PGDM (RM/IB) (19-21)

Statistics for Business Analysis

IB-110//RM-103

Trimester – I, End-Term Examination: September 2019

Time allowed: 2 hrs 30 min

Max Marks: 50

Roll No: ____________

Instruction: Students are reqired to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means.** In case of rough work please use answer sheet.

Sections	No. of Questions to attempt	Marks	Marks
A	3 questions with internal choices and CILO covered	10 Marks each	3*10 = 30
B	Compulsory Case Study	20 Marks	20
		Total Marks	**50**

SECTION A

A1. (CILO 1)

I. Credit card companies are increasing their revenues by raising the late fees charged to their customers. According to a study, late fees represent the third largest revenue source for card companies, after interest changes and payments from the merchants who accept their cards. In the preceding year, 58%of all credit card customers had to pay late fees. If a random sample of 20 credit card holders is selected, what is the probability that

a) 0 had to pay a late fee? (2.5 marks)

b) No more than 5 had to pay a late fees? (2.5 marks)

c) More than 10 had to pay a late fees? (2.5 marks)

d) What assumptions did you have to make to answer (a) through (c)? (2.5 marks)

OR

II. Only 0.02% of credit card holders of a company report the loss or theft of their credit cards each month. The company has 150 credit cards in the city of Memphis. Use the Poisson probability tables to answer the following questions. What is the probability that during the next month in the city of Memphis

a. No one reports the loss or theft of his or her credit cards? (2.5 marks)

b. Every credit card is lost or stolen? (2.5 marks)

c. At least nine people report the loss or theft of their cards? (2.5 marks)

d. Determine the expected number and standard deviation of reported lost or stolen credit cards. (2.5 marks)

A2. (CILO 2)

I. The average life expectancy of dishwashers produced by a company is 6 years with a standard deviation of 8 months. Assume that the lives of dishwashers are normally distributed.

a. What is the probability that a randomly selected dishwasher will have a life expectancy of at least 7 years? (2.5 marks)

b. Dishwashers that fail operating in less than 4 years will be replaced free of charge. What percent of dishwashers are expected to be replaced free of charge?(2.5 marks)

c. What are the minimum and the maximum life expectancy of the middle 95% of the dishwashers' lives? Give your answer in months. (2.5 marks)

d. If 155 of this year's dishwasher production fail operating in less than 4 years and 4 months, how many dishwashers were produced this year? (2.5 marks)

OR

II. Pepsi is studying the effect of its latest advertising campaign. People chosen at random were called and asked and asked how many cans of Pepsi they had bought in the past week and how many Pepsi advertisements they had either read or seen in the past week.

X (number of ads)	3	7	4	2	0	4	2	2
Y (cans purchased)	11	16	9	6	5	6	3	8

a) Develop an equation for the relationship between cans purchased and number of ads read or seen. (4 marks)

b) Interpret the slope of the regression line (2 marks)

c) Plot appropriate graphs for observed sales and estimated sales. (2 marks)

d) If a customer has seen or read 5 ads, how many Pepsi cans he is expected to purchase? (2 marks)

A3. (CILO 3)

I. A small lawnmower company produced 1,500 lawnmowers in 1990. In an effort to determine how maintenance-free these units were, the company decided to conduct a multiyear study of the 1990 lawnmowers. A sample of 200 owners of these lawnmowers was drawn randomly from company records and contacted. The owners were given an 800 number and asked to call the company when the first major repair was required for the lawnmowers. Owners who no longer used the lawnmower to cut their grass were disqualified. After many years, 187 of the owners had reported. The other 13 disqualified themselves. The average number of years until the first major repair was 5.3 for the 187 owners reporting, and the sample standard deviation was 1.28 years. If the company wants to advertise an average number of years of repair- free lawn mowing for this lawnmower, what is the point estimate? Construct a 95% confidence interval for the average number of years until the first major repair. (10marks)

OR

II. A production line operation is designed to fill cartons with laundry detergent to a mean weight of 32 ounces. A sample of cartons is periodically selected and weighed to determine whether underflling or overfilling is occurring. If the sample data lead to a conclusion of underfilling or overfilling, the production line will be shut down and adjusted to obtain proper filling.

a) Formulate the null and alternative hypotheses that will help in deciding whether to shut down and adjust the production line. (4 marks)

b) Comment on the conclusion and the decision when H_0 cannot be rejected. (3 marks)

c) Comment on the conclusion and the decision when H_0 can be rejected (3 marks)

SECTION B

Case : Quality Associates, Ins. (CILO 3)

Quality Associates, Ins., a consulting firm, advises its clients about sampling and statistical procedures that can be used to control their manufacturing processes. In one particular application, a client gave Quality Associates a sample of 800 observations taken during a time in which that client's process was operating satisfactorily. The sample standard deviation for these data was .21; hence, with so much data, the population standard deviation was assumed to be .21. Quality Associates then suggested that random samples of size 30 be taken periodically to monitor the process on an ongoing basis. By analyzing the new samples, the client could quickly learn whether the process was operating satisfactorily. When the process was not operating satisfactorily, corrective action could be taken to eliminate the problem. The design specification indicated the mean for the process should be 12. The hypothesis test suggested by Quality Associates follows.

$$H_o: \mu = 12$$
$$H_a: \mu \neq 12$$

Corrective action will be taken any time Ho rejected.

The following samples were collected at hourly intervals during the first day of operation of the new statistical process control procedure. These data are available in the data set Quality.

Sample 1	Sample 2	Sample 3	Sample 4	Sample 1	Sample 2	Sample 3	Sample 4
11.55	11.62	11.91	12.02	11.93	12.00	12.01	12.35
11.62	11.69	11.36	12.02	11.85	11.92	12.06	12.09
11.52	11.59	11.75	12.05	11.76	11.83	11.76	11.77
11.75	11.82	11.95	12.18	12.16	12.23	11.82	12.20
11.90	11.97	12.14	12.11	11.77	11.84	12.12	11.79
11.64	11.71	11.72	12.07	12.00	12.07	11.60	12.30
11.80	11.87	11.61	12.05	12.04	12.11	11.95	12.27
12.03	12.10	11.85	11.64	11.98	12.05	11.96	12.29
11.94	12.01	12.16	12.39	12.30	12.37	12.22	12.47
11.92	11.99	11.91	11.65	12.18	12.25	11.75	12.03
12.13	12.20	12.12	12.11	11.97	12.04	11.96	12.17
12.09	12.16	11.61	11.90	12.17	12.24	11.95	11.94
11.93	12.00	12.21	12.22	11.85	11.92	11.89	11.97
12.21	12.28	11.56	11.88	12.30	12.37	11.88	12.23
12.32	12.39	11.95	12.03	12.15	12.22	11.93	12.25

Sample mean and Sample standard deviation for the four samples are as follows:

	Sample 1	Sample 2	Sample 3	Sample 4
Sample Size	30	30	30	30
Mean	11.959	12.029	11.889	12.081
Standard Deviation	0.220	0.220	0.207	0.206

Managerial Report

B1. Conduct a hypothesis test for each sample at the .01 level of significance and determine what action, if any, should be taken. Provide the test statistic for each test. (5 marks)

B2. Looking at the standard deviation for each of the four samples. Does the assumption of .21 for the population standard deviation appear reasonable? (10marks)

B3. Compute limits for the sample mean $\bar{x}$ around $\mu = 12$ such that, as long as a new sample mean is within those limits, the process will be considered to be operating satisfactorily. If $\bar{x}$ exceeds the upper limit or if $\bar{x}$ is below the lower limit, corrective action will be taken. These limits are referred to as upper and lower control limits for quality control purposes. (5 marks)

Some important Formulae

$$P(x) = \binom{n}{x} p^{x} q^{(n-x)} = \frac{n!}{x!(n-x)!} p^{x} q^{(n-x)} \quad ; \mu = np \quad ; \sigma^2 = npq$$

$$P(x) = \frac{\mu^{x} e^{-\mu}}{x!} \text{ for } x = 1,2,3,\ldots \quad ; \quad z = \frac{x - \mu}{\sigma}$$

$$\frac{\bar{X} - \mu}{\sigma/\sqrt{n}} \qquad \frac{\bar{X} - \mu}{s/\sqrt{n}} \qquad \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$$

$$\frac{\bar{X} - \mu_0}{\sigma/\sqrt{n}} \qquad \frac{\bar{X} - \mu_0}{s/\sqrt{n}} \qquad \frac{(\hat{p} - p_0)}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

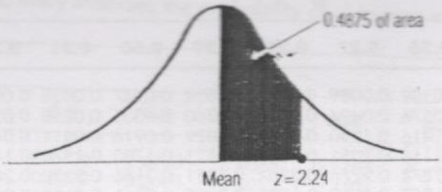
$$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \qquad \bar{X} \pm t_{(\frac{\alpha}{2}, n-1)} \frac{s}{\sqrt{n}} \qquad n = \frac{(z_{\alpha/2})^2 \sigma^2}{E^2}$$

Finite Correction Factor : $\sqrt{\frac{N-n}{N-1}}$

$$N\bar{X} \pm N\left(t_{\alpha/2, n-1}\right) \frac{S}{\sqrt{n}} \sqrt{\frac{(N-n)}{(N-1)}}$$

$$Y_i = b_0 + b_1 X \qquad b_0 - \bar{y} - b_1 \bar{x}$$

$$b_1 = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} \qquad b_1 = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

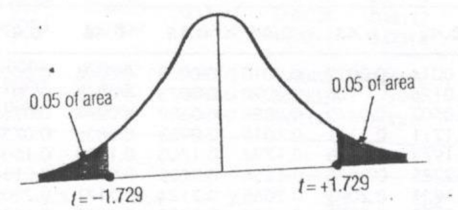


Appendix Table 1

Areas under the Standard Normal Probability Distribution between the Mean and Positive Values of z

Example: To find the area under the curve between the mean and a point 2.24 standard deviations to the right of the mean, look up the value opposite 2.2 and under 0.04 in the table: 0.4875 of the area under the curve lies between the mean and a z value of 2.24.

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



Appendix Table 2

Areas in Both Tails Combined for Student's t Distribution

Example: To find the value of t that corresponds to an area of 0.10 in both tails of the distribution combined, when there are 19 degrees of freedom, look under the 0.10 column, and proceed down to the 19 degrees of freedom row; the appropriate t value there is 1.729.

Degrees of Freedom	Area in Both Tails Combined: 0.10	0.05	0.02	0.01
1	6.314	12.706	31.821	63.657
2	2.920	4.303	6.965	9.925
3	2.353	3.182	4.541	5.841
4	2.132	2.776	3.747	4.604
5	2.015	2.571	3.365	4.032
6	1.943	2.447	3.143	3.707
7	1.895	2.365	2.998	3.499
8	1.860	2.306	2.896	3.355
9	1.833	2.262	2.821	3.250
10	1.812	2.228	2.764	3.169
11	1.796	2.201	2.718	3.106
12	1.782	2.179	2.681	3.055
13	1.771	2.160	2.650	3.012
14	1.761	2.145	2.624	2.977
15	1.753	2.131	2.602	2.947
16	1.746	2.120	2.583	2.921
17	1.740	2.110	2.567	2.898
18	1.734	2.101	2.552	2.878
19	1.729	2.093	2.539	2.861
20	1.725	2.086	2.528	2.845
21	1.721	2.080	2.518	2.831
22	1.717	2.074	2.508	2.819
23	1.714	2.069	2.500	2.807
24	1.711	2.064	2.492	2.797
25	1.708	2.060	2.485	2.787
26	1.706	2.056	2.479	2.779
27	1.703	2.052	2.473	2.771
28	1.701	2.048	2.467	2.763
29	1.699	2.045	2.462	2.756
30	1.697	2.042	2.457	2.750
40	1.684	2.021	2.423	2.704
60	1.671	2.000	2.390	2.660
120	1.658	1.980	2.358	2.617
Normal Distribution	1.645	1.960	2.326	2.576

Binomial propabilities

n	r	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	r	n
15	0	0.0424	0.0352	0.0291	0.0241	0.0198	0.0163	0.0134	0.0109	0.0089	0.0072	0.0059	0.0047	0.0038	0.0031	0.0025	0.0020	0.0016	0.0012	15	
	1	0.1492	0.1319	0.1162	0.1018	0.0889	0.0772	0.0668	0.0576	0.0494	0.0423	0.0360	0.0305	0.0258	0.0217	0.0182	0.0152	0.0126	0.0104	14	
	2	0.2449	0.2309	0.2162	0.2010	0.1858	0.1707	0.1559	0.1416	0.1280	0.1150	0.1029	0.0916	0.0811	0.0715	0.0627	0.0547	0.0476	0.0411	13	
	3	0.2489	0.2501	0.2490	0.2457	0.2405	0.2336	0.2252	0.2156	0.2051	0.1939	0.1821	0.1700	0.1579	0.1457	0.1338	0.1222	0.1110	0.1002	12	
	4	0.1752	0.1876	0.1986	0.2079	0.2155	0.2213	0.2252	0.2273	0.2276	0.2262	0.2231	0.2186	0.2128	0.2057	0.1977	0.1888	0.1792	0.1692	11	
	5	0.0904	0.1032	0.1161	0.1290	0.1416	0.1537	0.1651	0.1757	0.1852	0.1935	0.2005	0.2061	0.2103	0.2130	0.2142	0.2140	0.2123	0.2093	10	
	6	0.0353	0.0430	0.0514	0.0606	0.0705	0.0809	0.0917	0.1029	0.1142	0.1254	0.1365	0.1472	0.1575	0.1671	0.1759	0.1837	0.1906	0.1963	9	
	7	0.0107	0.0138	0.0176	0.0220	0.0271	0.0329	0.0393	0.0465	0.0543	0.0627	0.0717	0.0811	0.0910	0.1011	0.1114	0.1217	0.1319	0.1419	8	
	8	0.0025	0.0035	0.0047	0.0062	0.0081	0.0104	0.0131	0.0163	0.0201	0.0244	0.0293	0.0348	0.0409	0.0476	0.0549	0.0627	0.0710	0.0798	7	
	9	0.0005	0.0007	0.0010	0.0014	0.0019	0.0025	0.0034	0.0045	0.0058	0.0074	0.0093	0.0116	0.0143	0.0174	0.0210	0.0251	0.0298	0.0349	6	
	10	0.0001	0.0001	0.0002	0.0002	0.0003	0.0005	0.0007	0.0009	0.0013	0.0017	0.0023	0.0030	0.0038	0.0049	0.0062	0.0078	0.0096	0.0118	5	
	11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0006	0.0008	0.0011	0.0014	0.0018	0.0024	0.0030	4	
	12	—	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0006	3	
	13	—	—	—	—	—	—	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	2	
	14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0000	0.0000	1	
	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	15
20	0	0.0148	0.0115	0.0090	0.0069	0.0054	0.0041	0.0032	0.0024	0.0018	0.0014	0.0011	0.0008	0.0006	0.0004	0.0003	0.0002	0.0002	0.0001	20	
	1	0.0693	0.0576	0.0477	0.0392	0.0321	0.0261	0.0211	0.0170	0.0137	0.0109	0.0087	0.0068	0.0054	0.0042	0.0033	0.0025	0.0020	0.0015	19	
	2	0.1545	0.1369	0.1204	0.1050	0.0910	0.0783	0.0669	0.0569	0.0480	0.0403	0.0336	0.0278	0.0229	0.0188	0.0153	0.0124	0.0110	0.0080	18	
	3	0.2175	0.2054	0.1920	0.1777	0.1631	0.1484	0.1339	0.1199	0.1065	0.0940	0.0823	0.0716	0.0619	0.0531	0.0453	0.0383	0.0323	0.0270	17	
	4	0.2168	0.2182	0.2169	0.2131	0.2070	0.1991	0.1897	0.1790	0.1675	0.1553	0.1429	0.1304	0.1181	0.1062	0.0947	0.0839	0.0738	0.0645	16	
	5	0.1627	0.1746	0.1845	0.1923	0.1979	0.2012	0.2023	0.2013	0.1982	0.1933	0.1868	0.1789	0.1698	0.1599	0.1493	0.1384	0.1272	0.1161	15	
	6	0.0954	0.1091	0.1226	0.1356	0.1478	0.1589	0.1686	0.1768	0.1833	0.1879	0.1907	0.1916	0.1907	0.1881	0.1839	0.1782	0.1712	0.1632	14	
	7	0.0448	0.0545	0.0652	0.0765	0.0883	0.1003	0.1124	0.1242	0.1356	0.1462	0.1558	0.1643	0.1714	0.1770	0.1811	0.1836	0.1844	0.1836	13	
	8	0.0171	0.0222	0.0282	0.0351	0.0429	0.0515	0.0609	0.0709	0.0815	0.0924	0.1034	0.1144	0.1251	0.1354	0.1450	0.1537	0.1614	0.1678	12	
	9	0.0053	0.0074	0.0100	0.0132	0.0171	0.0217	0.0271	0.0332	0.0402	0.0479	0.0563	0.0654	0.0750	0.0849	0.0952	0.1056	0.1158	0.1259	11	
	10	0.0014	0.0020	0.0029	0.0041	0.0056	0.0075	0.0099	0.0128	0.0163	0.0205	0.0253	0.0308	0.0370	0.0440	0.0516	0.0598	0.0686	0.0779	10	
	11	0.0003	0.0005	0.0007	0.0010	0.0015	0.0022	0.0030	0.0041	0.0055	0.0072	0.0094	0.0120	0.0151	0.0188	0.0231	0.0280	0.0336	0.0398	9	
	12	0.0001	0.0001	0.0001	0.0002	0.0003	0.0005	0.0008	0.0011	0.0015	0.0021	0.0029	0.0039	0.0051	0.0066	0.0085	0.0108	0.0136	0.0168	8	
	13	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0014	0.0019	0.0026	0.0034	0.0045	0.0058	7	
	14	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012	0.0016	6	
	15	—	—	—	—	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	5	
	16	—	—	—	—	—	—	—	—	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	4	
	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0000	3	
	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	
	19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	
	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	20
n	r	0.81	0.80	0.79	0.78	0.77	0.76	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.66	0.65	0.64	r	n

n	r	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	r	n
12	0	0.0039	0.0032	0.0027	0.0022	0.0018	0.0014	0.0012	0.0010	0.0008	0.0006	0.0005	0.0004	0.0003	0.0002	12	
	1	0.0276	0.0237	0.0204	0.0174	0.0148	0.0126	0.0106	0.0090	0.0075	0.0063	0.0052	0.0043	0.0036	0.0029	11	
	2	0.0890	0.0800	0.0716	0.0639	0.0567	0.0502	0.0442	0.0388	0.0339	0.0294	0.0255	0.0220	0.0189	0.0161	10	
	3	0.1742	0.1634	0.1526	0.1419	0.1314	0.1211	0.1111	0.1015	0.0923	0.0836	0.0754	0.0676	0.0604	0.0537	9	
	4	0.2302	0.2254	0.2195	0.2128	0.2054	0.1973	0.1886	0.1794	0.1700	0.1602	0.1504	0.1405	0.1306	0.1208	8	
	5	0.2163	0.2210	0.2246	0.2270	0.2284	0.2285	0.2276	0.2256	0.2225	0.2184	0.2134	0.2075	0.2008	0.1934	7	
	6	0.1482	0.1580	0.1675	0.1766	0.1851	0.1931	0.2003	0.2068	0.2124	0.2171	0.2208	0.2234	0.2250	0.2256	6	
	7	0.0746	0.0830	0.0918	0.1009	0.1103	0.1198	0.1295	0.1393	0.1489	0.1585	0.1678	0.1768	0.1853	0.1934	5	
	8	0.0274	0.0318	0.0367	0.0420	0.0479	0.0542	0.0611	0.0684	0.0762	0.0844	0.0930	0.1020	0.1113	0.1208	4	
	9	0.0071	0.0087	0.0104	0.0125	0.0148	0.0175	0.0205	0.0239	0.0277	0.0319	0.0367	0.0418	0.0475	0.0537	3	
	10	0.0013	0.0016	0.0020	0.0025	0.0031	0.0038	0.0046	0.0056	0.0068	0.0082	0.0098	0.0116	0.0137	0.0161	2	
	11	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0019	0.0024	0.0029	1	
	12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0	12
15	0	0.0010	0.0008	0.0006	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	15	
	1	0.0086	0.0071	0.0058	0.0047	0.0038	0.0031	0.0025	0.0020	0.0016	0.0012	0.0010	0.0008	0.0006	0.0005	14	
	2	0.0354	0.0303	0.0259	0.0219	0.0185	0.0156	0.0130	0.0108	0.0090	0.0074	0.0060	0.0049	0.0040	0.0032	13	
	3	0.0901	0.0805	0.0716	0.0634	0.0558	0.0489	0.0426	0.0369	0.0318	0.0272	0.0232	0.0197	0.0166	0.0139	12	
	4	0.1587	0.1481	0.1374	0.1268	0.1163	0.1061	0.0963	0.0869	0.0780	0.0696	0.0617	0.0545	0.0478	0.0417	11	
	5	0.2051	0.1997	0.1933	0.1859	0.1778	0.1691	0.1598	0.1502	0.1404	0.1304	0.1204	0.1106	0.1010	0.0916	10	
	6	0.2008	0.2040	0.2059	0.2066	0.2060	0.2041	0.2010	0.1967	0.1914	0.1851	0.1780	0.1702	0.1617	0.1527	9	
	7	0.1516	0.1608	0.1693	0.1771	0.1840	0.1900	0.1949	0.1987	0.2013	0.2028	0.2030	0.2020	0.1997	0.1964	8	
	8	0.0890	0.0985	0.1082	0.1181	0.1279	0.1376	0.1470	0.1561	0.1647	0.1727	0.1800	0.1864	0.1919	0.1964	7	
	9	0.0407	0.0470	0.0538	0.0612	0.0691	0.0775	0.0863	0.0954	0.1048	0.1144	0.1241	0.1338	0.1434	0.1527	6	
	10	0.0143	0.0173	0.0206	0.0245	0.0288	0.0337	0.0390	0.0450	0.0515	0.0585	0.0661	0.0741	0.0827	0.0916	5	
	11	0.0038	0.0048	0.0060	0.0074	0.0091	0.0111	0.0134	0.0161	0.0191	0.0226	0.0266	0.0311	0.0361	0.0417	4	
	12	0.0007	0.0010	0.0013	0.0016	0.0021	0.0027	0.0034	0.0042	0.0052	0.0064	0.0079	0.0096	0.0116	0.0139	3	
	13	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0016	0.0020	0.0026	0.0032	2	
	14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	1	
	15	—	—	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	15
20	0	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	—	—	—	20	
	1	0.0011	0.0009	0.0007	0.0005	0.0004	0.0003	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	19	
	2	0.0064	0.0050	0.0040	0.0031	0.0024	0.0018	0.0014	0.0011	0.0008	0.0006	0.0005	0.0003	0.0002	0.0002	18	
	3	0.0224	0.0185	0.0152	0.0123	0.0100	0.0080	0.0064	0.0051	0.0040	0.0031	0.0024	0.0019	0.0014	0.0011	17	
	4	0.0559	0.0482	0.0412	0.0350	0.0295	0.0247	0.0206	0.0170	0.0139	0.0113	0.0092	0.0074	0.0059	0.0046	16	
	5	0.1051	0.0945	0.0843	0.0746	0.0656	0.0573	0.0496	0.0427	0.0365	0.0309	0.0260	0.0217	0.0180	0.0148	15	
	6	0.1543	0.1447	0.1347	0.1244	0.1140	0.1037	0.0936	0.0839	0.0746	0.0658	0.0577	0.0501	0.0432	0.0370	14	
	7	0.1812	0.1774	0.1722	0.1659	0.1585	0.1502	0.1413	0.1318	0.1221	0.1122	0.1023	0.0925	0.0830	0.0739	13	
	8	0.1730	0.1767	0.1790	0.1797	0.1790	0.1768	0.1732	0.1683	0.1623	0.1553	0.1474	0.1388	0.1296	0.1201	12	
	9	0.1354	0.1444	0.1526	0.1597	0.1658	0.1707	0.1742	0.1763	0.1771	0.1763	0.1742	0.1708	0.1661	0.1602	11	
	10	0.0875	0.0974	0.1073	0.1171	0.1268	0.1359	0.1446	0.1524	0.1593	0.1652	0.1700	0.1734	0.1755	0.1762	10	
	11	0.0467	0.0542	0.0624	0.0710	0.0801	0.0895	0.0991	0.1089	0.1185	0.1280	0.1370	0.1455	0.1533	0.1602	9	
	12	0.0206	0.0249	0.0299	0.0355	0.0417	0.0486	0.0561	0.0642	0.0727	0.0818	0.0911	0.1007	0.1105	0.1201	8	
	13	0.0074	0.0094	0.0118	0.0146	0.0178	0.0217	0.0260	0.0310	0.0366	0.0429	0.0497	0.0572	0.0653	0.0739	7	
	14	0.0022	0.0029	0.0038	0.0049	0.0062	0.0078	0.0098	0.0122	0.0150	0.0183	0.0221	0.0264	0.0314	0.0370	6	
	15	0.0005	0.0007	0.0010	0.0013	0.0017	0.0023	0.0030	0.0038	0.0049	0.0062	0.0078	0.0098	0.0121	0.0148	5	
	16	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0013	0.0017	0.0022	0.0028	0.0036	0.0046	4	
	17	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0005	0.0006	0.0008	0.0011	3	
	18	—	—	—	—	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	2	
	19	—	—	—	—	—	—	—	—	—	—	0.0000	0.0000	0.0000	0.0000	1	

For a given value of λ, entry indicates the probability of obtaining a specified value of X.

	λ									
X	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0	0.9048	0.8187	0.7408	0.6703	0.6065	0.5488	0.4966	0.4493	0.4066	0.3679
1	0.0905	0.1637	0.2222	0.2681	0.3033	0.3293	0.3476	0.3595	0.3659	0.3679
2	0.0045	0.0164	0.0333	0.0536	0.0758	0.0988	0.1217	0.1438	0.1647	0.1839
3	0.0002	0.0011	0.0033	0.0072	0.0126	0.0198	0.0284	0.0383	0.0494	0.0613
4	0.0000	0.0001	0.0003	0.0007	0.0016	0.0030	0.0050	0.0077	0.0111	0.0153
5	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0007	0.0012	0.0020	0.0031
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0003	0.0005
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

	λ									
X	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	0.3329	0.3012	0.2725	0.2466	0.2231	0.2019	0.1827	0.1653	0.1496	0.1353
1	0.3662	0.3614	0.3543	0.3452	0.3347	0.3230	0.3106	0.2975	0.2842	0.2707
2	0.2014	0.2169	0.2303	0.2417	0.2510	0.2584	0.2640	0.2678	0.2700	0.2707
3	0.0738	0.0867	0.0998	0.1128	0.1255	0.1378	0.1496	0.1607	0.1710	0.1804
4	0.0203	0.0260	0.0324	0.0395	0.0471	0.0551	0.0636	0.0723	0.0812	0.0902
5	0.0045	0.0062	0.0084	0.0111	0.0141	0.0176	0.0216	0.0260	0.0309	0.0361
6	0.0008	0.0012	0.0018	0.0026	0.0035	0.0047	0.0061	0.0078	0.0098	0.0120
7	0.0001	0.0002	0.0003	0.0005	0.0008	0.0011	0.0015	0.0020	0.0027	0.0034
8	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002

	λ									
X	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
0	0.1225	0.1108	0.1003	0.0907	0.0821	0.0743	0.0672	0.0608	0.0550	0.0498
1	0.2572	0.2438	0.2306	0.2177	0.2052	0.1931	0.1815	0.1703	0.1596	0.1494
2	0.2700	0.2681	0.2652	0.2613	0.2565	0.2510	0.2450	0.2384	0.2314	0.2240
3	0.1890	0.1966	0.2033	0.2090	0.2138	0.2176	0.2205	0.2225	0.2237	0.2240
4	0.0992	0.1082	0.1169	0.1254	0.1336	0.1414	0.1488	0.1557	0.1622	0.1680
5	0.0417	0.0476	0.0538	0.0602	0.0668	0.0735	0.0804	0.0872	0.0940	0.1008
6	0.0146	0.0174	0.0206	0.0241	0.0278	0.0319	0.0362	0.0407	0.0455	0.0504
7	0.0044	0.0055	0.0068	0.0083	0.0099	0.0118	0.0139	0.0163	0.0188	0.0216
8	0.0011	0.0015	0.0019	0.0025	0.0031	0.0038	0.0047	0.0057	0.0068	0.0081
9	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0022	0.0027
10	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

X	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
0	0.0450	0.0408	0.0369	0.0334	0.0302	0.0273	0.0247	0.0224	0.0202	0.0183
1	0.1397	0.1304	0.1217	0.1135	0.1057	0.0984	0.0915	0.0850	0.0789	0.0733
2	0.2165	0.2087	0.2008	0.1929	0.1850	0.1771	0.1692	0.1615	0.1539	0.1465
3	0.2237	0.2226	0.2209	0.2186	0.2158	0.2125	0.2087	0.2046	0.2001	0.1954
4	0.1734	0.1781	0.1823	0.1858	0.1888	0.1912	0.1931	0.1944	0.1951	0.1954
5	0.1075	0.1140	0.1203	0.1264	0.1322	0.1377	0.1429	0.1477	0.1522	0.1563
6	0.0555	0.0608	0.0662	0.0716	0.0771	0.0826	0.0881	0.0936	0.0989	0.1042
7	0.0246	0.0278	0.0312	0.0348	0.0385	0.0425	0.0466	0.0508	0.0551	0.0595
8	0.0095	0.0111	0.0129	0.0148	0.0169	0.0191	0.0215	0.0241	0.0269	0.0298
9	0.0033	0.0040	0.0047	0.0056	0.0066	0.0076	0.0089	0.0102	0.0116	0.0132
10	0.0010	0.0013	0.0016	0.0019	0.0023	0.0028	0.0033	0.0039	0.0045	0.0053
11	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0019
12	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006
13	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

	λ									
X	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
0	0.0166	0.0150	0.0136	0.0123	0.0111	0.0101	0.0091	0.0082	0.0074	0.0067
1	0.0679	0.0630	0.0583	0.0540	0.0500	0.0462	0.0427	0.0395	0.0365	0.0337
2	0.1393	0.1323	0.1254	0.1188	0.1125	0.1063	0.1005	0.0948	0.0894	0.0842
3	0.1904	0.1852	0.1798	0.1743	0.1687	0.1631	0.1574	0.1517	0.1460	0.1404
4	0.1951	0.1944	0.1933	0.1917	0.1898	0.1875	0.1849	0.1820	0.1789	0.1755
5	0.1600	0.1633	0.1662	0.1687	0.1708	0.1725	0.1738	0.1747	0.1753	0.1755
6	0.1093	0.1143	0.1191	0.1237	0.1281	0.1323	0.1362	0.1398	0.1432	0.1462
7	0.0640	0.0686	0.0732	0.0778	0.0824	0.0869	0.0914	0.0959	0.1022	0.1044
8	0.0328	0.0360	0.0393	0.0428	0.0463	0.0500	0.0537	0.0575	0.0614	0.0653
9	0.0150	0.0168	0.0188	0.0209	0.0232	0.0255	0.0280	0.0307	0.0334	0.0363
10	0.0061	0.0071	0.0081	0.0092	0.0104	0.0118	0.0132	0.0147	0.0164	0.0181
11	0.0023	0.0027	0.0032	0.0037	0.0043	0.0049	0.0056	0.0064	0.0073	0.0082
12	0.0008	0.0009	0.0011	0.0014	0.0016	0.0019	0.0022	0.0026	0.0030	0.0034
13	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0013
14	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005

For a given value of λ, entry indicates the probability of obtaining a specified value of X.

X	λ = 0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0	0.9048	0.8187	0.7408	0.6703	0.6065	0.5488	0.4966	0.4493	0.4066	0.3679
1	0.0905	0.1637	0.2222	0.2681	0.3033	0.3293	0.3476	0.3595	0.3659	0.3679
2	0.0045	0.0164	0.0333	0.0536	0.0758	0.0988	0.1217	0.1438	0.1647	0.1839
3	0.0002	0.0011	0.0033	0.0072	0.0126	0.0198	0.0284	0.0383	0.0494	0.0613
4	0.0000	0.0001	0.0003	0.0007	0.0016	0.0030	0.0050	0.0077	0.0111	0.0153
5	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0007	0.0012	0.0020	0.0031
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0003	0.0005
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

X	λ = 1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	0.3329	0.3012	0.2725	0.2466	0.2231	0.2019	0.1827	0.1653	0.1496	0.1353
1	0.3662	0.3614	0.3543	0.3452	0.3347	0.3230	0.3106	0.2975	0.2842	0.2707
2	0.2014	0.2169	0.2303	0.2417	0.2510	0.2584	0.2640	0.2678	0.2700	0.2707
3	0.0738	0.0867	0.0998	0.1128	0.1255	0.1378	0.1496	0.1607	0.1710	0.1804
4	0.0203	0.0260	0.0324	0.0395	0.0471	0.0551	0.0636	0.0723	0.0812	0.0902
5	0.0045	0.0062	0.0084	0.0111	0.0141	0.0176	0.0216	0.0260	0.0309	0.0361
6	0.0008	0.0012	0.0018	0.0026	0.0035	0.0047	0.0061	0.0078	0.0098	0.0120
7	0.0001	0.0002	0.0003	0.0005	0.0008	0.0011	0.0015	0.0020	0.0027	0.0034
8	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002

X	λ = 2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
0	0.1225	0.1108	0.1003	0.0907	0.0821	0.0743	0.0672	0.0608	0.0550	0.0498
1	0.2572	0.2438	0.2306	0.2177	0.2052	0.1931	0.1815	0.1703	0.1596	0.1494
2	0.2700	0.2681	0.2652	0.2613	0.2565	0.2510	0.2450	0.2384	0.2314	0.2240
3	0.1890	0.1966	0.2033	0.2090	0.2138	0.2176	0.2205	0.2225	0.2237	0.2240
4	0.0992	0.1082	0.1169	0.1254	0.1336	0.1414	0.1488	0.1557	0.1622	0.1680
5	0.0417	0.0476	0.0538	0.0602	0.0668	0.0735	0.0804	0.0872	0.0940	0.1008
6	0.0146	0.0174	0.0206	0.0241	0.0278	0.0319	0.0362	0.0407	0.0455	0.0504
7	0.0044	0.0055	0.0068	0.0083	0.0099	0.0118	0.0139	0.0163	0.0188	0.0216
8	0.0011	0.0015	0.0019	0.0025	0.0031	0.0038	0.0047	0.0057	0.0068	0.0081
9	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0022	0.0027
10	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

X	λ = 3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
0	0.0450	0.0408	0.0369	0.0334	0.0302	0.0273	0.0247	0.0224	0.0202	0.0183
1	0.1397	0.1304	0.1217	0.1135	0.1057	0.0984	0.0915	0.0850	0.0789	0.0733
2	0.2165	0.2087	0.2008	0.1929	0.1850	0.1771	0.1692	0.1615	0.1539	0.1465
3	0.2237	0.2226	0.2209	0.2186	0.2158	0.2125	0.2087	0.2046	0.2001	0.1954
4	0.1734	0.1781	0.1823	0.1858	0.1888	0.1912	0.1931	0.1944	0.1951	0.1954
5	0.1075	0.1140	0.1203	0.1264	0.1322	0.1377	0.1429	0.1477	0.1522	0.1563
6	0.0555	0.0608	0.0662	0.0716	0.0771	0.0826	0.0881	0.0936	0.0989	0.1042
7	0.0246	0.0278	0.0312	0.0348	0.0385	0.0425	0.0466	0.0508	0.0551	0.0595
8	0.0095	0.0111	0.0129	0.0148	0.0169	0.0191	0.0215	0.0241	0.0269	0.0298
9	0.0033	0.0040	0.0047	0.0056	0.0066	0.0076	0.0089	0.0102	0.0116	0.0132
10	0.0010	0.0013	0.0016	0.0019	0.0023	0.0028	0.0033	0.0039	0.0045	0.0053
11	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0019
12	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006
13	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

X	λ = 4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
0	0.0166	0.0150	0.0136	0.0123	0.0111	0.0101	0.0091	0.0082	0.0074	0.0067
1	0.0679	0.0630	0.0583	0.0540	0.0500	0.0462	0.0427	0.0395	0.0365	0.0337
2	0.1393	0.1323	0.1254	0.1188	0.1125	0.1063	0.1005	0.0948	0.0894	0.0842
3	0.1904	0.1852	0.1798	0.1743	0.1687	0.1631	0.1574	0.1517	0.1460	0.1404
4	0.1951	0.1944	0.1933	0.1917	0.1898	0.1875	0.1849	0.1820	0.1789	0.1755
5	0.1600	0.1633	0.1662	0.1687	0.1708	0.1725	0.1738	0.1747	0.1753	0.1755
6	0.1093	0.1143	0.1191	0.1237	0.1281	0.1323	0.1362	0.1398	0.1432	0.1462
7	0.0640	0.0686	0.0732	0.0778	0.0824	0.0869	0.0914	0.0959	0.1022	0.1044
8	0.0328	0.0360	0.0393	0.0428	0.0463	0.0500	0.0537	0.0575	0.0614	0.0653
9	0.0150	0.0168	0.0188	0.0209	0.0232	0.0255	0.0280	0.0307	0.0334	0.0363
10	0.0061	0.0071	0.0081	0.0092	0.0104	0.0118	0.0132	0.0147	0.0164	0.0181
11	0.0023	0.0027	0.0032	0.0037	0.0043	0.0049	0.0056	0.0064	0.0073	0.0082
12	0.0008	0.0009	0.0011	0.0014	0.0016	0.0019	0.0022	0.0026	0.0030	0.0034
13	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0013
14	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005
15	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002