Examination Statistics
Prof. Dr. E. Falkenberg
Course of Study Computer Sciencs
17.02.2015

Name : _____
Matriculation Number : _____

I hereby confirm that I am physically fit to take the examination.

Signature student _____

Problems	1	2	3	4	5	Sum	Mark
Max. scores	22	15	14	16	13	80	
Obt. scores							

Authorized examinations aids:
Scientific calculator, one english-german dictionary, one book and one file folder

Further instructions:

1. Do not use your own paper. Blank paper is attached to this question paper. Extra sheets will be provided on demand.
2. Please notice, not only the solution but the deriviation of the solution has to be given.
3. You will be excluded from the exam if you
   - cooperate in any form with other participants;
   - keep your mobile phone switched on;
   - use a mobile phone, a notebook or any other similar electronic device;
   - use documents which are not allowed.
4. Switch off all electronic devices und remove them from the table.

Good Luck!
Dr. Falkenberg

1. In the following table are the results of a survey of 25 male and 25 female students about their reading habits in the last six months.

number of read books	male	female
1	2	1
2	5	2
3	7	2
4	3	5
5	4	6
6	2	4
7	1	2
8	1	1
9		1
10		1

   (a) Calculate for the group of male and for the group of female students in each case the arithmetic mean, the modus, the median, the first quartil, the third quartil, the 90%-quantil and the standard deviation.

   (b) If you compare the values of the median and the arithmetic mean what can you say about the form of the distributions of the number of read books in every group.

   (c) Draw for the group of male students and for the group of female students a box-plot.

2. An aircraft emergency locator transmitter (ELT) is a device designed to transmit a signal in the case of a crash. Company A makes 80% of the ELTs, company B makes 15% of them, and the company C makes the other 5%. The ELTs made by A have a 4% rate of defects, the B ELTs have a 6% rate of defects, and the C ELTs have a 9% rate of defects.

   (a) If an ELT is randomly selected from the general population of all ELTs, find the probability that it not defect.

   (b) If a randomly selected ELT is then tested and is found to be defective, find the probability that it was made by the company A resp B or C.

   (c) If ELTs are randomly selected from the general population of all ELTs, what is the probability that the tenth checked ELT is the third defect ELT?

3. In a cantine the price of salad is 1 Euro/100g. The salad is weighed and the price of the salad is rounded to a multiple of 50 cent. The rounding of the exact price is allways to the closest multiple of 50 cent. In the case that the exact price is exactly between to multiples of 50 cent the price is rounded up.

   (a) Jusitfy that the difference D of the exact price to the rounded price is an uniformly distributed random variable on an interval [a,b]. What are the appropiate values of a and b?

   (b) Determine E(D) and Var(D).

   (c) Apply the central limit theorem to find an approximation of the distribution of the cumulated differences S of 192 purchases of salad in the cantine?

   (d) What is the approximated probability that you have lost at least 3 Euro if you have buyed 192 portions of salad?

4. A machine produces bolts. The length of a manufactured bolt is normally distributed random variable L. During the production process the expectation of L changes but the standard does not changes, it remains constant 0.05cm. A worker checks the machine with a sample of bolts. The $1 - \alpha = 0.95$-confidence interval is [9.9822cm, 10.0214cm].

   (a) Determine the mean and the size of the sample.

   (b) Calculate a 99%-confidence interval for the length of the bolts.

   (c) Calculate a 95%-upper confidence bound for the length of the bolts.

   (d) How many bolts should the worker sample at least to get a 95%-confidence interval of a length less than 0.1 mm?

   Hint: If you can not solve a) please use 9.99 cm as the mean of the bolts and 16 as the sample size!

5. The President claims that a majority of voters are in favor of his foreign aid program. A random sample of 1000 voters showed 545 who favored the foreign aid program. Is there sufficient evidence to support the President's claim?

   (a) State the null hypothesis.

   (b) Give the appropriate test statistic.

   (c) Use alpha of 0.005 to determine the rejection area.

   (d) Find the p-value for the test.

   (e) State your conclusions, and interpret your results.

Table of the Standard Normal Distribution N(0,1)

	?,?0	?,?1	?,?2	?,?3	?,?4	?,?5	?,?6	?,?7	?,?8	?,?9
0	0.500000	0.503989	0.507978	0.511966	0.515953	0.519939	0.523922	0.527903	0.531881	0.535856
0.1	0.539828	0.543795	0.547758	0.551717	0.555670	0.559618	0.563559	0.567495	0.571424	0.575345
0.2	0.579260	0.583166	0.587064	0.590954	0.594835	0.598706	0.602568	0.606420	0.610261	0.614092
0.3	0.617911	0.621720	0.625516	0.629300	0.633072	0.636831	0.640576	0.644309	0.648027	0.651732
0.4	0.655422	0.659097	0.662757	0.666402	0.670031	0.673645	0.677242	0.680822	0.684386	0.687933
0.5	0.691462	0.694974	0.698468	0.701944	0.705401	0.708840	0.712260	0.715661	0.719043	0.722405
0.6	0.725747	0.729069	0.732371	0.735653	0.738914	0.742154	0.745373	0.748571	0.751748	0.754903
0.7	0.758036	0.761148	0.764238	0.767305	0.770350	0.773373	0.776373	0.779350	0.782305	0.785236
0.8	0.788145	0.791030	0.793892	0.796731	0.799546	0.802337	0.805105	0.807850	0.810570	0.813267
0.9	0.815940	0.818589	0.821214	0.823814	0.826391	0.828944	0.831472	0.833977	0.836457	0.838913
1	0.841345	0.843752	0.846136	0.848495	0.850830	0.853141	0.855428	0.857690	0.859929	0.862143
1.1	0.864334	0.866500	0.868643	0.870762	0.872857	0.874928	0.876976	0.879000	0.881000	0.882977
1.2	0.884930	0.886861	0.888768	0.890651	0.892512	0.894350	0.896165	0.897958	0.899727	0.901475
1.3	0.903200	0.904902	0.906582	0.908241	0.909877	0.911492	0.913085	0.914657	0.916207	0.917736
1.4	0.919243	0.920730	0.922196	0.923641	0.925066	0.926471	0.927855	0.929219	0.930563	0.931888
1.5	0.933193	0.934478	0.935745	0.936992	0.938220	0.939429	0.940620	0.941792	0.942947	0.944083
1.6	0.945201	0.946301	0.947384	0.948449	0.949497	0.950529	0.951543	0.952540	0.953521	0.954486
1.7	0.955435	0.956367	0.957284	0.958185	0.959070	0.959941	0.960796	0.961636	0.962462	0.963273
1.8	0.964070	0.964852	0.965620	0.966375	0.967116	0.967843	0.968557	0.969258	0.969946	0.970621
1.9	0.971283	0.971933	0.972571	0.973197	0.973810	0.974412	0.975002	0.975581	0.976148	0.976705
2	0.977250	0.977784	0.978308	0.978822	0.979325	0.979818	0.980301	0.980774	0.981237	0.981691
2.1	0.982136	0.982571	0.982997	0.983414	0.983823	0.984222	0.984614	0.984997	0.985371	0.985738
2.2	0.986097	0.986447	0.986791	0.987126	0.987455	0.987776	0.988089	0.988396	0.988696	0.988989
2.3	0.989276	0.989556	0.989830	0.990097	0.990358	0.990613	0.990863	0.991106	0.991344	0.991576
2.4	0.991802	0.992024	0.992240	0.992451	0.992656	0.992857	0.993053	0.993244	0.993431	0.993613
2.5	0.993790	0.993963	0.994132	0.994297	0.994457	0.994614	0.994766	0.994915	0.995060	0.995201
2.6	0.995339	0.995473	0.995604	0.995731	0.995855	0.995975	0.996093	0.996207	0.996319	0.996427
2.7	0.996533	0.996636	0.996736	0.996833	0.996928	0.997020	0.997110	0.997197	0.997282	0.997365
2.8	0.997445	0.997523	0.997599	0.997673	0.997744	0.997814	0.997882	0.997948	0.998012	0.998074
2.9	0.998134	0.998193	0.998250	0.998305	0.998359	0.998411	0.998462	0.998511	0.998559	0.998605
3	0.998650	0.998694	0.998736	0.998777	0.998817	0.998856	0.998893	0.998930	0.998965	0.998999
3.1	0.999032	0.999065	0.999096	0.999126	0.999155	0.999184	0.999211	0.999238	0.999264	0.999289
3.2	0.999313	0.999336	0.999359	0.999381	0.999402	0.999423	0.999443	0.999462	0.999481	0.999499
3.3	0.999517	0.999534	0.999550	0.999566	0.999581	0.999596	0.999610	0.999624	0.999638	0.999651
3.4	0.999663	0.999675	0.999687	0.999698	0.999709	0.999720	0.999730	0.999740	0.999749	0.999758
3.5	0.999767	0.999776	0.999784	0.999792	0.999800	0.999807	0.999815	0.999822	0.999828	0.999835
3.6	0.999841	0.999847	0.999853	0.999858	0.999864	0.999869	0.999874	0.999879	0.999883	0.999888
3.7	0.999892	0.999896	0.999900	0.999904	0.999908	0.999912	0.999915	0.999918	0.999922	0.999925
3.8	0.999928	0.999931	0.999933	0.999936	0.999938	0.999941	0.999943	0.999946	0.999948	0.999950
3.9	0.999952	0.999954	0.999956	0.999958	0.999959	0.999961	0.999963	0.999964	0.999966	0.999967
4	0.999968	0.999970	0.999971	0.999972	0.999973	0.999974	0.999975	0.999976	0.999977	0.999978

Quantiles of the Standard Normal Distribution $N(0,1)$ u_p

	p	x	p	x	p	x
1	0.800	0.8416212	0.950	1.6448536	0.990	2.3263479
2	0.820	0.9153651	0.955	1.6953977	0.991	2.3656181
3	0.840	0.9944579	0.960	1.7506861	0.992	2.4089155
4	0.860	1.0803193	0.965	1.8119107	0.993	2.4572634
5	0.880	1.1749868	0.970	1.8807936	0.994	2.5121443
6	0.900	1.2815516	0.975	1.9599640	0.995	2.5758293
7	0.920	1.4050716	0.980	2.0537489	0.996	2.6520698
8	0.940	1.5547736	0.985	2.1700904	0.997	2.7477814
9	0.960	1.7506861	0.990	2.3263479	0.998	2.8781617
10	0.980	2.0537489	0.995	2.5758293	0.999	3.0902323

Quantiles of the t_n-Distribution $t_{n,p}$

	p=0.6	p=0.65	p=0.7	p=0.75	p=0.8	p=0.85	p=0.9	p=0.95	p=0.96	p=0.97	p=0.975	p=0.98	p=0.985	p=0.99	p=0.995	p=0.999	p=0.9995
1	0.3249	0.5095	0.7265	1.0000	1.3764	1.9626	3.0777	6.3138	7.9158	10.5789	12.7062	15.8945	21.2049	31.8205	63.6567	318.3088	636.6192
2	0.2887	0.4447	0.6172	0.8165	1.0607	1.3862	1.8856	2.9200	3.3198	3.8964	4.3027	4.8487	5.6428	6.9646	9.9248	22.3271	31.5991
3	0.2767	0.4242	0.5844	0.7649	0.9785	1.2498	1.6377	2.3534	2.6054	2.9505	3.1824	3.4819	3.8960	4.5407	5.8409	10.2145	12.9240
4	0.2707	0.4142	0.5686	0.7407	0.9410	1.1896	1.5332	2.1318	2.3329	2.6008	2.7764	2.9985	3.2976	3.7469	4.6041	7.1732	8.6103
5	0.2672	0.4082	0.5594	0.7267	0.9195	1.1558	1.4759	2.0150	2.1910	2.4216	2.5706	2.7565	3.0029	3.3649	4.0321	5.8934	6.8688
6	0.2648	0.4043	0.5534	0.7176	0.9057	1.1342	1.4398	1.9432	2.1043	2.3133	2.4469	2.6122	2.8289	3.1427	3.7074	5.2076	5.9588
7	0.2632	0.4015	0.5491	0.7111	0.8960	1.1192	1.4149	1.8946	2.0460	2.2409	2.3646	2.5168	2.7146	2.9980	3.4995	4.7853	5.4079
8	0.2619	0.3995	0.5459	0.7064	0.8889	1.1081	1.3968	1.8595	2.0042	2.1892	2.3060	2.4490	2.6338	2.8965	3.3554	4.5008	5.0413
9	0.2610	0.3979	0.5435	0.7027	0.8834	1.0997	1.3830	1.8331	1.9727	2.1504	2.2622	2.3984	2.5738	2.8214	3.2498	4.2968	4.7809
10	0.2602	0.3966	0.5415	0.6998	0.8791	1.0931	1.3722	1.8125	1.9481	2.1202	2.2281	2.3593	2.5275	2.7638	3.1693	4.1437	4.5869
11	0.2596	0.3956	0.5399	0.6974	0.8755	1.0877	1.3634	1.7959	1.9284	2.0961	2.2010	2.3281	2.4907	2.7181	3.1058	4.0247	4.4370
12	0.2590	0.3947	0.5386	0.6955	0.8726	1.0832	1.3562	1.7823	1.9123	2.0764	2.1788	2.3027	2.4607	2.6810	3.0545	3.9296	4.3178
13	0.2586	0.3940	0.5375	0.6938	0.8702	1.0795	1.3502	1.7709	1.8989	2.0600	2.1604	2.2816	2.4358	2.6503	3.0123	3.8520	4.2208
14	0.2582	0.3933	0.5366	0.6924	0.8681	1.0763	1.3450	1.7613	1.8875	2.0462	2.1448	2.2638	2.4149	2.6245	2.9768	3.7874	4.1405
15	0.2579	0.3928	0.5357	0.6912	0.8662	1.0735	1.3406	1.7531	1.8777	2.0343	2.1314	2.2485	2.3970	2.6025	2.9467	3.7328	4.0728
16	0.2576	0.3923	0.5350	0.6901	0.8647	1.0711	1.3368	1.7459	1.8693	2.0240	2.1199	2.2354	2.3815	2.5835	2.9208	3.6862	4.0150
17	0.2573	0.3919	0.5344	0.6892	0.8633	1.0690	1.3334	1.7396	1.8619	2.0150	2.1098	2.2238	2.3681	2.5669	2.8982	3.6458	3.9651
18	0.2571	0.3915	0.5338	0.6884	0.8620	1.0672	1.3304	1.7341	1.8553	2.0071	2.1009	2.2137	2.3562	2.5524	2.8784	3.6105	3.9216
19	0.2569	0.3912	0.5333	0.6876	0.8610	1.0655	1.3277	1.7291	1.8495	2.0000	2.0930	2.2047	2.3456	2.5395	2.8609	3.5794	3.8834
20	0.2567	0.3909	0.5329	0.6870	0.8600	1.0640	1.3253	1.7247	1.8443	1.9937	2.0860	2.1967	2.3362	2.5280	2.8453	3.5518	3.8495
21	0.2566	0.3906	0.5325	0.6864	0.8591	1.0627	1.3232	1.7207	1.8397	1.9880	2.0796	2.1894	2.3278	2.5176	2.8314	3.5272	3.8193
22	0.2564	0.3904	0.5321	0.6858	0.8583	1.0614	1.3212	1.7171	1.8354	1.9829	2.0739	2.1829	2.3202	2.5083	2.8188	3.5050	3.7921
23	0.2563	0.3902	0.5317	0.6853	0.8575	1.0603	1.3195	1.7139	1.8316	1.9782	2.0687	2.1770	2.3132	2.4999	2.8073	3.4850	3.7676
24	0.2562	0.3900	0.5314	0.6848	0.8569	1.0593	1.3178	1.7109	1.8281	1.9740	2.0639	2.1715	2.3069	2.4922	2.7969	3.4668	3.7454
25	0.2561	0.3898	0.5312	0.6844	0.8562	1.0584	1.3163	1.7081	1.8248	1.9701	2.0595	2.1666	2.3011	2.4851	2.7874	3.4502	3.7251
26	0.2560	0.3896	0.5309	0.6840	0.8557	1.0575	1.3150	1.7056	1.8219	1.9665	2.0555	2.1620	2.2958	2.4786	2.7787	3.4350	3.7066
27	0.2559	0.3894	0.5306	0.6837	0.8551	1.0567	1.3137	1.7033	1.8191	1.9632	2.0518	2.1578	2.2909	2.4727	2.7707	3.4210	3.6896
28	0.2558	0.3893	0.5304	0.6834	0.8546	1.0560	1.3125	1.7011	1.8166	1.9601	2.0484	2.1539	2.2864	2.4671	2.7633	3.4082	3.6739
29	0.2557	0.3892	0.5302	0.6830	0.8542	1.0553	1.3114	1.6991	1.8142	1.9573	2.0452	2.1503	2.2822	2.4620	2.7564	3.3962	3.6594
30	0.2556	0.3890	0.5300	0.6828	0.8538	1.0547	1.3104	1.6973	1.8120	1.9546	2.0423	2.1470	2.2783	2.4573	2.7500	3.3852	3.6460
40	0.2550	0.3881	0.5286	0.6807	0.8507	1.0500	1.3031	1.6839	1.7963	1.9357	2.0211	2.1229	2.2503	2.4233	2.7045	3.3069	3.5510
50	0.2547	0.3875	0.5278	0.6794	0.8489	1.0473	1.2987	1.6759	1.7870	1.9244	2.0086	2.1087	2.2338	2.4033	2.6778	3.2614	3.4960
60	0.2545	0.3872	0.5272	0.6786	0.8477	1.0455	1.2958	1.6706	1.7808	1.9170	2.0003	2.0994	2.2229	2.3901	2.6603	3.2317	3.4602
70	0.2543	0.3869	0.5268	0.6780	0.8468	1.0442	1.2938	1.6669	1.7765	1.9118	1.9944	2.0927	2.2152	2.3808	2.6479	3.2108	3.4350
80	0.2542	0.3867	0.5265	0.6776	0.8461	1.0432	1.2922	1.6641	1.7732	1.9078	1.9901	2.0878	2.2095	2.3739	2.6387	3.1953	3.4163
90	0.2541	0.3866	0.5263	0.6772	0.8456	1.0424	1.2910	1.6620	1.7707	1.9048	1.9867	2.0839	2.2050	2.3685	2.6316	3.1833	3.4019
100	0.2540	0.3864	0.5261	0.6770	0.8452	1.0418	1.2901	1.6602	1.7687	1.9024	1.9840	2.0809	2.2015	2.3642	2.6259	3.1737	3.3905
200	0.2537	0.3859	0.5252	0.6757	0.8434	1.0391	1.2858	1.6525	1.7596	1.8915	1.9719	2.0672	2.1857	2.3451	2.6006	3.1315	3.3398
300	0.2536	0.3857	0.5250	0.6753	0.8428	1.0382	1.2844	1.6499	1.7566	1.8879	1.9679	2.0627	2.1805	2.3388	2.5923	3.1176	3.3233
400	0.2535	0.3856	0.5248	0.6751	0.8425	1.0378	1.2837	1.6487	1.7551	1.8861	1.9659	2.0605	2.1779	2.3357	2.5882	3.1107	3.3150
500	0.2535	0.3855	0.5247	0.6750	0.8423	1.0375	1.2832	1.6479	1.7543	1.8851	1.9647	2.0591	2.1763	2.3338	2.5857	3.1066	3.3101
∞	0.2533	0.3853	0.5244	0.6745	0.8416	1.0364	1.2816	1.6449	1.7507	1.8808	1.9600	2.0537	2.1701	2.3263	2.5758	3.0902	3.2905

Quantiles of the χ^2_n-Distribution $\chi_{n,p}$

	p=0.005	p=0.01	p=0.015	p=0.02	p=0.025	p=0.05	p=0.1	p=0.5	p=0.9	p=0.95	p=0.975	p=0.98	p=0.985	p=0.99	p=0.995
1	0.000	0.000	0.000	0.001	0.001	0.004	0.016	0.455	2.706	3.841	5.024	5.412	5.916	6.635	7.879
2	0.010	0.020	0.030	0.040	0.051	0.103	0.211	1.386	4.605	5.991	7.378	7.824	8.399	9.210	10.597
3	0.072	0.115	0.152	0.185	0.216	0.352	0.584	2.366	6.251	7.815	9.348	9.837	10.465	11.345	12.838
4	0.207	0.297	0.368	0.429	0.484	0.711	1.064	3.357	7.779	9.488	11.143	11.668	12.339	13.277	14.860
5	0.412	0.554	0.662	0.752	0.831	1.145	1.610	4.351	9.236	11.070	12.833	13.388	14.098	15.086	16.750
6	0.676	0.872	1.016	1.134	1.237	1.635	2.204	5.348	10.645	12.592	14.449	15.033	15.777	16.812	18.548
7	0.989	1.239	1.418	1.564	1.690	2.167	2.833	6.346	12.017	14.067	16.013	16.622	17.398	18.475	20.278
8	1.344	1.646	1.860	2.032	2.180	2.733	3.490	7.344	13.362	15.507	17.535	18.168	18.974	20.090	21.955
9	1.735	2.088	2.335	2.532	2.700	3.325	4.168	8.343	14.684	16.919	19.023	19.679	20.513	21.666	23.589
10	2.156	2.558	2.837	3.059	3.247	3.940	4.865	9.342	15.987	18.307	20.483	21.161	22.021	23.209	25.188
11	2.603	3.053	3.363	3.609	3.816	4.575	5.578	10.341	17.275	19.675	21.920	22.618	23.503	24.725	26.757
12	3.074	3.571	3.910	4.178	4.404	5.226	6.304	11.340	18.549	21.026	23.337	24.054	24.963	26.217	28.300
13	3.565	4.107	4.476	4.765	5.009	5.892	7.042	12.340	19.812	22.362	24.736	25.472	26.403	27.688	29.819
14	4.075	4.660	5.057	5.368	5.629	6.571	7.790	13.339	21.064	23.685	26.119	26.873	27.827	29.141	31.319
15	4.601	5.229	5.653	5.985	6.262	7.261	8.547	14.339	22.307	24.996	27.488	28.259	29.235	30.578	32.801
16	5.142	5.812	6.263	6.614	6.908	7.962	9.312	15.338	23.542	26.296	28.845	29.633	30.629	32.000	34.267
17	5.697	6.408	6.884	7.255	7.564	8.672	10.085	16.338	24.769	27.587	30.191	30.995	32.011	33.409	35.718
18	6.265	7.015	7.516	7.906	8.231	9.390	10.865	17.338	25.989	28.869	31.526	32.346	33.382	34.805	37.156
19	6.844	7.633	8.159	8.567	8.907	10.117	11.651	18.338	27.204	30.144	32.852	33.687	34.742	36.191	38.582
20	7.434	8.260	8.810	9.237	9.591	10.851	12.443	19.337	28.412	31.410	34.170	35.020	36.093	37.566	39.997
25	10.520	11.524	12.187	12.697	13.120	14.611	16.473	24.337	34.382	37.652	40.646	41.566	42.725	44.314	46.928
30	13.787	14.953	15.719	16.306	16.791	18.493	20.599	29.336	40.256	43.773	46.979	47.962	49.199	50.892	53.672
35	17.192	18.509	19.369	20.027	20.569	22.465	24.797	34.336	46.059	49.802	53.203	54.244	55.553	57.342	60.275
40	20.707	22.164	23.113	23.838	24.433	26.509	29.051	39.335	51.805	55.758	59.342	60.436	61.812	63.691	66.766
45	24.311	25.901	26.933	27.720	28.366	30.612	33.350	44.335	57.505	61.656	65.410	66.555	67.994	69.957	73.166
50	27.991	29.707	30.818	31.664	32.357	34.764	37.689	49.335	63.167	67.505	71.420	72.613	74.111	76.154	79.490
60	35.534	37.485	38.744	39.699	40.482	43.188	46.459	59.335	74.397	79.082	83.298	84.580	86.188	88.379	91.952
70	43.275	45.442	46.836	47.893	48.758	51.739	55.329	69.334	85.527	90.531	95.023	96.388	98.098	100.425	104.215
80	51.172	53.540	55.061	56.213	57.153	60.391	64.278	79.334	96.578	101.879	106.629	108.069	109.874	112.329	116.321
90	59.196	61.754	63.394	64.635	65.647	69.126	73.291	89.334	107.565	113.145	118.136	119.648	121.542	124.116	128.299
100	67.328	70.065	71.818	73.142	74.222	77.929	82.358	99.334	118.498	124.342	129.561	131.142	133.120	135.807	140.169
110	75.550	78.458	80.318	81.723	82.867	86.792	91.471	109.334	129.385	135.480	140.917	142.562	144.620	147.414	151.948
120	83.852	86.923	88.886	90.367	91.573	95.705	100.624	119.334	140.233	146.567	152.211	153.918	156.053	158.950	163.648
130	92.222	95.451	97.512	99.066	100.331	104.662	109.811	129.334	151.045	157.610	163.453	165.219	167.427	170.423	175.278
140	100.655	104.034	106.190	107.815	109.137	113.659	119.029	139.334	161.827	168.613	174.648	176.471	178.750	181.840	186.847
150	109.142	112.668	114.915	116.608	117.985	122.692	128.275	149.334	172.581	179.581	185.800	187.678	190.025	193.208	198.360
160	117.679	121.346	123.681	125.440	126.870	131.756	137.546	159.334	183.311	190.516	196.915	198.846	201.259	204.530	209.824
170	126.261	130.064	132.486	134.308	135.790	140.849	146.839	169.334	194.017	201.423	207.995	209.978	212.455	215.812	221.242
180	134.884	138.820	141.325	143.210	144.741	149.969	156.153	179.334	204.704	212.304	219.044	221.077	223.616	227.056	232.620
190	143.545	147.610	150.196	152.141	153.721	159.113	165.485	189.334	215.371	223.160	230.064	232.146	234.745	238.266	243.959
200	152.241	156.432	159.096	161.100	162.728	168.279	174.835	199.334	226.021	233.994	241.058	243.187	245.845	249.445	255.264