UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama
Sidang Akademik 1995/96

Oktober/November 1995

HGT 311 Kaedah Kuantitatif Dalam Geografi

Masa: [3 jam]

KERTAS PEPERIKSAAN INI MENGANDUNGI ENAM [6] SOALAN DI DALAM DUA BELAS [12] HALAMAN.

Jawab EMPAT [4] soalan. DUA [2] soalan daripada setiap Bahagian A dan B.

BAHAGIAN A - Jawab DUA [2] soalan

1. Berikut ialah data hipotetikal satu sampel rawak 60 daerah di Semenanjung Malaysia. Kadar kematian kasar dan juga Negeri telah diteliti dan maklumat ini diperturunkan dalam Jadual 1.

Jadual 1

Taburan Kekerapan Kadar Kematian Kasar, Semenanjung Malaysia, Mengikut Negeri dan Mengikut Kadar Kematian Kasar

Negeri	Kadar Kematian Kasar (%) 5.0 dan ke bawah	5.1 dan ke atas	Jumlah
Johor	5	1	6
Kedah	4	5	9
Kelantan	2	5	7
Melaka	1	1	2
Negeri Sembilan	4	2	6
Pahang	6	1	7
Pulau Pinang	1	3	4
Perak	1	6	7
Selangor	5	2	7
Terengganu	2	3	5
Jumlah	31	29	60

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[a] Berdasarkan Jadual 1, huraikan dengan ringkas pola kadar kematian kasar di Semenanjung Malaysia.

[2 markah]

[b] Apakah kaedah yang boleh anda gunakan untuk mengetahui sama ada kadar kematian kasar bebas daripada negeri?

[1 markah]

[c] Buktikan bahawa tiada perkaitan di antara kadar kematian kasar dengan negeri di Semenanjung Malaysia.

[20 markah]

[d] Nyatakan kelemahan-kelemahan kaedah yang telah anda pilih.

[2 markah]

2. Jadual 2 memperlihatkan [a] maklumat mengenai peratus penduduk di 10 buah negeri di Amerika Syarikat yang keluar mengundi pada pilihanraya 1980 dan [b] kadar kemiskinan di negeri-negeri yang berkenaan.

Jadual 2

Penduduk Yang Keluar Mengundi dan Kadar Kemiskinan di 10 buah negeri di Amerika Syarikat

Negeri	% Keluar Mengundi	% Penduduk Miskin
Alabama	49.0	18.9
California	49.5	11.4
Connecticut	61.2	8.0
Florida	49.6	13.5
Georgia	41.7	16.6
Illinois	57.8	11.0
Indiana	57.7	9.7
Iowa	62.9	10.1
Kentucky	50.0	17.6
Louisiana	53.7	18.6

[a] Buktikan bahawa peratus penduduk keluar mengundi di setiap negeri berkorelasi dengan peratus penduduk miskin di negeri-negeri berkenaan.

[20 markah]

.../3

[b] Apakah pekali korelasi signifikan pada $\alpha = .05$?

[3 markah]

[c] Apakah kaedah yang boleh anda gunakan untuk meramalkan peratus yang akan keluar mengundi di pilihanraya umum yang akan diadakan pada masa hadapan (dan kadar kemiskinan diketahui)?

[2 markah]

3. [a] Bezakan statistik pemerihalan dengan statistik inferens.

[5 markah]

[b] Nyatakan ukuran-ukuran statistik pemerihalan yang perlu anda kira untuk mengukur tahap taburan data dalam dua set data seperti dalam Jadual 3.

[2 markah]

Jadual 3

Hasil Tanaman (kg/ha) 10 Sampel Ladang di Dua Buah Daerah di Sarawak

Daerah	Hasil Tanaman (kg/ha)									
A	65	42	78	83	51	61	69	48	66	59
B	45	44	87	52	33	29	62	43	12	74

[c] Berdasarkan Jadual 3, buktikan tahap taburan hasil tanaman dengan mengira Pekali Ubahan ("Coefficient of Variation").

[18 markah]

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BAHAGIAN B - Jawab DUA [2] soalan

4. [a] Terangkan pernyataan-pernyataan berikut:

```
   [i]  @SUM(b6..b25)
  [ii]  @MAX(B6..B25) - @MIN(B6..b25)
 [iii]  @COUNT(C4..C20)
  [iv]  @STD(B6..B40)
   [v]  SQRT((B6-C6)/F6))
  [vi]  PROC PRINT DATA=OLD;
 [vii]  INFILE 'B:HGT311';
[viii]  PROC REG;
  [ix]  PROC FREQ DATA=NEW; TABLES VI*V2/CHISQ;
   [x]  FILENAME KEDUA 'EXER1.DAT';
```

[10 markah]

[b] Jadual 4 menunjukkan data penduduk negeri-negeri di Semenanjung Malaysia bagi tahun 1991. Sediakan satu lembaran kerja LOTUS 1-2-3 yang lengkap bagi mencari data statistik pemerihalan berikut:

[i] jumlah kes

[ii] min

[iii] julat

[iv] nilai minimum dan maksimum

[v] sisihan piawai

[15 markáh]

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Jadual 4

Penduduk Negeri-Negeri Di Semenanjung Malaysia 1991

Negeri	Jumlah Penduduk
Johor	2,074,297
Kedah	1,304,800
Kelantan	1,181,680
Melaka	504,502
Negeri Sembilan	691,150
Pahang	1,036,724
Pulau Pinang	1,880,016
Perak	1,065,075
Perlis	184,070
Selangor	2,289,236
Terengganu	770,931
Kuala Lumpur	1,145,075

Sumber: Jab. Perangkaan Malaysia, 1992

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5. [a] Jadual 5 menunjukkan satu jadual bersilang dari output SAS. Terangkan maksud output tersebut .

[10 markah]

Jadual 5

Jadual Bersilang Umur Dan Jantina

UMUR	JANTINA		
FREQUENCY PERCENT ROW PCT COL PCT	PEREMPUAN	LELAKI	TOTAL
11	1 5.26 50.0 11.11	1 5.26 50.0 10.0	2 10.53
12	2 10.53 49.00 22.22	3 15.79 60.0 30.0	5 26.3
13	2 10.53 66.67 22.22	1 5.26 33.33 10.00	3 15.79
14	2 10.53 50.0 22.22	2 10.53 50.0 20.0	4 21.05
15	2 10.53 50.00 22.22	2 10.53 50.00 20.00	4 21.05
16	0 0.00 0.00 0.00	1 5.26 100.00 10.00	1 5.26
TOTAL	9 47.37	10 52.63	19 100.00

Sumber: SAS(1978).

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[b] Jadual 6 menunjukkan data air larian, keluasan, perimeter, ketinggian, kecerunan, peratusan gunatanah hutan dan intensiti hujan sebuah lembangan saliran. Tuliskan **satu [1]** program SAS yang lengkap bagi melihat perkaitan antara air larian dengan keluasan, perimeter, ketinggian, kecerunan, peratusan gunatanah hutan dan intensiti hujan.

[15 markah]

Jadual 6

Ciri-Ciri Lembangan Saliran Sampel

Kes	Keluasan	Panjang	Ketinggian	% Hutan	Air Larian	Hujan	Cerun
1	11.71	4.1	1080	100	1156	1605	16
2	31.82	5.2	1756	100	1378	2202	17
3	18.57	3.8	2006	73	1560	2036	12
4	7.74	2.1	1257	68	947	1868	18
5	15.20	3.0	486	4	356	1520	8
6	2.31	1.5	1070	88	454	1276	11
7	4.95	3.3	1600	75	654	1710	10
8	11.06	4.0	1380	48	473	1510	10
9	12.23	2.8	335	2	127	1285	5
10	8.16	2.3	1195	50	651	1522	14
11	17.07	4.0	955	10	485	1585	10
12	24.35	3.6	946	100	750	1682	16
13	24.10	4.8	1806	93	978	1984	18
14	9.08	3.3	780	50	641	1594	11
15	3.42	1.2	600	50	757	1693	10

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6. [a] Betul dan jelaskan dengan ringkas kesilapan-kesilapan yang terdapat dalam pernyataan berikut:

```
 [i]  PROC AVERAGE(b6..b25);
[ii]  @SUM(B6..B30) - @MAX(B6..B30)
[iii] /*SEMUA INI ADALAH KOMEN SAHAJA /*; RUB;
[vi]  NISBAH=@MIN/@MAX;
 [v]  PROC REG MODEL A**y; RUN;
```

[10 markah]

[b] Jadual 7 menunjukkan satu hasilan analisis regrasi berbagai ("multiple regression") untuk melihat perkaitan antara pendapatan petani (INCOME) dengan bilangan lembu (LEMBU) yang dipelihara dan keluasan ladang yang dimiliki (LADANG).

[15 markah]

Jadual 7

Output Analisis Regrasi SAS

SAS 22:35 Wednesday, February 23, 1994
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Model: MODEL1
Dependent Variable: INCOME

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	2	141220707.63	70610353.813	15.592	0.0001
Error	17	76987292.373	4528664.2573		
C Total	19	218208000.00			

Root MSE	2128.06585	R-square	0.6472
Dep Mean	17440.00000	Adj R-sq	0.6057
C.V.	12.20221		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	8222.312718	2053.9770258	4.003	0.0009
LEMBU	1	354.463365	63.47571878	5.584	0.0001
LADANG	1	29.570404	9.42780706	3.137	0.0060

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LAMPIRAN 1

Formula

1. Min

a. Sampel $\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$

b. Populasi $\mu = \frac{\sum_{i=1}^{N} X_i}{N}$

2. Varians

a. Sampel $s^2 = \frac{n \sum_{i=1}^{n} x_i^2 - \sum_{i=1}^{n} x_i^2}{n(n-1)}$

b. Populasi $\sigma^2 = \sum_{i=1}^{N} \frac{(X^i-\mu)^2}{N}$

3. Sisihan Piawai

a. Sampel $S = \sqrt{s^2}$

b. Populasi $\sigma = \sqrt{\sigma^2}$

4. Pekali Ubahan $CV = \frac{s}{\bar{X}} \times 100$ atau $CV = \frac{\sigma}{\bar{X}} \times 100$

5. $r_s = \frac{6\Sigma D^2}{n(n^2-1)}$ $r = \frac{\frac{\Sigma XY}{n} - \bar{X}\bar{Y}}{\sigma X \, \sigma Y}$

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6. Ujian Keertian *t*

$$t = r \frac{\sqrt{n - 2}}{\sqrt{1 - r^2}}$$

8. Persamaan anggaran bagi regrasi X dan Y

$$Y_i = a + bX_i$$

9. Cerun garisan regrasi

$$b = \frac{\Sigma XY - \bar{X}(\Sigma Y)}{\Sigma X^2 - \bar{X}(\Sigma X)}$$

10. Nilai "intercept" *a*

$$a = \bar{Y} - b\bar{X}$$

11. Ujian "Chi-Square"

$$\chi^2 = \sum_{1}^{k} \frac{(f_o - f_E)^2}{f_E}$$

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Chi-Square (χ^2) Distribution

For given degrees of freedom and for specified values of a α.
$P(\chi^2_{20} \leq 31.410) = \alpha_{05}$

	Value of P																					
df	.999	.995	.99	.98	.975	.95	.90	.80	.75	.70	.50	.30	.25	.20	.10	.05	.025	.02	.01	.005	.001	*df*
1	$.0^3157$	$.0^3393$	.0 157	$.0^3628$	$.0^3982$	.00393	.0158	.064	.102	.148	.455	1.074	1.323	1.642	2.706	3.841	5.024	5.412	6.635	7.879	10.827	1
2	.00200	.0100	.0201	.0404	.0506	.103	.211	.446	.575	.713	1.386	2.408	2.773	3.219	4.605	5.991	7.378	7.824	9.210	10.597	13.815	2
3	.0243	.0717	.115	.185	.216	.352	.584	1.005	1.213	1.424	2.366	3.665	4.108	4.642	6.251	7.815	9.348	9.837	11.345	12.838	16.268	3
4	.0908	.207	.297	.429	.484	.711	1.064	1.649	1.923	2.195	3.357	4.878	5.385	5.989	7.779	9.488	11.143	11.668	13.277	14.860	18.465	4
5	.210	.412	.554	.752	.831	1.145	1.610	2.343	2.675	3.000	4.351	6.064	6.626	7.289	9.236	11.070	12.832	13.388	15.086	16.750	20.517	5
6	.381	.676	.872	1.134	1.237	1.635	2.204	3.070	3.455	3.828	5.348	7.231	7.841	8.558	10.645	12.592	14.449	15.033	16.812	18.548	22.457	6
7	.598	.989	1.239	1.564	1.690	2.167	2.833	3.822	4.255	4.671	6.346	8.383	9.037	9.803	12.017	14.067	16.013	16.622	18.475	20.278	24.322	7
8	.857	1.344	1.646	2.032	2.180	2.733	3.490	4.594	5.071	5.527	7.344	9.524	10.219	11.030	13.362	15.507	17.535	18.168	20.090	21.955	26.125	8
9	1.152	1.735	2.088	2.532	2.700	3.325	4.168	5.380	5.899	6.393	8.343	10.656	11.389	12.242	14.684	16.919	19.023	19.679	21.666	23.589	27.877	9
10	1.479	2.156	2.558	3.059	3.247	3.940	4.865	6.179	6.737	7.267	9.342	11.781	12.549	13.442	15.987	18.307	20.483	21.161	23.209	25.188	29.588	10
11	1.834	2.603	3.053	3.609	3.816	4.575	5.578	6.989	7.584	8.148	10.341	12.899	13.701	14.631	17.275	19.675	21.920	22.618	24.725	26.757	31.264	11
12	2.214	3.074	3.571	4.178	4.404	5.226	6.304	7.807	8.438	9.034	11.340	14.011	14.845	15.812	18.549	21.026	23.337	24.054	26.217	28.300	32.909	12
13	2.617	3.565	4.107	4.765	5.009	5.892	7.042	8.634	9.299	9.926	12.340	15.119	15.984	16.985	19.812	22.362	24.736	25.472	27.688	29.819	34.528	13
14	3.041	4.075	4.660	5.368	5.629	6.571	7.790	9.467	10.165	10.821	13.339	16.222	17.117	18.151	21.064	23.685	26.119	26.873	29.141	31.319	36.123	14
15	3.483	4.601	5.229	5.985	6.262	7.261	8.547	10.307	11.036	11.721	14.339	17.322	18.245	19.311	22.307	24.996	27.488	28.259	30.578	32.801	37.697	15
16	3.942	5.124	5.812	6.614	6.908	7.962	9.312	11.152	11.912	12.624	15.338	18.418	19.369	20.465	23.542	26.296	28.845	29.633	32.000	34.267	39.252	16
17	4.416	5.697	6.408	7.255	7.564	8.672	10.085	12.002	12.792	13.531	16.338	19.511	20.489	21.615	24.769	27.587	30.191	30.995	33.409	35.718	40.790	17
18	4.905	6.265	7.015	7.906	8.231	9.390	10.865	12.857	13.675	14.440	17.338	20.601	21.605	22.760	25.989	28.869	31.526	32.346	34.805	37.156	42.312	18
19	5.407	6.844	7.633	8.567	8.907	10.117	11.651	13.716	14.562	15.352	18.338	21.689	22.718	23.900	27.204	30.144	32.852	33.687	36.191	38.582	43.820	19
20	5.921	7.434	8.260	9.237	9.591	10.851	12.443	14.578	15.452	16.266	19.337	22.775	23.828	25.038	28.412	31.410	34.170	35.020	37.566	39.997	45.315	20
21	6.447	8.034	8.897	9.915	10.283	11.591	13.240	15.445	16.344	17.182	20.337	23.858	24.935	26.171	29.615	32.671	35.479	36.343	38.932	41.401	46.797	21
22	6.983	8.643	9.542	10.600	10.982	12.338	14.041	16.314	17.240	18.101	21.337	24.939	26.039	27.301	30.813	33.924	36.781	37.659	40.289	42.796	48.268	22
23	7.529	9.260	10.196	11.293	11.688	13.091	14.848	17.187	18.137	19.021	22.337	26.018	27.141	28.429	32.007	35.172	38.076	35.968	41.638	44.181	49.728	23
24	8.085	9.886	10.856	11.992	12.401	13.848	15.659	18.062	19.037	19.943	23.337	27.096	28.241	29.553	33.196	36.415	39.364	40.270	42.980	45.558	51.179	24
25	8.649	10.520	11.524	12.697	13.120	14.611	16.473	18.940	19.939	20.867	24.337	28.172	29.339	30.675	34.382	37.652	40.646	41.566	44.314	46.926	52.620	25
26	9.222	11.160	12.198	13.409	13.844	15.379	17.292	19.820	20.843	21.792	25.336	29.246	30.434	31.795	35.563	38.885	41.923	42.856	45.642	48.290	54.052	26
27	9.803	11.808	12.879	14.125	14.573	16.151	18.114	20.703	21.749	22.719	26.336	30.319	31.528	32.912	36.741	40.113	43.194	44.140	46.963	49.645	55.476	27
28	10.391	12.461	13.565	14.847	15.308	16.928	18.939	21.588	22.657	23.647	27.336	31.391	32.620	34.027	37.916	41.337	44.461	45.419	48.278	50.993	56.893	28
29	10.986	13.121	14.256	15.574	16.047	17.708	19.758	22.475	23.567	24.577	28.336	32.461	33.711	35.139	39.087	42.557	45.722	46.693	49.588	52.336	58.302	29
30	11.588	13.787	14.953	16.306	16.791	18.493	20.599	23.364	24.478	25.508	29.336	33.530	34.800	36.250	40.256	43.773	46.979	47.962	50.892	53.672	59.703	30

For values of df) 30, approximate values for X^2 may be obtained from the expression

$$df\left[1 - \frac{2}{9\ df} \pm \frac{x}{\sigma}\sqrt{\frac{2}{9\ df}}\right]^3,$$

where x/o is the normal deviate cutting off the corresponding tails of a normal distribution. If x/o is taken at the 0.02 level, so that 0.01 of the normal distribution is in each tail, the expression yields X^2 at the 0.99 and 0.01 points. For very large values of df, it is sufficiently accurate to compute $\sqrt{2X^2}$, the distribution of which is approximately normal around a mean of $\sqrt{2\ df}$-1 and with a standard deviation of 1. Source: Croxton, Cowden and Klein (1967:672).

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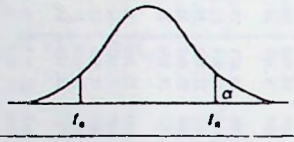
LAMPIRAN 3

t Distribution

[Note: This table refers to critical values for both tails of the curve. Therefore, values in the body of the table indicate probabilities for the null hypothesis]



ν	Level of significance (P)										Level of significance (P)						ν
	.90	80	.70	.60	50	.40	.30	.25	.20	.10	.05	.025	.02	.01	.005	.001	
1	.158	325	.510	.727	1 000	1 376	1.963	2.414	3.078	6 314	12.706	25 452	31 821	63.657	127 32	636 619	1
2	.142	289	.445	.617	.816	1 061	1 386	1.604	1.886	2 920	4.303	6 205	6 965	9.925	14 089	31.598	2
3	.137	277	.424	.584	.765	.978	1 250	1.423	1.638	2.353	3.182	4.176	4 541	5.841	7 453	12.941	3
4	.134	271	.414	.569	.741	.941	1.190	1.344	1.533	2 132	2.776	3 495	3.747	4 601	5 598	8.010	4
5	.132	.267	.408	.559	.727	.920	1.156	1.301	1.476	2.015	2.571	3 163	3.365	4.032	4.773	6.859	5
6	.131	.265	.404	.553	.718	.906	1.134	1.273	1.440	1.943	2 447	2.969	3.143	3.707	4.317	5.959	6
7	.130	.263	.402	.549	.711	.896	1.119	1.254	1.415	1.895	2 365	2.841	2.998	3.499	4.029	5.405	7
8	.130	.262	.399	.546	.706	.889	1.108	1.240	1.397	1.860	2 306	2.752	2.896	3.355	3.832	5.041	8
9	.129	.261	.398	.543	.703	.883	1.100	1.230	1.383	1.833	2 262	2.685	2.821	3.250	3.690	4.781	9
10	.129	.260	.397	.542	.700	.879	1.093	1.221	1.372	1.812	2.228	2.634	2.764	3.169	3.581	4.587	10
11	.129	.260	.396	.540	.697	.876	1.088	1.214	1.363	1.796	2.201	2.593	2.718	3.106	3.497	4.437	11
12	.128	.259	.395	.539	.695	.873	1.083	1.209	1.356	1.782	2.179	2.560	2.681	3.055	3.428	4.318	12
13	.128	.259	.394	.538	.694	.870	1.079	1.204	1.350	1.771	2.160	2.533	2.650	3.012	3.372	4.221	13
14	.128	.258	.393	.537	.692	.868	1.076	1.200	1.345	1.761	2.145	2.510	2.624	2.977	3.326	4.140	14
15	.128	.258	.393	.536	.691	.866	1.074	1.197	1.341	1.753	2.131	2.490	2.602	2.947	3.286	4.073	15
16	.128	.258	.392	.535	.690	.865	1.071	1.194	1.337	1.746	2.120	2.473	2.583	2.921	3.252	4.015	16
17	.128	.257	.392	.534	.689	.863	1.069	1.191	1.333	1.740	2.110	2.458	2.567	2.898	3.222	3.965	17
18	.127	.257	.392	.534	.688	.862	1.067	1.189	1.330	1.734	2.101	2.445	2.552	2.878	3.197	3.922	18
19	.127	.257	.391	.533	.688	.861	1.066	1.187	1.328	1.729	2.093	2.433	2.539	2.861	3.174	3.883	19
20	.127	.257	.391	.533	.687	.860	1.064	1.185	1.325	1.725	2.086	2.423	2.528	2.845	3.153	3.850	20
21	.127	.257	.391	.532	.686	.859	1.063	1.183	1.323	1.721	2.080	2.414	2.518	2.831	3.135	3.819	21
22	.127	.256	.390	.532	.686	.858	1.061	1.182	1.321	1.717	2.074	2.400	2.508	2.819	3.110	3.792	22
23	.127	.256	.390	.532	.685	.858	1.060	1.180	1.319	1.714	2.069	2.398	2.500	2.807	3.104	3.767	23
24	.127	.256	.390	.531	.685	.857	1.059	1.179	1.318	1.711	2.064	2.391	2.492	2.797	3.090	3.745	21
25	.127	.256	.390	.531	.684	.856	1.058	1.178	1.316	1.708	2.060	2.385	2.485	2.787	3.078	3.726	25
26	.127	.256	.390	.531	.684	.856	1.058	1.177	1.315	1.706	2.056	2.379	2.479	2.779	3.067	3.707	26
27	.127	.256	.389	.531	.684	.855	1.057	1.176	1.314	1.703	2.052	2.373	2 473	2.771	3.056	3.690	27
28	.127	.256	.389	.530	.683	.855	1.056	1.175	1.313	1.701	2.048	2.368	2.467	2.763	3.047	3.674	28
29	.127	.256	.389	.530	.683	.854	1.055	1.174	1.311	1.699	2.045	2.364	2.462	2.756	3.038	3.659	29
30	.127	.256	.389	.530	.683	.854	1.055	1.173	1.310	1.697	2.042	2.360	2.457	2.750	3.030	3.646	30
40	.126	.255	.388	.529	.681	.851	1.050	1.167	1.303	1.684	2.021	2.329	2.423	2.704	2.971	3.551	40
60	.126	.254	.387	.527	.679	.848	1.046	1.162	1.296	1.671	2.000	2.299	2.390	2.660	2.915	3.460	60
120	.126	.254	.386	.526	.677	.845	1.041	1.156	1.289	1.658	1.980	2.270	2.358	2.617	2.860	3.373	120
∞	.126	.253	.385	.524	.674	.842	1.036	1.150	1.282	1.645	1.960	2.241	2.326	2.576	2.807	3.291	∞

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