SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN PERDAGANGAN

PEPERIKSAAN AKHIR

SESI II : 2023/2024

DPB30063: STATISTICS

TARIKH : 09 JUN 2024
MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas ini mengandungi **ENAM (6)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula, Jadual t-score, Jadual z-score

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JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

INSTRUCTION:

This section consists of **FOUR (4)** questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO2 (a) Annotate **FIVE (5)** types of graphical methods to present data.

*Catatkan **LIMA (5)** jenis kaedah grafik untuk mempersembahkan data.*

[5 marks]

[*5 markah*]

CLO2 (b) The data below are the marks obtained by 50 students in the Statistics test.

Data di bawah adalah markah yang diperolehi oleh 50 orang pelajar dalam ujian Statistik.

34	42	20	50	17	9	34	43	50	18
35	43	50	23	23	35	37	38	38	39
39	38	38	39	24	29	25	26	28	27
44	44	49	48	46	45	45	46	45	46
12	41	45	32	29	21	33	15	38	50

Construct a frequency distribution table that consists of the class interval, frequency, midpoint and class boundaries.

Bina jadual taburan kekerapan yang terdiri daripada selang kelas, kekerapan, titik tengah dan sempadan kelas.

[10 marks]

[*10 markah*]

CLO2 (c) Based on the answer in (b), you are required to draw a "more than" ogive.

Berdasarkan jawapan di (b), anda dikehendaki melukis ogif "lebih daripada".

[10 marks]

[*10 markah*]

QUESTION 2

SOALAN 2

CLO2 (a) The heights of 90 female students from Mentari College are recorded in the following table:

Ukuran tinggi bagi 90 pelajar perempuan dari Kolej Mentari direkodkan dalam jadual berikut:

Height (in cm) ***Tinggi (dalam cm)***	**Number of Students** ***Bilangan Pelajar***
140.5 – 145.4	8
145.5 – 150.4	13
150.5 – 155.4	12
155.5 – 160.4	7
160.5 – 165.4	20
165.5 – 170.4	16
170.5 – 175.4	9
175.5 – 180.4	5

Based on the above information, detail out the calculation value of mean, median and mode.

Berdasarkan maklumat di atas, perincikan nilai min, median dan mod.

[12 marks]

[*12 markah*]

CLO2 (b) From the data in 2 (a), calculate Pearson's Coefficient of Skewness 2 (PCS 2) by interpreting the type of distribution.

Daripada data di 2 (a), kirakan Pekali Pencongan Pearson 2 (PCS 2) dengan mentafsirkan jenis taburan.

[13 marks]

[*13 markah*]

QUESTION 3

SOALAN 3

CLO2 (a) A car manufacturer has sales for both local and imported cars. A marketing survey was conducted on 240 potential buyers regarding their preference for owning local or imported cars. The breakdown of details are as follows.
Pengeluar kereta mempunyai jualan untuk kereta tempatan dan kereta import. Tinjauan pemasaran telah dijalankan ke atas 240 bakal pembeli berhubung keutamaan mereka untuk memiliki kereta tempatan atau import. Pecahan butiran adalah seperti berikut.

	Local cars / *Kereta tempatan*	**Imported cars / *Kereta import***	**Total / *Jumlah***
Male / *Lelaki*	21	39	60
Female / *Wanita*	135	45	180
Total / *Jumlah*	156	84	240

Locate the value of the following probability:
Cari nilai kebarangkalian berikut:

i) A person chosen at random will be a male who prefers an imported car.
Seseorang yang dipilih secara rawak adalah lelaki yang lebih suka kereta import.

ii) A person chosen at random will be a female who prefers a local car.
Seseorang yang dipilih secara rawak akan menjadi seorang wanita yang lebih suka kereta tempatan.

iii) A person chosen at random will be female or a person who prefers an imported car.
Seseorang yang dipilih secara rawak adalah wanita atau seseorang yang lebih suka kereta import.

[5 marks]

[*5 markah*]

CLO2 (b) i) Zahirah asked 50 people which drinks they liked, either tea, coffee, or milk. She found that:
All 50 people like at least one of the drinks.
19 people like all three drinks.
16 people like tea and coffee but do not like milk.
21 people like coffee and milk.
24 people like tea and milk.
40 people like coffee.
One person likes only milk.

Zahirah bertanya kepada 50 orang minuman yang mana satukah mereka sukai samada teh, kopi atau susu. Dia mendapati bahawa:
Kesemua 50 orang menyukai sekurang-kurangnya satu daripada minuman tersebut.
19 orang menyukai ketiga-tiga minuman itu.
16 orang suka teh dan kopi tetapi tidak suka susu.
21 orang suka kopi dan susu.
24 orang suka teh dan susu.
40 orang suka kopi.
Satu orang suka susu sahaja.

a) From the events above, draw the Venn diagram.
Daripada peristiwa di atas, lukis gambar rajah Venn.

[8 marks]
[*8 markah*]

b) The person selected at random from 50 people likes tea, compute the probability that this person also likes exactly one other drink.
Individu yang dipilh secara rawak daripada 50 orang menyukai teh, hitung kebarangkalian bahawa individu ini juga sangat menyukai minuman yang lain.

[2 marks]
[*2 markah*]

ii) Fahmi hits the snooze bar on his alarm clock on 60% of school days. If he doesn't hit the snooze bar, there is a 0.90 probability that he makes it to class on time. However, if he hits the snooze bar, there is only a 0.70 probability that he makes it to class on time.
Fahmi menekan butang tunda pada jam locengnya pada 60% hari persekolahan. Sekiranya dia tidak menekan butang tunda, terdapat kebarangkalian sebanyak 0.90 bahawa dia akan tiba di kelas tepat pada waktunya. Walau bagaimanapun, jika dia menekan butang tunda, terdapat hanya 0.70 kebarangkalian bahawa dia akan tiba di kelas tepat pada waktunya.

a) Draw a tree diagram from the information above to show the probability.
Lukiskan gambar rajah pokok daripada maklumat di atas untuk menunjukkan kebarangkalian.

[6 marks]
[*6 markah*]

b) Calculate the probability that Fahmi will be late for the class.
Kira kebarangkalian Fahmi akan lewat ke kelas.

[2 marks]
[*2 markah*]

c) Suppose Fahmi is late for the class, compute the probability that he hit the snooze bar that morning.
Katakan Fahmi lewat ke kelas, hitung kebarangkalian dia menekan butang tunda pagi itu.

[2 marks]
[*2 markah*]

QUESTION 4

SOALAN 4

CLO2 (a) Table below shows expenditure incurred by Man & Moon Holding for the Research and Development (R&D) to produce smartphone and total profit earned for 6 consecutive years.

Jadual di bawah menunjukkan perbelanjaan yang ditanggung oleh Man & Moon Holding untuk Penyelidikan dan Pembangunan (R&D) untuk menghasilkan telefon pintar dan jumlah keuntungan yang diperoleh selama 6 tahun berturut-turut.

Year ***Tahun***	**R&D Expenditure (RM million)** ***Perbelanjaan R&D (RM juta)*** **x**	**Total Profit (RM million)** ***Jumlah Keuntungan (RM juta)*** **y**
2018	2	20
2019	3	25
2020	5	34
2021	4	30
2022	11	40
2023	5	31

Simplify the data above by interpreting the relationship between R&D expenditure and total profit using Pearson's product moment correlation coefficient.

Permudahkan data di atas dengan mentafsirkan hubungan antara perbelanjaan R&D dan jumlah keuntungan menggunakan pekali kolerasi produk momen Pearson.

[12 marks]

[*12 markah*]

CLO1 (b) Amory is a car battery manufacturer. The company claims that the average life span of batteries is two (2) or more years. An engineer believes this value can be lessened. Using 10 samples, he measures the average life span to be 1.8 years with a standard deviation of 0.15. If the researcher uses a 1% level of significance, demonstrate **FIVE (5)** steps of hypothesis testing if there is enough evidence to decline this claim.

*Amory adalah pengeluar bateri kereta. Syarikat itu mendakwa bahawa purata jangka hayat bateri adalah dua (2) tahun atau lebih. Seorang jurutera percaya bahawa nilai ini boleh dikurangkan. Dengan menggunakan 10 sampel, jurutera mengukur jangka hayat purata menjadi 1.8 tahun dengan sisihan piawai 0.15. Jika penyelidik menggunakan aras keertian 1%, tunjukkan **LIMA (5)** langkah ujian hipotesis jika terdapat bukti yang mencukupi untuk menolak dakwaan ini.*

[13 marks]

[*13 markah*]

SOALAN TAMAT

FORMULA STATISTICS

$$k = 1 + 3.3 \log_{10} n$$

$$R = Highest\ value - Lowest\ value$$

$$c = \frac{Range}{k}$$

$$\overline{x} = \frac{\sum fx}{\sum f}$$

$$\tilde{x} = Lm + \left[\frac{\frac{\sum f}{2} - \sum fm^{-1}}{fm}\right] C$$

$$\hat{x} = Lb + \left[\frac{f_0 - f_1}{(f_0 - f_1) + (f_0 - f_2)}\right] C$$

$$\hat{x} = \overline{x} - 3(\overline{x} - \tilde{x})$$

$$MD = \frac{1}{\sum f}[\sum f(x - \overline{x})]$$

$$s^2 = \frac{1}{\sum f - 1}\left[\sum fx^2 - \frac{(\sum fx)^2}{\sum f}\right]$$

$$s = \sqrt{s^2}$$

$$cv = \frac{s}{\overline{x}} \times 100$$

$$PCS\ 1 = \frac{\overline{x} - \hat{x}}{s}$$

$$PCS\ 2 = \frac{3(\overline{x} - \tilde{x})}{s}$$

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

$$\rho = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

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

$$a = \frac{\sum y}{n} - b\frac{\sum x}{n}$$

$$y = a + bx$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \cup B) = P(A) + P(B)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

$$\overline{x} \pm Z_{\alpha/2}\frac{\alpha}{\sqrt{n}}$$

$$z = \frac{\overline{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$t = \frac{\overline{x} - \mu}{\frac{s}{\sqrt{n}}}$$

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	**0.50**	**0.25**	**0.20**	**0.15**	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**	**0.001**	**0.0005**
two-tails	**1.00**	**0.50**	**0.40**	**0.30**	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.002**	**0.001**
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

Table entry for z is the area under the standard normal curve to the left of z.

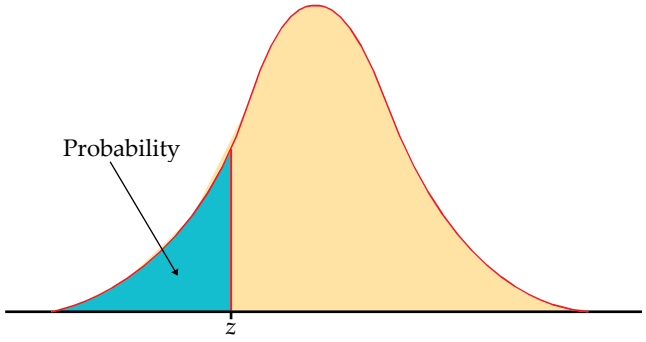

TABLE A

Standard normal probabilities

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
−3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
−3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
−3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
−3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
−3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
−2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
−2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
−2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
−2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
−2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
−2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
−2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
−2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
−2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
−2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
−1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
−1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
−1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
−1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
−1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
−1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
−1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
−1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
−1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
−1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
−0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
−0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
−0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
−0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

Table entry for z is the area under the standard normal curve to the left of z.

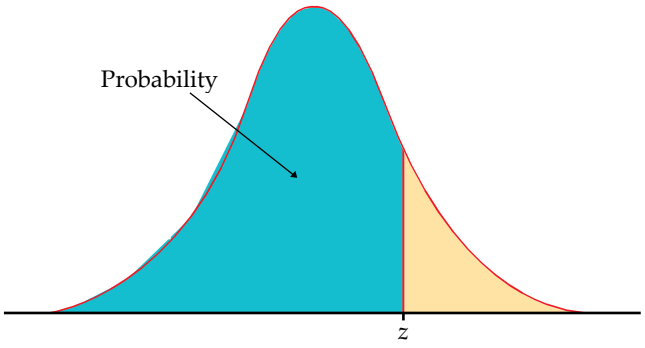

TABLE A

Standard normal probabilities (continued)

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998