
UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Kedua
Sidang Akademik 2006/2007

April 2007

HGT 219 – KAEDAH KUANTITATIF DAN ANALISIS RUANGAN

Masa : 3 jam

Sila pastikan bahawa kertas peperiksaan ini mengandungi EMPAT BELAS muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

Jawab EMPAT soalan. Jawab DUA soalan dari setiap Bahagian A dan B.

Bahagian A

1. Dalam satu soal selidik yang dijalankan di sebuah kilang di Seberang Perai, didapati staf yang bekerja di kilang tersebut terbahagi kepada 240 orang di bahagian pengeluaran, 100 orang di bahagian jualan, dan 60 orang di bahagian pentadbiran.

- [a] Jika sekiranya min umur 400 orang staf dalam syarikat itu ialah 30.6 tahun, manakala min umur bagi staf di bahagian pengeluaran dan jualan ialah 27.6 dan 32.1. Kira min umur bagi staf bahagian pentadbiran.

[5 markah]

- [b] Syarikat tersebut kemudiannya ingin membuat analisis tentang prestasi jualan barang-barang syarikatnya. Satu sampel 500 jualan telah dipilih secara rawak dan jadual berikut diperolehi:

Jadual 1. Sampel peratusan nilai jualan barang-barang syarikat.

| Nilai Jualan | Peratusan Jualan |
|--------------|------------------|
| 0 - 20 | 35 |
| 20 - 40 | 30 |
| 40 - 60 | 21 |
| 60 - 100 | 10 |
| 100 - 200 | 4 |

Kira sisihan piawai dan persembahkan data di atas dalam bentuk grafik.

[20 markah]

2. Jadual berikut menunjukkan peratusan pelajar wanita yang berijazah daripada Universiti XYZ dari tahun 1980 hingga 2007.

Jadual 2.: Peratusan pelajar wanita Universiti XYZ yang berijazah 1980-2007.

| Tahun | 1980 | 1983 | 1986 | 1989 | 1992 | 1995 | 2000 | 2004 | 2007 |
|----------------------------|------|------|------|------|------|------|------|------|------|
| % pelajar wanita berijazah | 56.4 | 58.8 | 60.7 | 64.4 | 64.1 | 64.2 | 65.7 | 67.8 | 69.4 |
| Jumlah kemasukan pelajar | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 |

...3/-

- [a] Kira persamaan regresi dan plot poin dan garisan di atas kertas graf.
- [b] Berdasarkan persamaan regresi itu, ramalkan peratusan pelajar wanita yang akan berijazah pada tahun berikutnya apabila jumlah pelajar meningkat kepada 7000 orang.

[25 markah]

3. Data Jabatan Statistik Negara menunjukkan 63.9% populasi adalah berkahwin, 7.7% janda dan duda, 6.9% bercerai (tidak berkahwin semula), dan 21.5% bujang. Satu sampel 500 orang dewasa diambil daripada kalangan penduduk Langkawi menunjukkan 310 berkahwin, 40 janda atau duda, 30 bercerai, dan 120 bujang. Pada aras keyakinan 95% ($\alpha = 0.05$), buat konklusi sama ada perangkaan penduduk kawasan Langkawi berbeza dengan Negara?

[25 markah]

4. Amaun (ppm) satu bahan larutan yang hadir dalam dua tahap kedalaman tanah (Jadual 2). Berdasarkan data tersebut bolehkah anda membuat konklusi bahawa tiada terdapat perbezaan amaun bahan larutan tersebut di kedua-dua kedalaman tanah itu. Nyatakan hipotesis anda dan gunakan aras keyakinan 95% ($\alpha = 0.05$).

[25 markah]

Jadual 2. Bahan larutan (ppm) yang terdapat dalam dua tahap kedalaman tanah.

| | <u>20 cm</u> | <u>40 cm</u> |
|--|--------------|--------------|
| | 92 | 98 |
| | 81 | 100 |
| | 75 | 79 |
| | 77 | 80 |
| | 90 | 82 |
| | | 77 |
| | | 82 |
| | | 84 |

Bahagian B

5. Peta 1 menunjukkan taburan kes denggi di Lembangan Sg. Pinang pada tahun 2004 dan Jadual 1 menunjukkan ringkasan analisis yang telah dijalankan terhadap taburan tersebut. Berdasarkan hanya kepada maklumat yang diberikan dalam peta dan jadual tersebut, jawab soalan berikut:

[a] Jelaskan kaedah yang digunakan dalam analisis ini dan uji kesignifikan statistik corak ruang taburan kes denggi berkenaan.

[10 markah]

[b] Huraikan dapatan anda. [5 markah]

[c] Huraikan batasan-batasan kaedah yang digunakan.

[10 markah]

Jadual 1: Ringkasan analisis corak titik kes denggi di Lembangan Sg. Pinang pada tahun 2004.

| Keterangan | Nilai |
|--------------|-------|
| Bilangan kes | 118 |
| Min | 1.18 |
| Varian | 8.65 |
| | |

6. Peta 2 menunjukkan taburan lokasi tapak arkeologi di Lembah Bujang dan Jadual 2 menunjukkan ringkasan analisis yang telah dijalankan terhadap corak tersebut. Berdasarkan hanya kepada maklumat yang diberikan dalam peta dan jadual tersebut, jawab soalan berikut:

[a] Menggunakan kaedah yang sesuai, ukurkan dan uji kesignifikan statistik corak ruang taburan tapak arkeologi tersebut

[10 markah]

[b] Huraikan dapatan anda. [5 markah]

[c] Huraikan batasan-batasan kaedah yang digunakan.

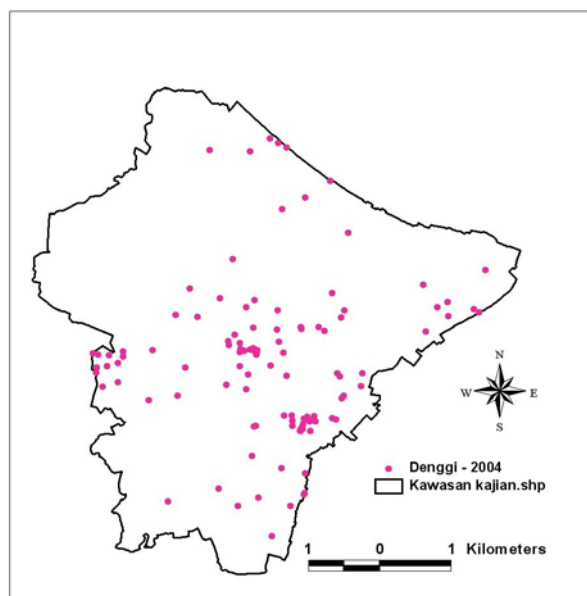
[10 markah]

...5/-

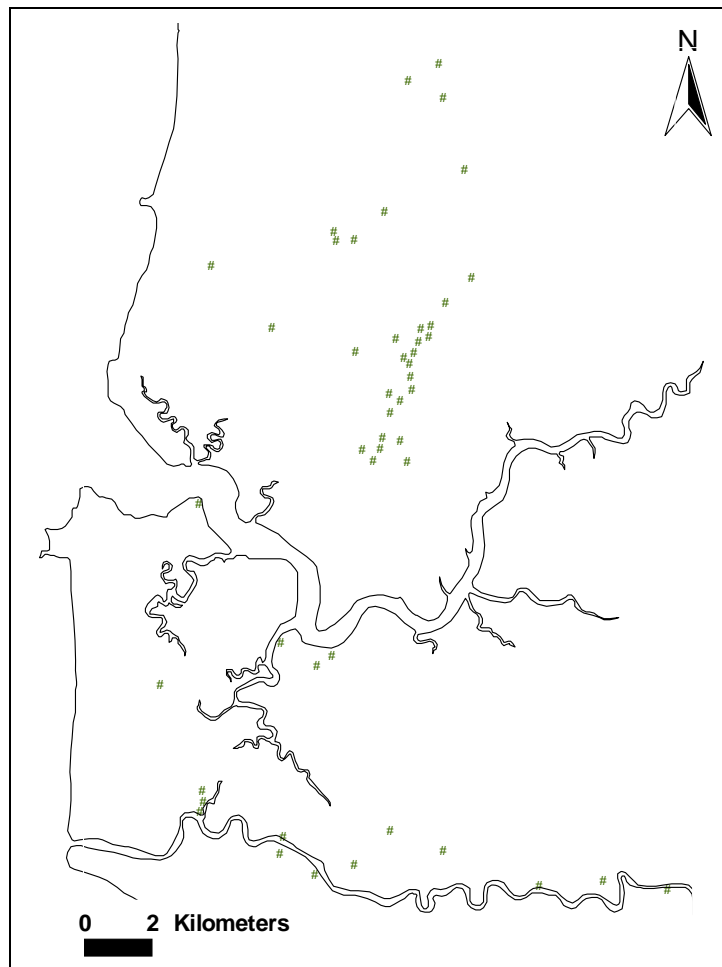
Jadual 2: Ringkasan analisis corak titik tapak arkeologi di Lembah Bujang.

| Keterangan | Nilai |
|---|----------------|
| Bilangan kes (n) | 47 |
| Keluasan | 400 km persegi |
| Purata jarak sebenar (\overline{NNND}) | 5363.9 meter |
| Purata jarak jangkaan (\overline{NNND}_R) | 5552.6 meter |
| Ralat piawai ($\sigma_{\overline{NNND}}$) | 6.533 |

7. [a] Huraikan komponen-komponen analisis ruangan. [10 markah]
- [b] Huraikan kerangka asas analisis ruangan. [15 markah]
8. Berdasarkan kepada contoh-contoh yang sesuai, bincangkan sejauhmana peranan sistem maklumat geografi dalam analisis ruangan. [25 markah]



Peta 1. Taburan Lokasi Kes Denggi di Lembangan Sg. Pinang



Peta 2. Taburan tapak arkeologi di Lembah Bujang.

Formula dan Jadual z, t, dan Chi Ganda Dua :

$$z = \frac{\bar{X} - \mu}{s / \sqrt{n}}$$

$$t = \frac{\bar{X} - \mu}{s / \sqrt{n}}$$

$$\sigma^2 = \frac{\sum X^2}{N} - \left(\frac{\sum X}{N} \right)^2$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{s_p^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

$$t = \frac{\bar{d}}{s_d / \sqrt{n}}$$

Error! Bookmark not defined.

$$s^2 = \frac{\sum (X - \bar{X})^2}{n - 1}$$

$$s^2 = \frac{\sum X^2 - \frac{(\sum X)^2}{n}}{n - 1}$$

$$\sigma^2 = \frac{\sum (X - \mu)^2}{N}$$

$$r = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[n(\sum X^2) - (\sum X)^2][n(\sum Y^2) - (\sum Y)^2]}}$$

Atau,

$$r = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum (X_i - \bar{X})^2 \sum (Y_i - \bar{Y})^2}}$$

$$\sqrt{\sum (X_i - \bar{X})^2 \sum (Y_i - \bar{Y})^2}$$

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

$$b = \frac{n(\sum XY) - (\sum X)(\sum Y)}{n(\sum X^2) - (\sum X)^2}$$

$$a = \frac{\sum Y}{n} - b \frac{\sum X}{n}$$

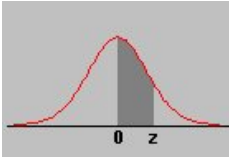
Atau,

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

$$b = \frac{\sum (Xi - \bar{X})(Yi - \bar{Y})}{\sum (Xi - \bar{X})^2}$$

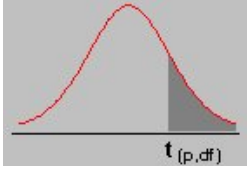
$$x^2 = \sum \left[\frac{(f_0 - f_e)^2}{f_e} \right]$$

Jadual Z (Standard Normal (Z) Table)

| Area between 0 and 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 |

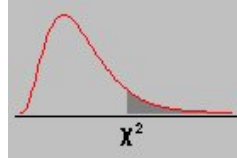
Jadual t (Student's t Table)

| t table with right tail probabilities | | | | | | | | |
|---|-------------|-------------|-------------|-------------|--------------|-------------|--------------|---------------|
|  | | | | | | | | |
| df\p | 0.40 | 0.25 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 | 0.0005 |
| 1 | 0.324920 | 1.000000 | 3.077684 | 6.313752 | 12.70620 | 31.82052 | 63.65674 | 636.6192 |
| 2 | 0.288675 | 0.816497 | 1.885618 | 2.919986 | 4.30265 | 6.96456 | 9.92484 | 31.5991 |
| 3 | 0.276671 | 0.764892 | 1.637744 | 2.353363 | 3.18245 | 4.54070 | 5.84091 | 12.9240 |
| 4 | 0.270722 | 0.740697 | 1.533206 | 2.131847 | 2.77645 | 3.74695 | 4.60409 | 8.6103 |
| 5 | 0.267181 | 0.726687 | 1.475884 | 2.015048 | 2.57058 | 3.36493 | 4.03214 | 6.8688 |
| 6 | 0.264835 | 0.717558 | 1.439756 | 1.943180 | 2.44691 | 3.14267 | 3.70743 | 5.9588 |
| 7 | 0.263167 | 0.711142 | 1.414924 | 1.894579 | 2.36462 | 2.99795 | 3.49948 | 5.4079 |
| 8 | 0.261921 | 0.706387 | 1.396815 | 1.859548 | 2.30600 | 2.89646 | 3.35539 | 5.0413 |
| 9 | 0.260955 | 0.702722 | 1.383029 | 1.833113 | 2.26216 | 2.82144 | 3.24984 | 4.7809 |
| 10 | 0.260185 | 0.699812 | 1.372184 | 1.812461 | 2.22814 | 2.76377 | 3.16927 | 4.5869 |
| 11 | 0.259556 | 0.697445 | 1.363430 | 1.795885 | 2.20099 | 2.71808 | 3.10581 | 4.4370 |
| 12 | 0.259033 | 0.695483 | 1.356217 | 1.782288 | 2.17881 | 2.68100 | 3.05454 | 4.3178 |
| 13 | 0.258591 | 0.693829 | 1.350171 | 1.770933 | 2.16037 | 2.65031 | 3.01228 | 4.2208 |
| 14 | 0.258213 | 0.692417 | 1.345030 | 1.761310 | 2.14479 | 2.62449 | 2.97684 | 4.1405 |
| 15 | 0.257885 | 0.691197 | 1.340606 | 1.753050 | 2.13145 | 2.60248 | 2.94671 | 4.0728 |
| 16 | 0.257599 | 0.690132 | 1.336757 | 1.745884 | 2.11991 | 2.58349 | 2.92078 | 4.0150 |
| 17 | 0.257347 | 0.689195 | 1.333379 | 1.739607 | 2.10982 | 2.56693 | 2.89823 | 3.9651 |
| 18 | 0.257123 | 0.688364 | 1.330391 | 1.734064 | 2.10092 | 2.55238 | 2.87844 | 3.9216 |
| 19 | 0.256923 | 0.687621 | 1.327728 | 1.729133 | 2.09302 | 2.53948 | 2.86093 | 3.8834 |
| 20 | 0.256743 | 0.686954 | 1.325341 | 1.724718 | 2.08596 | 2.52798 | 2.84534 | 3.8495 |
| 21 | 0.256580 | 0.686352 | 1.323188 | 1.720743 | 2.07961 | 2.51765 | 2.83136 | 3.8193 |
| 22 | 0.256432 | 0.685805 | 1.321237 | 1.717144 | 2.07387 | 2.50832 | 2.81876 | 3.7921 |
| 23 | 0.256297 | 0.685306 | 1.319460 | 1.713872 | 2.06866 | 2.49987 | 2.80734 | 3.7676 |

| | | | | | | | | |
|------------|----------|----------|----------|----------|---------|---------|---------|--------|
| 24 | 0.256173 | 0.684850 | 1.317836 | 1.710882 | 2.06390 | 2.49216 | 2.79694 | 3.7454 |
| 25 | 0.256060 | 0.684430 | 1.316345 | 1.708141 | 2.05954 | 2.48511 | 2.78744 | 3.7251 |
| 26 | 0.255955 | 0.684043 | 1.314972 | 1.705618 | 2.05553 | 2.47863 | 2.77871 | 3.7066 |
| 27 | 0.255858 | 0.683685 | 1.313703 | 1.703288 | 2.05183 | 2.47266 | 2.77068 | 3.6896 |
| 28 | 0.255768 | 0.683353 | 1.312527 | 1.701131 | 2.04841 | 2.46714 | 2.76326 | 3.6739 |
| 29 | 0.255684 | 0.683044 | 1.311434 | 1.699127 | 2.04523 | 2.46202 | 2.75639 | 3.6594 |
| 30 | 0.255605 | 0.682756 | 1.310415 | 1.697261 | 2.04227 | 2.45726 | 2.75000 | 3.6460 |
| inf | 0.253347 | 0.674490 | 1.281552 | 1.644854 | 1.95996 | 2.32635 | 2.57583 | 3.2905 |

Jadual Chi Ganda dua (Chi-Square Table)

Right tail areas for the *Chi-square* Distribution



| df\area | .995 | .990 | .975 | .950 | .900 | .750 | .500 | .250 | .100 | .050 | .025 | .010 | .005 |
|-----------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1 | 0.00004 | 0.00016 | 0.00098 | 0.00393 | 0.01579 | 0.10153 | 0.45494 | 1.32330 | 2.70554 | 3.84146 | 5.02389 | 6.63490 | 7.87944 |
| 2 | 0.01003 | 0.02010 | 0.05064 | 0.10259 | 0.21072 | 0.57536 | 1.38629 | 2.77259 | 4.60517 | 5.99146 | 7.37776 | 9.21034 | 10.59663 |
| 3 | 0.07172 | 0.11483 | 0.21580 | 0.35185 | 0.58437 | 1.21253 | 2.36597 | 4.10834 | 6.25139 | 7.81473 | 9.34840 | 11.34487 | 12.83816 |
| 4 | 0.20699 | 0.29711 | 0.48442 | 0.71072 | 1.06362 | 1.92256 | 3.35669 | 5.38527 | 7.77944 | 9.48773 | 11.14329 | 13.27670 | 14.86026 |
| 5 | 0.41174 | 0.55430 | 0.83121 | 1.14548 | 1.61031 | 2.67460 | 4.35146 | 6.62568 | 9.23636 | 11.07050 | 12.83250 | 15.08627 | 16.74960 |
| 6 | 0.67573 | 0.87209 | 1.23734 | 1.63538 | 2.20413 | 3.45460 | 5.34812 | 7.84080 | 10.64464 | 12.59159 | 14.44938 | 16.81189 | 18.54758 |
| 7 | 0.98926 | 1.23904 | 1.68987 | 2.16735 | 2.83311 | 4.25485 | 6.34581 | 9.03715 | 12.01704 | 14.06714 | 16.01276 | 18.47531 | 20.27774 |
| 8 | 1.34441 | 1.64650 | 2.17973 | 2.73264 | 3.48954 | 5.07064 | 7.34412 | 10.21885 | 13.36157 | 15.50731 | 17.53455 | 20.09024 | 21.95495 |
| 9 | 1.73493 | 2.08790 | 2.70039 | 3.32511 | 4.16816 | 5.89883 | 8.34283 | 11.38875 | 14.68366 | 16.91898 | 19.02277 | 21.66599 | 23.58935 |
| 10 | 2.15586 | 2.55821 | 3.24697 | 3.94030 | 4.86518 | 6.73720 | 9.34182 | 12.54886 | 15.98718 | 18.30704 | 20.48318 | 23.20925 | 25.18818 |
| 11 | 2.60322 | 3.05348 | 3.81575 | 4.57481 | 5.57778 | 7.58414 | 10.34100 | 13.70069 | 17.27501 | 19.67514 | 21.92005 | 24.72497 | 26.75685 |
| 12 | 3.07382 | 3.57057 | 4.40379 | 5.22603 | 6.30380 | 8.43842 | 11.34032 | 14.84540 | 18.54935 | 21.02607 | 23.33666 | 26.21697 | 28.29952 |
| 13 | 3.56503 | 4.10692 | 5.00875 | 5.89186 | 7.04150 | 9.29907 | 12.33976 | 15.98391 | 19.81193 | 22.36203 | 24.73560 | 27.68825 | 29.81947 |
| 14 | 4.07467 | 4.66043 | 5.62873 | 6.57063 | 7.78953 | 10.16531 | 13.33927 | 17.11693 | 21.06414 | 23.68479 | 26.11895 | 29.14124 | 31.31935 |
| 15 | 4.60092 | 5.22935 | 6.26214 | 7.26094 | 8.54676 | 11.03654 | 14.33886 | 18.24509 | 22.30713 | 24.99579 | 27.48839 | 30.57791 | 32.80132 |

| | | | | | | | | | | | | | |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 16 | 5.14221 | 5.81221 | 6.90766 | 7.96165 | 9.31224 | 11.91222 | 15.33850 | 19.36886 | 23.54183 | 26.29623 | 28.84535 | 31.99993 | 34.26719 |
| 17 | 5.69722 | 6.40776 | 7.56419 | 8.67176 | 10.08519 | 12.79193 | 16.33818 | 20.48868 | 24.76904 | 27.58711 | 30.19101 | 33.40866 | 35.71847 |
| 18 | 6.26480 | 7.01491 | 8.23075 | 9.39046 | 10.86494 | 13.67529 | 17.33790 | 21.60489 | 25.98942 | 28.86930 | 31.52638 | 34.80531 | 37.15645 |
| 19 | 6.84397 | 7.63273 | 8.90652 | 10.11701 | 11.65091 | 14.56200 | 18.33765 | 22.71781 | 27.20357 | 30.14353 | 32.85233 | 36.19087 | 38.58226 |
| 20 | 7.43384 | 8.26040 | 9.59078 | 10.85081 | 12.44261 | 15.45177 | 19.33743 | 23.82769 | 28.41198 | 31.41043 | 34.16961 | 37.56623 | 39.99685 |
| 21 | 8.03365 | 8.89720 | 10.28290 | 11.59131 | 13.23960 | 16.34438 | 20.33723 | 24.93478 | 29.61509 | 32.67057 | 35.47888 | 38.93217 | 41.40106 |
| 22 | 8.64272 | 9.54249 | 10.98232 | 12.33801 | 14.04149 | 17.23962 | 21.33704 | 26.03927 | 30.81328 | 33.92444 | 36.78071 | 40.28936 | 42.79565 |
| 23 | 9.26042 | 10.19572 | 11.68855 | 13.09051 | 14.84796 | 18.13730 | 22.33688 | 27.14134 | 32.00690 | 35.17246 | 38.07563 | 41.63840 | 44.18128 |
| 24 | 9.88623 | 10.85636 | 12.40115 | 13.84843 | 15.65868 | 19.03725 | 23.33673 | 28.24115 | 33.19624 | 36.41503 | 39.36408 | 42.97982 | 45.55851 |
| 25 | 10.51965 | 11.52398 | 13.11972 | 14.61141 | 16.47341 | 19.93934 | 24.33659 | 29.33885 | 34.38159 | 37.65248 | 40.64647 | 44.31410 | 46.92789 |
| 26 | 11.16024 | 12.19815 | 13.84390 | 15.37916 | 17.29188 | 20.84343 | 25.33646 | 30.43457 | 35.56317 | 38.88514 | 41.92317 | 45.64168 | 48.28988 |
| 27 | 11.80759 | 12.87850 | 14.57338 | 16.15140 | 18.11390 | 21.74940 | 26.33634 | 31.52841 | 36.74122 | 40.11327 | 43.19451 | 46.96294 | 49.64492 |
| 28 | 12.46134 | 13.56471 | 15.30786 | 16.92788 | 18.93924 | 22.65716 | 27.33623 | 32.62049 | 37.91592 | 41.33714 | 44.46079 | 48.27824 | 50.99338 |
| 29 | 13.12115 | 14.25645 | 16.04707 | 17.70837 | 19.76774 | 23.56659 | 28.33613 | 33.71091 | 39.08747 | 42.55697 | 45.72229 | 49.58788 | 52.33562 |
| 30 | 13.78672 | 14.95346 | 16.79077 | 18.49266 | 20.59923 | 24.47761 | 29.33603 | 34.79974 | 40.25602 | 43.77297 | 46.97924 | 50.89218 | 53.67196 |