Roll No: --------------------------

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

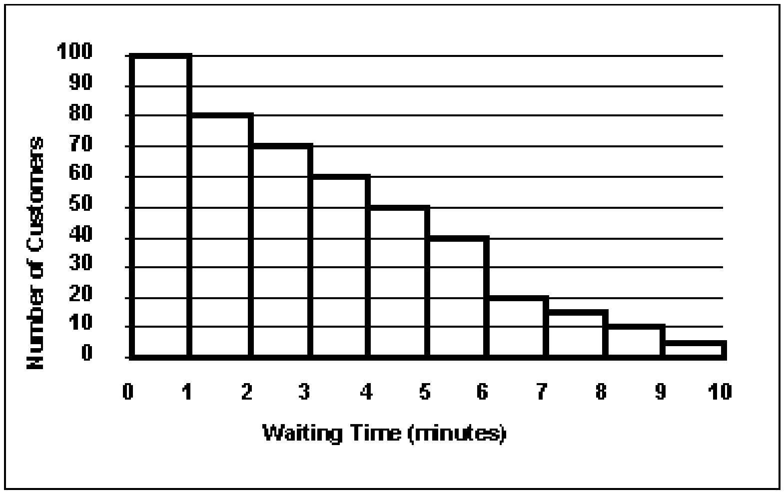
Program/course: MBA (BA/ET)	**Semester – I**
Subject: Quantitative Methods	**Max. Marks : 100**
Code : DSQT 7001	**Duration : 3 Hrs**
No. of page/s: 12	

Section A (co_1)

1. Select most appropriate answer. (2x10)

I. The probability that a ticketless traveler is caught during trip is 0.1. If the traveler makes 4 trips, the probability that he/she will be caught during at least one of the trips is :
(a) $1-(0.9)^4$
(b) $(1-0.9)^4$
(c) $1-(1-0.9)^4$
(d) $(0.9)^4$

II. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a frequency histogram of waiting time for walk-in customers.



Approximately _____ walk-in customers waited less than 2 minutes.

(a) 20
(b) 30
(c) 100
(d) 180

III. Mr. Mohanty, VP of Human Resources of American First Banks (AFB), is reviewing the employee training programs of AFB banks. His staff compiled the following table of regional statistics on teller training hours.

	Southeast Region	Southwest Region
Mean	20	28
Median	20	20
Mode	20	21
Standard Deviation	5	7

What can David conclude from these statistics?

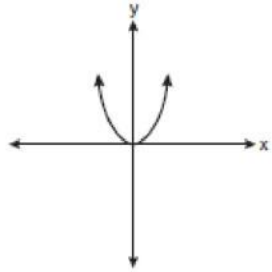
(a) The Southeast distribution is symmetrical.
(b) The Southwest distribution is skewed to the left.
(c) The two distributions are symmetrical
(d) The Southeast distribution is skewed to the left.

IV. Considering mean, mode and skewness of data, value of skewness will be positive if

(a) Mean < Median
(b) Mean > Median
(c) Mean > Mode

(d) Mean < Mode

V. What type of function is shown by the graph?



(a) Linear
(b) Exponential
(c) Quadratic
(d) Absolute Value

VI. Which graph is usually made for the qualitative data

(a) Histogram
(b) Frequency polygon
(c) Bar Graph
(d) None of these.

VII. The domain and range of the function defined as, $f(x) = \dfrac{4-x}{x-4}$ is given by

(a) Domain= R, Range=R
(b) Domain = R-{4}, Range = {-1}
(c) Domain = R-{4}, Range = {-1,1}
(d) None of these

VIII. The difference between the actual y value and the predicted y value, found using a regression equation, is called

(a) Residual
(b) y-intercept
(c) mean of y
(d) None of these

IX. A tourist wants to spend his summer vacation in some winter location therefore, he is comparing the annual snowfall for the two ski resort Powder Valley and Mad Mountain. After searching lots of sites on internet he got the data from last 50 years which was plotted as box plot. Which of the following is not required for summarizing & plotting the data in box-plot?

(a) the smallest value
(b) the 25th percentile
(c) the median
(d) the mean

X. Which of the following is **not** a condition of the binomial distribution?

(a) Only two possible outcomes
(b) have constant probability of success
(c) must have at least 3 trials
(d) trials must be independent

Section B (co_1,co_2)

Attempt any four questions. **(5x4)**

2. What do you understand by coefficient of determination?
3. What is the probability of obtaining a score greater than 750 on a GMAT test that has a mean of 540 and SD 100? Assume GMAT scores are normally distributed.
4. An Arithmetic series has first term 4 and common difference ½. Find
   (i) 10^{th} term of the series
   (ii) Sum of the first 10 terms

5. Prices of two stocks over the week are as follows:
   Stock A: 57, 68, 64, 62, 71
   Stock B: 12, 8, 17, 15, 13

   Based on the average & variability, which stock is suitable to invest money?

6. Explain how Statistics are important in decision making in business.

Section-C (co_2 , co_3)

Answer any three questions. **(10 x 3)**

7. The following data represent the number of passengers per flight in the sample of 50 flights from Dehradun to Varanasi.

23	46	66	67	13	58	19	17	65	17

25	20	47	28	16	38	44	29	48	29
69	34	35	60	37	52	80	59	51	33
48	46	23	38	52	50	17	57	41	77
45	47	49	19	32	64	27	61	70	19

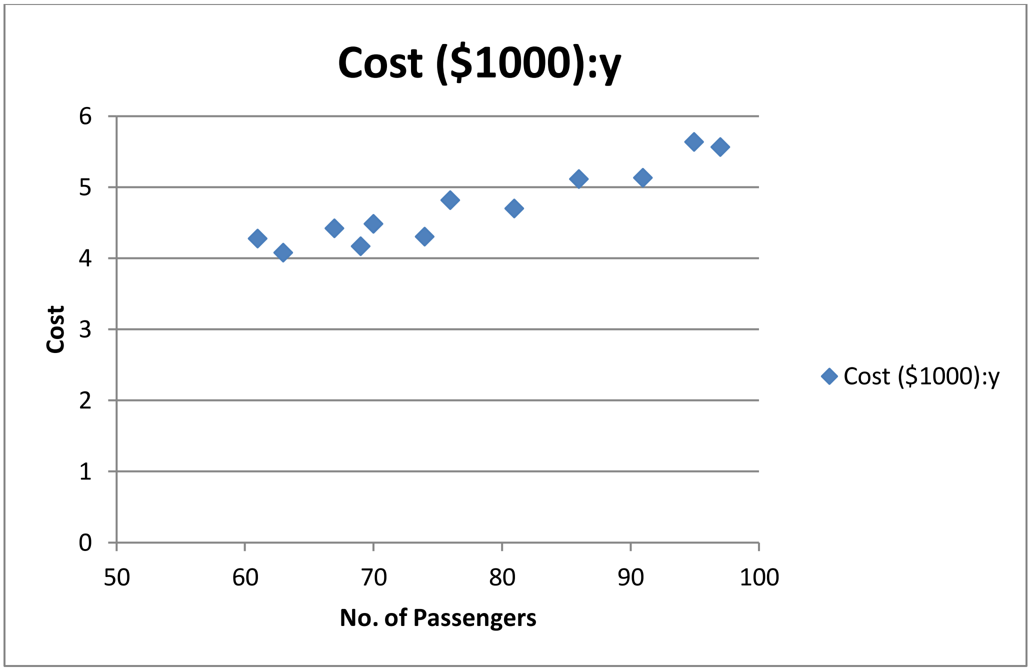
Construct a steam and leaf plot for these data. What does the plot tell you about the number of passengers per flight?

8. Forecasting in aviation sector has an important role, particularly while deciding the cost of the seat on specific day. Number of passenger is one variable which affect the cost of the seat of flight. Graph of the Airline cost data (given in table 1), shown in figure 1. **Develop a regression model** to predict the cost for the given no. of passengers. Interpret the result in terms of the slop & Intercept.

Table: 1

Number of Passengers: X	Cost ($1000):Y
61	4.28
63	4.08
67	4.42
69	4.17
70	4.48
74	4.3
76	4.82
81	4.7
86	5.11
91	5.13
95	5.64
97	5.56

Figure:1



9. The National Safety Council released the following data on the incidence rates for fatal or lost-worktime injuries per 100 employees for several industries in the three years. Compute the intensity of linear relationship 2015-2016 & 2016-2017 and determine which years are most highly correlated?

Industry	**Year 2015**	**Year 2016**	**Year 2017**
Textile	0.46	0.48	0.69
Chemical	0.52	0.62	0.63
Communication	0.90	0.72	0.81
IT	1.50	1.74	2.10
Sales	2.89	2.03	2.46
Food	1.80	1.92	2.00
Transportation	3.29	3.18	3.17
Education	5.73	4.43	4.00

10. For decades, in many countries around the world wrestled with the issue of how to store and ship good via trucks, trains and Ships. Various sizes and shapes of container were developed to ship goods even within country. The lack of consistent containers created a lot of extra work as products were relocated from one container to another. Fortunately in 1955 former trucking company executive teamed up with an engineers to develop a version of the modern intermodal containers that is widely used today. Because it is a

standard size the container in various form can we move from trucks to trains to ships without being opend, thereby eliminating the work of loading and unloading it contain multiple times. The International Organization for standardization (ISO) has set up standard for the modern day container and perhaps most commonly used container is 20 feet long 8 feet wide. The container capacity of a ship is often measured in the number of 20-foot equivalent units that can be loaded or unloaded from vessel. Containerization has revolutionized cargo shipping and today approximately 90% of non-bulk cargo worldwide moves by containers stacked on transport ships. Shown in the next column are TEU capacities available on board operated ships for the top five companies in the world as of October 25, 2010. Also included in the data is the total number of ships operated by each company.

Company	**Total TEU Capacity**	**Number of Ships**
APM Maersk	2,128,651	568
Mediterranean Shipping	1,833,795	445
CMA CGM Group	1,210,179	396
Evergreen Line	606,900	159
Hapag Lyoyd	589,563	136

Managerial Questions

Suppose you are a shipping container industry analyst and you are asked to prepare a brief report showing the leading shipping companies both in TEU shipping capacity and in number of ships.

(i) What is the best way to display this shipping container company information? Are the raw data enough? Can you effectively display the data graphically?

(ii) Because of some the data are close together in size is there a preferred graphical technique for differentiating between two or more similar numbers?

11. The effectiveness of the district attorneys can be measured by several variables, including the number of convictions per month, the number of cases handled per months and the total number of years of conviction per months. A researcher uses a sample of five district attorneys in a city and determines the total number of years of conviction that each attorney won against defendants during the past month, as reported in the first column in the following table. Compute the standard deviation and variance for these figures.

Class Interval	Frequency
1 under 3	4
3 under 5	12
5 under 7	13
7 under 9	19
9 under 11	7
11 under 13	5

Section-D (co_3)

Answer the questions. **(30)**

Life with Cell Phone

As early as 1947 scientists understood the basic concept of a cell phone as a type of two way radio. Seeing the potential of crude mobile car phones, researcher understood that by using a small range of service areas (cells) with frequency reuse, they could increase the capacity for mobile phone usage significantly even though the technology was not then available. During that same year, AT&T proposed the allocation of a large number of radio-spectrum frequencies by the FCC that would thereby make widespread mobile service feasible. At the same time, the FCC decided to limit the amount of frequency capacity available such that only 23 phone conversations could take place simultaneously. In 1968, the FCC reconsidered its position and freed the airwaves for more phones. About this time, AT&T and Bell Labs proposed on the FCC a system in which they would construct a series of many small, low-powered broadcast towers, each of which would broadcast to a “cell” covering a few miles. Taken as a whole, such “cells” could be used to pass phone calls from cell to cell, thereby reaching a large area. The first company to actually produce a cell phone was Motorola, and Dr. Martin cooper, then Motorola and considered the inventor of the first modern portable handset made his first call in the portable cell phone in 1973. By 1977 AT&T a d bell Labs had developed a prototype cellular phone system that was tested in Chicago by 2000 trial customers. After the first commercial cell phone system began operation in Japan in 1979, and Motorola and American Radio developed a second U.S. cell system in 1981, the FCC authorized commercial cellular service in the United States in 1982. By 1987, cell phone subscribers had exceeded one million customers in the United States, and as frequencies were getting crowded, the FCC authorized alternatives cellular technologies, opening up new opportunities for the development. Since that time, researchers have developed a number of advances that have increased capacity exponentially.

Today in the United States, nearly 25% of cell phone owners have only cellular phones, and the trend is rising. According to a Hassis Poll of 9132 surveyed adults, 89% of adults have a cell phone. In an associated Press/America online Pew Poll of 1200 cell phones users, it was discovered that two third of all cell phones user said that it would hard to give up their cell phones, and 26% responded that they cannot imagine life without their cell phones. In spite of American's growing dependence on their cell phones, not everyone is happy their usages. Almost 9 out of 10 cell users encounter other using their phones in an annoying way. In addition, 28% claim that sometimes they do not drive as safely as they should do because they are using cell phones. Now , there are multiple uses for the cell phone owners in the 18 to 29 age bracket sent text message using their cell phones, 55% take pictures with their phones, 47% play games on the phones, and 28% use the internet through their cell phones.

Answer the following:

1. One study reports that nearly 25% of cell phone owners in the United States use only cellular phone (no land line). Suppose you randomly select 20 Americans, what is the probability that more than 2 of the sample use only cell phones?

2. The study also reports that 9 out of 10 cell users encounter others using their phones in an annoying way. Based on this, if you were to randomly select 25 cell phone users, what is the probability that less than 23 reports that they encounter others using their phone in an annoying way?

3. Suppose a survey of cell phone users shows that, on average, a cell phone user receives 3.6 calls per day. If this figure is true, what is the probability that a cell phone user receives no call in a day? What is the probability is the probability that a cell phone user receives 2 or more calls in a day?

TABLE A.3

Poisson Probabilities

	λ									
x	.005	.01	.02	.03	.04	.05	.06	.07	.08	.09
0	.9950	.9900	.9802	.9704	.9608	.9512	.9418	.9324	.9231	.9139
1	.0050	.0099	.0196	.0291	.0384	.0476	.0565	.0653	.0738	.0823
2	.0000	.0000	.0002	.0004	.0008	.0012	.0017	.0023	.0030	.0037
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001

x	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
0	.9048	.8187	.7408	.6703	.6065	.5488	.4966	.4493	.4066	.3679
1	.0905	.1637	.2222	.2681	.3033	.3293	.3476	.3595	.3659	.3679
2	.0045	.0164	.0333	.0536	.0758	.0988	.1217	.1438	.1647	.1839
3	.0002	.0011	.0033	.0072	.0126	.0198	.0284	.0383	.0494	.0613
4	.0000	.0001	.0003	.0007	.0016	.0030	.0050	.0077	.0111	.0153
5	.0000	.0000	.0000	.0001	.0002	.0004	.0007	.0012	.0020	.0031
6	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0003	.0005
7	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001

x	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	.3329	.3012	.2725	.2466	.2231	.2019	.1827	.1653	.1496	.1353
1	.3662	.3614	.3543	.3452	.3347	.3230	.3106	.2975	.2842	.2707
2	.2014	.2169	.2303	.2417	.2510	.2584	.2640	.2678	.2700	.2707
3	.0738	.0867	.0998	.1128	.1255	.1378	.1496	.1607	.1710	.1804
4	.0203	.0260	.0324	.0395	.0471	.0551	.0636	.0723	.0812	.0902
5	.0045	.0062	.0084	.0111	.0141	.0176	.0216	.0260	.0309	.0361
6	.0008	.0012	.0018	.0026	.0035	.0047	.0061	.0078	.0098	.0120
7	.0001	.0002	.0003	.0005	.0008	.0011	.0015	.0020	.0027	.0034
8	.0000	.0000	.0001	.0001	.0001	.0002	.0003	.0005	.0006	.0009
9	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0002

x	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
0	.1225	.1108	.1003	.0907	.0821	.0743	.0672	.0608	.0550	.0498
1	.2572	.2438	.2306	.2177	.2052	.1931	.1815	.1703	.1596	.1494
2	.2700	.2681	.2652	.2613	.2565	.2510	.2450	.2384	.2314	.2240
3	.1890	.1966	.2033	.2090	.2138	.2176	.2205	.2225	.2237	.2240
4	.0992	.1082	.1169	.1254	.1336	.1414	.1488	.1557	.1622	.1680
5	.0417	.0476	.0538	.0602	.0668	.0735	.0804	.0872	.0940	.1008
6	.0146	.0174	.0206	.0241	.0278	.0319	.0362	.0407	.0455	.0504
7	.0044	.0055	.0068	.0083	.0099	.0118	.0139	.0163	.0188	.0216
8	.0011	.0015	.0019	.0025	.0031	.0038	.0047	.0057	.0068	.0081
9	.0003	.0004	.0005	.0007	.0009	.0011	.0014	.0018	.0022	.0027
10	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006	.0008
11	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0002	.0002
12	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001

					λ					
x	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**4.0**
0	.0450	.0408	.0369	.0334	.0302	.0273	.0247	.0224	.0202	.0183
1	.1397	.1304	.1217	.1135	.1057	.0984	.0915	.0850	.0789	.0733
2	.2165	.2087	.2008	.1929	.1850	.1771	.1692	.1615	.1539	.1465
3	.2237	.2226	.2209	.2186	.2158	.2125	.2087	.2046	.2001	.1954
4	.1733	.1781	.1823	.1858	.1888	.1912	.1931	.1944	.1951	.1954
5	.1075	.1140	.1203	.1264	.1322	.1377	.1429	.1477	.1522	.1563
6	.0555	.0608	.0662	.0716	.0771	.0826	.0881	.0936	.0989	.1042
7	.0246	.0278	.0312	.0348	.0385	.0425	.0466	.0508	.0551	.0595
8	.0095	.0111	.0129	.0148	.0169	.0191	.0215	.0241	.0269	.0298
9	.0033	.0040	.0047	.0056	.0066	.0076	.0089	.0102	.0116	.0132
10	.0010	.0013	.0016	.0019	.0023	.0028	.0033	.0039	.0045	.0053
11	.0003	.0004	.0005	.0006	.0007	.0009	.0011	.0013	.0016	.0019
12	.0001	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005	.0006
13	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0001	.0002	.0002
14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001

x	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**4.7**	**4.8**	**4.9**	**5.0**
0	.0166	.0150	.0136	.0123	.0111	.0101	.0091	.0082	.0074	.0067
1	.0679	.0630	.0583	.0540	.0500	.0462	.0427	.0395	.0365	.0337
2	.1393	.1323	.1254	.1188	.1125	.1063	.1005	.0948	.0894	.0842
3	.1904	.1852	.1798	.1743	.1687	.1631	.1574	.1517	.1460	.1404
4	.1951	.1944	.1933	.1917	.1898	.1875	.1849	.1820	.1789	.1755
5	.1600	.1633	.1662	.1687	.1708	.1725	.1738	.1747	.1753	.1755
6	.1093	.1143	.1191	.1237	.1281	.1323	.1362	.1398	.1432	.1462
7	.0640	.0686	.0732	.0778	.0824	.0869	.0914	.0959	.1002	.1044
8	.0328	.0360	.0393	.0428	.0463	.0500	.0537	.0575	.0614	.0653
9	.0150	.0168	.0188	.0209	.0232	.0255	.0281	.0307	.0334	.0363
10	.0061	.0071	.0081	.0092	.0104	.0118	.0132	.0147	.0164	.0181
11	.0023	.0027	.0032	.0037	.0043	.0049	.0056	.0064	.0073	.0082
12	.0008	.0009	.0011	.0013	.0016	.0019	.0022	.0026	.0030	.0034
13	.0002	.0003	.0004	.0005	.0006	.0007	.0008	.0009	.0011	.0013
14	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005
15	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0002

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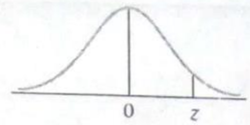

SECOND DECIMAL PLACE IN z

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.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	.4554	.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	.4977	.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									
4.0	.49997									
4.5	.499997									
5.0	.4999997									
6.0	.499999999									