Understand/LOCQ)]

(3 + 7 + 2) = 12

9. (a) The duration of Alzheimer's disease from the onset of symptoms until death ranges from 3 to 20 years. The average is 8 years with a standard deviation of 4 years. The administrator of a large medical centre randomly selects the medical records of 30 deceased Alzheimer's patients from the medical centre's database, and records the average duration. Find the approximate probabilities for the following events:
   (i) The average duration is less than 7 years.
   (ii) The average duration exceeds 7 years. [(CO4, CO5, CO6) (Apply/IOCQ)]

   (b) An automatic machine was manufactured to pack 10 kg of oil. A random sample of 13 tins was taken to test the machine. The weights of 13 tins were as follows: 9.7, 9.6, 10.4, 10.3, 9.8, 10.2, 10.4, 9.5, 10.6, 10.8, 9.1, 9.4, 10.7.
   Assuming normal distribution of the weights of the packed tins, examine whether the machine worked in accordance with the specifications (assume $\alpha = 0.05$). [(CO4, CO5, CO6) (Evaluate/HOCQ)]

(3 + 3) + (3 + 3) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	32.29%	43.75%	23.95%

Course Outcome (CO):

After the completion of the course students will be able to

MATH 2111.1 Articulate the axioms (laws) of probability.

MATH 2111.2 Compare and contrast different interpretations of probability theory and take
a stance on which might be preferred.

MATH 2111.3 Formulate predictive models to tackle situations where deterministic algorithms are intractable.

MATH 2111.4 Summarize data visually and numerically

MATH 2111.5 Assess data-based models.

MATH 2111.6 Apply tools of formal inference.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

Department & Section	Submission Link (Regular)
CSE-A	https://classroom.google.com/c/NDA0NzgyOTE0MzE0/a/NDY0MzEwNDk2NDQ2/details
CSE-B	https://classroom.google.com/c/NDA0NzgyOTE0MzM0/a/NDY0MzEwMzM2Njc5/details
CSE-C	https://classroom.google.com/c/NDA0NDcyMjgxMDkz/a/NDYzOTUwMDUxOTQ4/details
CSBS	https://classroom.google.com/c/NDA0NDcyMjgxMTc4/a/NDYzOTUwMDUyNDQ0/details

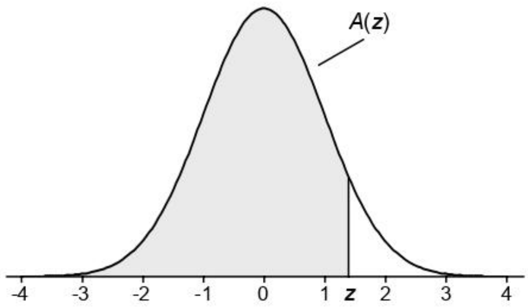
Note: Students having backlog in MATH2111 are advised to follow the steps as mentioned below in order to submit the answer-scripts properly:

Step-I: Join the Google classroom by clicking the following link (note that you have to join using your institutional email account):
https://classroom.google.com/c/NDU1MTYzNTk3MDY1?cjc=v2jwxot

Step-II: Submit your answer script by clicking link below:
https://classroom.google.com/c/NDU1MTYzNTk3MDY1/a/NDY0NTExMzcwMjUy/details

TABLE A.1

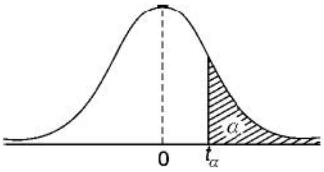
Cumulative Standardized Normal Distribution



$A(z)$ is the integral of the standardized normal distribution from $-\infty$ to z (in other words, the area under the curve to the left of z). It gives the probability of a normal random variable not being more than z standard deviations above its mean. Values of z of particular importance:

z	$A(z)$	
1.645	0.9500	Lower limit of right 5% tail
1.960	0.9750	Lower limit of right 2.5% tail
2.326	0.9900	Lower limit of right 1% tail
2.576	0.9950	Lower limit of right 0.5% tail
3.090	0.9990	Lower limit of right 0.1% tail
3.291	0.9995	Lower limit of right 0.05% tail

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
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999							



4. t_α-Critical Values of the t-Distribution

	α						
ν	0.40	0.30	0.20	0.15	0.10	0.05	0.025
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179
13	0.259	0.537	0.870	1.079	1.350	1.771	2.160
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000
120	0.254	0.526	0.845	1.041	1.289	1.658	1.980
∞	0.253	0.524	0.842	1.036	1.282	1.645	1.960

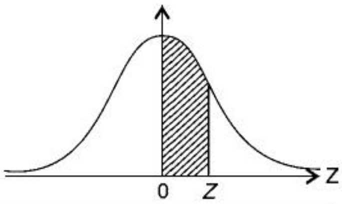
A.14 — STATISTICAL TABLES

t_α-Critical Values of the t-Distribution

	α						
ν	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	15.895	21.205	31.821	42.434	63.657	127.322	636.590
2	4.849	5.643	6.965	8.073	9.925	14.089	31.598
3	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	2.398	2.574	2.821	2.998	3.250	3.690	4.781
10	2.359	2.527	2.764	2.932	3.169	3.581	4.587
11	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	2.224	2.368	2.567	2.706	2.898	3.222	3.965
18	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	2.197	2.336	2.528	2.661	2.845	3.153	3.849
21	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	2.167	2.301	2.485	2.612	2.787	3.078	3.725
26	2.162	2.296	2.479	2.605	2.779	3.067	3.707
27	2.158	2.291	2.473	2.598	2.771	3.057	3.690
28	2.154	2.286	2.467	2.592	2.763	3.047	3.674
29	2.150	2.282	2.462	2.586	2.756	3.038	3.659
30	2.147	2.278	2.457	2.581	2.750	3.030	3.646
40	2.125	2.250	2.423	2.542	2.704	2.971	3.551
60	2.099	2.223	2.390	2.504	2.660	2.915	3.460
120	2.076	2.196	2.358	2.468	2.617	2.860	3.373
∞	2.054	2.170	2.326	2.432	2.576	2.807	3.291

A.12 — STATISTICAL TABLES

3. Areas under the Standard Normal Curve from 0 to z
(Normal Tables)



z	0	1	2	3	4	5	6	7	8	9
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0754
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1256	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1916	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2258	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2649
0.7	.2580	.2612	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2996	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4654	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4979	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4098	.4998	.4998	.4998
3.6	.4998	.4998	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.7	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.8	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.9	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000