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Rational Chebyshev Approximations for the Bessel Functions $J_0(x)$, $J_1(x)$, $Y_0(x)$, $Y_1(x)$*

By C. A. Wills, J. M. Blair and P. L. Ragde

Abstract. This report presents near-minimax rational approximations for the Bessel functions $J_0(x)$, $J_1(x)$, $Y_0(x)$, and $Y_1(x)$ for the complete range of x, with relative errors ranging down to 10^{-23}. The first thirty zeros of each function are listed to 35D. The tabulated zeros and the McMahon asymptotic formulae may be used to construct an algorithm which retains relative accuracy in the neighborhood of zeros.

1. Introduction. The Bessel functions of the first and second kinds $J_0(x)$, $J_1(x)$, $Y_0(x)$, and $Y_1(x)$ are among the most commonly used functions in scientific computations, and efficient approximations have wide applicability.

Chebyshev series expansion coefficients are given to 20D in [3] for the ranges $|x| \leqslant 8$ and $x \geqslant 8$; in [10] for the ranges $|x| \leqslant 8$ and $x \geqslant 5$; and to 15D in [14] for $|x| \leqslant 5$. [7] contains rational minimax approximations for $|x| \leqslant 8$ and $x \geqslant 8$ with absolute errors ranging down to 10^{-25}. [4] contains unpublished rational minimax approximations to $J_0(x)$ and $J_1(x)$ for $|x| \leqslant 4$ and $4 \leqslant x \leqslant 8$, and to $Y_\nu(x)$ for $0 \leqslant \nu \leqslant 1$ [5]. A number of other approximations are listed in [10].

The present report gives rational minimax approximations to $J_0(x)$, $J_1(x)$, $Y_0(x)$, and $Y_1(x)$ for small values of x, and to the modulus and phase for larger arguments. An advantage of using the modulus and phase is that fewer function evaluations are necessary. For example, the computation of $J_0(x)$ for $x \geqslant 8$ by the formulae in [7] involves the computation of $P(x)$, $Q(x)$, $\sin \chi$ and $\cos \chi$, whereas the modulus-phase approach involves the computation of $M(x)$, $\theta(x)$ and $\cos \theta$.

Following Cody [4] we have factored the zeros of the function out of the rational approximation wherever possible, thereby providing a form which retains relative accuracy in the neighborhood of zeros. For the remaining ranges, accurate zeros are either listed in the report or are obtainable by the McMahon asymptotic formulae, and a Taylor expansion about each zero provides full relative accuracy in a neighborhood containing the zero. Thus the methods described here provide $J_0(x)$, $J_1(x)$, $Y_0(x)$, and $Y_1(x)$ with full relative accuracy for the complete range of the argument.

2. Functional Properties. $J_n(x)$ and $Y_n(x)$ are linearly independent solutions of the differential equation

$$x^2y'' + xy' + (x^2 - n^2)y = 0.$$

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Ascending series, given in [1], are

$$J_n(x) = (x/2)^n \sum_{k=0}^{\infty} \frac{(-x^2/4)^k}{k!\,(n+k)!}, \tag{1}$$

$$\begin{aligned} Y_n(x) = &-\frac{(x/2)^{-n}}{\pi} \sum_{k=0}^{n-1} \frac{(n-k-1)!}{k!}(x^2/4)^k + \frac{2}{\pi}\ln(x/2)J_n(x) \\ &-\frac{(x/2)^n}{\pi}\sum_{k=0}^{\infty}[\psi(k+1)+\psi(n+k+1)]\frac{(-x^2/4)^k}{k!(n+k)!}, \end{aligned} \tag{2}$$

where $\psi(n) = -\gamma + \sum_{k=1}^{n-1} k^{-1}$ and γ is Euler's constant.

The modulus and phase are defined in [1] as

$$M_n(x) = [J_n^2(x) + Y_n^2(x)]^{1/2}, \tag{3}$$

$$\theta_n(x) = \arctan[Y_n(x)/J_n(x)], \tag{4}$$

so that $J_n(x) = M_n \cos\theta_n$ and $Y_n(x) = M_n \sin\theta_n$.

An asymptotic formula for M_n for large argument is given in [1];

$$M_n^2 \sim \frac{2}{\pi x}\left(1 + \sum_{k=1}^{\infty} a_k x^{-2k}\right), \tag{5}$$

where

$$a_k = \frac{1\cdot 3\cdot 5\cdots(2k-1)}{2\cdot 4\cdot 6\cdots 2k}\,\frac{(\mu-1^2)(\mu-3^2)\cdots[\mu-(2k-1)^2]}{2^{2k}} \quad \text{and}$$

$\mu = 4n^2$.

The corresponding asymptotic formula for θ_n is

$$\theta_n \sim x - (n/2 + 1/4)\pi + \sum_{k=1}^{\infty} b_k x^{-2k+1}. \tag{6}$$

An explicit formula for b_k is not known, but a recursive formula can be developed by substituting (5) and (6) in the identity $M_n^2\theta_n' = 2/(\pi x)$.

The resulting formula is

$$b_k = \left[a_k - \sum_{n=1}^{k-1}(2n-1)a_{k-n}b_n\right]/(2k-1). \tag{7}$$

If $\mathcal{C}$ denotes either J or Y, the derivatives with respect to x are given by

$$\mathcal{C}_0' = -\mathcal{C}_1, \qquad x\mathcal{C}_1' = x\mathcal{C}_0 - \mathcal{C}_1. \tag{8}$$

Repeated differentiation gives the following formulae for the kth derivatives

$$\mathcal{C}_0^{(k)} = -\mathcal{C}_1^{(k-1)}, \qquad \mathcal{C}_1^{(k)} = -\frac{k}{x}\mathcal{C}_1^{(k-1)} + \mathcal{C}_0^{(k-1)} + \frac{(k-1)}{x}\mathcal{C}_0^{(k-2)}, \tag{9}$$

for $k = 1, 2, 3, \ldots$.

The Wronskian

$$J_1(x)Y_0(x) - J_0(x)Y_1(x) = 2/(\pi x) \tag{10}$$

is often used for checking computations.

The McMahon asymptotic expansions for the zeros of $J_n(x)$ and $Y_n(x)$ are [1]

$$j_{n,s},\ y_{n,s} \sim \beta + \sum_{k=1}^{\infty} c_k \beta^{-2k+1}, \tag{11}$$

where $\beta = (s + n/2 - 1/4)\pi$ for $j_{n,s}$, $\beta = (s + n/2 - 3/4)\pi$ for $y_{n,s}$.

Expressions for $c_1, c_2, \ldots, c_7$ are listed in [13], but a general formula for c_k is not known. The c_k may be computed in terms of the b_k by the following algorithm

$$\begin{aligned} c_k = -b_k - \sum_{l=1}^{k-1} b_{k-l} \\ \times \sum_{i=1}^{l} \frac{(-2k+2l+1)(-2k+2l)\cdots(-2k+2l+2-i)}{i!} c_{i,l}, \end{aligned} \tag{12}$$

for $k = 1, 2, 3, \ldots$, where $c_{1,k} \equiv c_k$ and

$$c_{k+1,l} = \sum_{i=1}^{l-k} c_i c_{k,l-i}, \qquad l = k+1, k+2, k+3, \ldots, k = 1, 2, 3, \ldots.$$

(7) and (12) are particular cases of the algorithm in [6].

The derivatives of J_n and Y_n at the zeros may be computed from the formulae

$$J_n'(j_{n,s}) = (-1)^s 2/[\pi j_{n,s} M_n(j_{n,s})],$$

$$Y_n'(y_{n,s}) = (-1)^{s-1} 2/[\pi y_{n,s} M_n(y_{n,s})],$$

and (9).

3. Generation of Approximations. Rational minimax approximations to $J_n(x)$, $Y_n(x)$, $M_n(x)$, and $\theta_n(x)$ were computed in 29S arithmetic on a CDC 6600/CYBER 170 Model 175 computer system using a version of the second algorithm of Remes due to Ralston [9]. The error of the approximations was levelled to three digits in most cases.

The approximation forms and intervals are:

$$\begin{aligned}
J_0(x) &\simeq (x^2 - j_{0,1}^2)(x^2 - j_{0,2}^2)(x^2 - j_{0,3}^2)(x^2 - j_{0,4}^2) R_{lm}(x^2), \qquad 0 \leqslant x \leqslant 14, \\
&= M_0(x)\cos\theta_0(x), \qquad x \geqslant 14, \\
Y_0(x) &\simeq (x^2 - j_{0,1}^2)\ln\frac{x}{y_{0,1}} R_{lm}(x^2) + (x^2 - y_{0,1}^2) S_{lm}(x^2), \qquad 0 < x \leqslant 3.5, \\
&= M_0(x)\sin\theta_0(x), \qquad x \geqslant 3.5, \\
M_0(x) &\simeq x^{-1/2} R_{lm}(1/x^2), \qquad 3.5 \leqslant x \leqslant 14 \text{ and } x \geqslant 14, \\
\theta_0(x) &\simeq x - \frac{\pi}{4} + x^{-1} S_{lm}(1/x^2), \qquad 3.5 \leqslant x \leqslant 14 \text{ and } x \geqslant 14, \qquad (13) \\
J_1(x) &\simeq x(x^2 - j_{1,1}^2)(x^2 - j_{1,2}^2)(x^2 - j_{1,3}^2)(x^2 - j_{1,4}^2) R_{lm}(x^2), \qquad 0 \leqslant x \leqslant 14, \\
&= M_1(x)\cos\theta_1(x), \qquad x \geqslant 14, \\
Y_1(x) &\simeq x(x^2 - j_{1,1}^2)\ln\frac{x}{y_{1,1}} R_{lm}(x^2) + \frac{(x^2 - y_{1,1}^2)}{x y_{1,1}^2} S_{lm}(x^2), \qquad 0 < x \leqslant 5, \\
&= M_1(x)\sin\theta_1(x), \qquad x \geqslant 5, \\
M_1(x) &\simeq x^{-1/2} R_{lm}(1/x^2), \qquad 5 \leqslant x \leqslant 14 \text{ and } x \geqslant 14, \\
\theta_1(x) &\simeq x - \frac{3\pi}{4} + x^{-1} S_{lm}(1/x^2), \qquad 5 \leqslant x \leqslant 14 \text{ and } x \geqslant 14,
\end{aligned}$$

where $R_{lm}(x)$ and $S_{lm}(x)$ are rational functions of degree l in the numerator and m in the denominator. The above forms are the most efficient of a number of different alternatives that were tested.

For the low range of x an approximation to $J_n(x)$ of the form

$$x^n \prod_{i=1}^{4} (x - j_{n,i}) R_{lm}(x)$$

was tried, but was discarded because of slow convergence in the Walsh array.

In the approximation to $Y_n(x)$ in the low range, the two terms in the formula cancel more and more as $x \to y_{n,2}$, and the breakpoint between the two lower ranges had to be somewhat smaller than $y_{n,2}$. For the value chosen, the maximum cancellation is between one and two bits for $Y_0(x)$ and about one bit for $Y_1(x)$. Other forms of approximation to $Y_n(x)$ in the ranges [3.5, 14] and [5, 14], involving the factors $(x - y_{n,i})$, were tested but were discarded because of slow convergence in the Walsh array.

In addition to the approximation to $M_n(x)$ on the previous page, we tested the form $[x^{-1}R_{lm}(1/x^2)]^{1/2}$, since both forms involve the same amount of computation. The latter form proved to be less accurate, for a given degree, and was discarded.

For the rational functions $R_{lm}(x)$ and $S_{lm}(x)$ the relative error of the approximation was minimized.

The master routines are based on the ascending series (1) and (2) for $0 \leqslant x \leqslant 6$, and on the asymptotic series (5) and (6) for $x \geqslant 40$. For the intermediate range $6 \leqslant x \leqslant 40$, $J_n(x)$ and $Y_n(x)$ are computed by Taylor series expansions of the form

$$\mathcal{C}_n(x_0 + h) = \mathcal{C}_n(x_0) + \sum_{m=1}^{N} \frac{h^m}{m!} \mathcal{C}_n^{(m)}(x_0), \tag{14}$$

where $\mathcal{C}_n(x_0)$ is the closest of a set of reference values, and where the derivatives $\mathcal{C}_n^{(m)}(x_0)$ are computed by (9). The table of reference values is constructed by using the Hankel asymptotic expansion at $x = 40$, and then using (14) repeatedly with negative values of h. For $x < 40$, M_n and θ_n are computed directly from (3) and (4).

The zeros $j_{n,1}, j_{n,2}, j_{n,3}, j_{n,4}$, and $y_{n,1}$ were obtained from [11].

For the lowest range of the argument each auxiliary function is computed from the corresponding value of J_n or Y_n if the argument is not close to a zero, and, if the argument is close to a zero, from a Taylor expansion about that zero.

The accuracy of the master routines was established by comparison with values in [8] and [7], with values computed by Brent's multiple-precision package [2], with values computed at the range boundaries, and by differencing. We conclude that the master routines are accurate to at least 26D for $0 < x \leqslant 14$, and to at least 26S for $x \geqslant 14$.

As a check of the zeros $j_{0,s}$, $j_{1,s}$, $y_{0,s}$, and $y_{1,s}$ in [11], we recomputed them with Brent's MP package and found agreement to all digits quoted in [11]. The formulae

$$\sum_{s=1}^{\infty} 1/[j_{0,s} J_1(j_{0,s})] = 1/2$$

and

$$\sum_{s=1}^{\infty} 1/[j_{1,s}^2 J_0(j_{1,s})] = -1/8,$$

combined with the Euler transformation applied to the $j_{0,s}$ and $j_{1,s}$ for $s = 1, 2, \ldots, 50$, gave agreement to 35D.

$y_{0,s}$ and $y_{1,s}$, $s = 1, 2, \ldots, 50$, were substituted in the Wronskian (10), and gave agreement to at least 40D.

The tests also indicate that the McMahon expansions (11) are accurate to 29S for $j_{0,11}, y_{0,12}, j_{1,12}, y_{1,11}$ and larger zeros.

4. Results. The details of the approximations are given in Tables 1–146, in a format similar to that used in [7]. Tables 1–14 summarize the best approximations in the L_∞ Walsh arrays of the functions, and Tables 19–146 give the coefficients of selected approximations. The precision is defined as

$$-\log_{10} \max_x \left| \frac{f(x) - R_{lm}(x)}{f(x)} \right|,$$

where $f(x)$ is the function being approximated, and the maximum is taken over the appropriate interval. Tables 1–146 are in the microfiche supplement attached to the end of this issue.

For completeness we have also listed in Tables 15–18 the zeros $j_{n,s}$ and $y_{n,s}$ to 35D for $s = 1, 2, \ldots, 30$.

For the lowest range of each function the rational approximations are ill-conditioned, those pertaining to $J_0(x)$ and $J_1(x)$ losing up to four significant digits by cancellation, and those pertaining to $Y_0(x)$ and $Y_1(x)$ about one digit. To eliminate the cancellation each numerator was converted to minimal Newton form [12], and the resulting coefficients rounded off by an algorithm similar to that used in [7]. The cancellation also necessitated a modification to the Remes algorithm for certain cases. In particular, the error curve for the last entry in Tables 1 and 8 was levelled to only one digit.

The approximations in Tables 19–146 were verified by comparing them with the master routine for 5000 pseudo random values of the argument in each interval. The resulting precision agreed to three digits with the computed value in the Walsh array, even for the cases in which the error curve was levelled to one digit. In addition J_n and Y_n values computed by (13) were compared with values in [8] and with values computed by the MP package, and in all cases the agreement was as expected.

5. Design of a Subroutine. For the low range of x relative accuracy may be retained in the computation of J_n and Y_n if the terms $(x^2 - c^2)$ and $\ln x/c$ in (13) are evaluated carefully, where c denotes a zero.

In the formula for J_n, let c denote the zero closest to x. Then the difference $(x^2 - c^2)$ should be computed as $(x - c)(x + c)$, and the factor $(x - c)$ computed in double-precision arithmetic, with c accurate to double precision. All other operations may be performed in single precision.

In the formula for Y_n, $(x^2 - c^2)$ should be evaluated in the same manner, where c denotes the closer of $j_{n,1}$ and $y_{n,1}$. If x is close to $y_{n,1}$, $\ln x/y_{n,1}$ may be computed accurately from the series expansion of $\ln[1 + (x - y_{n,1})/y_{n,1}]$. Again, $x - y_{n,1}$ should be computed in double-precision arithmetic.

For the remaining ranges of x, the formulae (13) are not capable of retaining complete accuracy in the neighborhood of zeros, and an alternative formulation is necessary there. We can assess the accuracy attainable with (13) by the following approximate analysis, which pertains to a binary computer with t binary digits in the mantissa of floating-point numbers.

Consider the evaluation of $Y_0(x) = M_0(x)\sin\theta_0(x)$, where

$$\theta_0(x) \simeq x - \pi/4 + x^{-1}S(1/x^2).$$

If x is reduced to the range $[0, \pi)$ by a double-precision range reduction, then the error in the reduced argument is $O(2^{-2t+1}x)$. If the subtraction of $\pi/4$ is again done in double precision, the error in the resulting value is $O(2^{-2t+1}x)$. $x^{-1}S(1/x^2)$ may now be added in single precision, introducing a further error $O(2^{-t-2}/x)$, if $S(1/x^2)$ is accurate to approximately single precision. Thus the total error in the reduced argument $\theta_0(x)$ is $O(2^{-2t+1}x) + O(2^{-t-2}/x)$, and, since the reduced $\theta_0(x)$ is approximately zero, the error in $\sin\theta_0(x)$ is $O(2^{-2t+1}x) + O(2^{-t-2}/x)$.

Let $\delta x = x - c$ be the minimum difference between x and the closest zero c of $Y_0(x)$ for which $\sin\theta_0(x)$, as computed above, gives single-precision accuracy. For this argument x, $\sin\theta_0(x) \simeq \pm\sin\delta x \simeq \pm\delta x$ (assuming $|\delta x| < 1$), and so, by the definition of δx,

$$\left|\frac{2^{-t-2}}{x\,\delta x}\right| = O(2^{-t}), \qquad \therefore |\delta x| = O(1/4x).$$

Thus, if $|\delta x| > O(1/4x)$, $\sin\theta_0(x)$ is accurate to single precision. Now, for a general argument x, the minimum δx possible for a single precision argument is $O(2^{-t+1}x)$, and so it follows that, for $x > O(2^{t/2})$, the above algorithm gives single-precision accuracy at zeros.

We have shown, therefore, that if $x > O(2^{t/2})$, or if $x < O(2^{t/2})$ and $|x - c| > O(1/4x)$, then $\sin\theta_0(x)$ as evaluated above, and hence $Y_0(x)$, is accurate to single precision.

For $x < O(2^{t/2})$ and $|x - c| < O(1/4x)$, $J_n(x)$ and $Y_n(x)$ can be computed accurately by using a Taylor expansion about c. Let $s = [x/\pi - n/2 + 1/4]$ or $s = [x/\pi - n/2 + 3/4]$ in the case of $J_n(x)$ and $Y_n(x)$, respectively (where [ ] denotes "integral part"), and compute

$$\beta = (s + n/2 - 1/4)\pi \quad \text{or} \quad \beta = (s + n/2 - 3/4)\pi.$$

The expansion should be based on $j_{n,s}$ or $y_{n,s}$ if $x - (\beta \pm c_1/\beta) < O(1/4x)$, and $j_{n,s+1}$ or $y_{n,s+1}$ if $x - (\beta + c_1/\beta) > \pi - O(1/4x)$. A typical expansion is

$$J_n(x) = hJ_n'(j_{n,s}) + h^2J_n''(j_{n,s})/2! + h^3J_n'''(j_{n,s})/3! + \cdots,$$

where $h = x - j_{n,s} \cdot h$ should be computed in double-precision arithmetic, with $j_{n,s}$ accurate to double precision, but all other operations may be performed in single precision.

Double-precision values of $j_{n,s}$ and $y_{n,s}$ may be obtained from a table of values, or computed by (11).

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Atomic Energy of Canada Limited
Chalk River Nuclear Laboratories
Chalk River, Ontario K0J 1J0, Canada

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Rational Chebyshev Approximations for the Bessel Functions $J_0(x)$, $J_1(x)$, $Y_0(x)$, $Y_1(x)$, p. 617.

Table 1

$$J_0(x) = \prod_{s=1}^{4}(x^2 - j_{0,s}^2) \sum_{j=0}^{\ell} p_j (x^2-196)^j \Big/ \sum_{j=0}^{m} q_j x^{2j}$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[0,14]	2.72	3	2	19
	4.95	5	2	20
	8.86	7	3	21
	11.79	8	4	22
	14.92	10	4	23
	16.56	10	5	24
	18.26	11	5	25
	21.74	12	6	26
	23.51	13	6	27

Table 2

$$Y_0(x) = (x^2 - j_{0,1}^2)\ln\frac{x}{Y_{0,1}} \sum_{j=0}^{\ell} p_j (x^2-12.25)^j \Big/ \sum_{j=0}^{m} q_j x^{2j} + (x^2 - y_{0,1}^2) S(x^2)$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[0,3.5]	2.61	1	1	28
	4.26	2	1	29
	7.92	4	1	30
	12.15	5	2	31
	14.38	6	2	32
	16.69	6	3	33
	19.13	7	3	34
	24.14	9	3	35

Table 3

$$Y_0(x) \approx (x^2-j_{0,1}^2)\ell n \frac{x}{y_{0,1}} R(x^2) + (x^2-y_{0,1}^2) \sum_{j=0}^{\ell} p_j (x^2-12.25)^j / \sum_{j=0}^{m} q_j x^{2j}$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[0,3.5]	2.35	1	1	36
	3.99	2	1	37
	7.61	4	1	38
	11.79	5	2	39
	14.02	6	2	40
	16.31	6	3	41
	18.73	7	3	42
	23.74	9	3	43

Table 4

$$M_0(x) = x^{-1/2} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[3.5,14]	2.67	0	0	44
	5.80	1	1	45
	8.27	2	2	46
	10.49	3	3	47
	12.55	4	4	48
	14.53	5	5	49
	16.44	6	6	50
	18.31	7	7	51
	20.14	8	8	52
	23.71	10	10	53

Table 5

$$M_0(x) \simeq x^{-1/2} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
$[0,1/196]_z$	3.80	0	0	54
	6.51	0	1	55
	8.86	1	1	56
	12.82	2	2	57
	14.55	2	3	58
	16.20	3	3	59
	17.74	3	4	60
	20.64	4	5	61
	24.63	6	6	62

Table 6

$$\theta_0(x) \simeq x - \pi/4 + x^{-1} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[3.5,14]	3.28	0	1	63
	5.83	1	2	64
	8.07	2	3	65
	10.15	3	4	66
	12.13	4	5	67
	14.04	5	6	68
	15.91	6	7	69
	18.64	8	8	70
	20.42	9	9	71
	23.90	11	11	72

Table 7

$$\theta_0(x) \simeq x - \pi/4 + x^{-1} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
$[0,1/196]_z$	2.88	0	0	73
	5.37	0	1	74
	7.56	1	1	75
	9.52	1	2	76
	11.34	2	2	77
	13.01	2	3	78
	14.61	3	3	79
	16.11	3	4	80
	18.95	4	5	81
	22.83	6	6	82

Table 8

$$J_1(x) \simeq x \prod_{s=1}^{4} (x^2 - j_{1,s}^2) \sum_{j=0}^{\ell} p_j (x^2-196)^j / \sum_{j=0}^{m} q_j x^{2j}$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[0,14]	3.15	3	2	83
	5.44	5	2	84
	8.07	6	3	85
	12.45	8	4	86
	14.02	9	4	87
	17.30	10	5	88
	20.75	12	5	89
	24.29	13	6	90

Table 9

$$Y_1(x) \simeq x(x^2-j_{1,1}^2)\,\ell n\,\frac{x}{y_{1,1}}\,\sum_{j=0}^{\ell} p_j(x^2-25)^j \Big/ \sum_{j=0}^{m} q_j x^{2j} + \frac{(x^2-y_{1,1}^2)}{xy_{1,1}^2}\,S(x^2)$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[0,5]	2.00	1	1	91
	4.92	3	1	92
	8.36	4	2	93
	12.21	6	2	94
	14.26	6	3	95
	16.41	7	3	96
	18.61	8	3	97
	20.86	9	3	98
	23.19	9	4	99

Table 10

$$Y_1(x) \simeq x(x^2-j_{1,1}^2)\,\ell n\,\frac{x}{y_{1,1}}\,R(x^2) + \frac{(x^2-y_{1,1}^2)}{xy_{1,1}^2} \times$$

$$\times\ [p_0+p_1(x^2-25)+x^2 \sum_{j=2}^{\ell} p_j(x^2-25)^{j-1}] \Big/ \sum_{j=0}^{m} q_j x^{2j}$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[0,5]	2.12	3	0	100
	4.96	4	1	101
	8.33	5	2	102
	12.16	7	2	103
	14.18	7	3	104
	16.32	8	3	105
	18.51	9	3	106
	20.75	10	3	107
	23.07	10	4	108

Table 11

$$M_1(x) \simeq x^{-1/2} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[5,14]	2.50	0	0	109
	4.63	1	0	110
	7.89	2	1	111
	11.89	3	3	112
	14.29	4	4	113
	16.57	5	5	114
	18.78	6	6	115
	20.94	7	7	116
	24.08	9	8	117

Table 12

$$M_1(x) \simeq x^{-1/2} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$
λ

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
$[0,1/196]_z$	3.32	0	0	118
	6.21	1	0	119
	8.64	1	1	120
	12.66	2	2	121
	14.41	3	2	122
	16.07	3	3	123
	17.62	4	3	124
	20.54	5	4	125
	24.53	6	6	126

Table 13

$$\theta_1(x) \simeq x - 3\pi/4 + x^{-1} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
[5,14]	2.15	0	0	127
	4.07	0	1	128
	8.44	2	2	129
	10.99	3	3	130
	12.14	3	4	131
	14.44	4	5	132
	16.65	5	6	133
	19.87	7	7	134
	21.96	8	8	135
	24.00	9	9	136

Table 14

$$\theta_1(x) \simeq x - 3\pi/4 + x^{-1} \sum_{j=0}^{\ell} p_j z^j / \sum_{j=0}^{m} q_j z^j, \quad z = 1/x^2$$

RANGE	PRECISION	ℓ	m	TABLE OF COEFFICIENTS
$[0,1/196]_z$	2.96	0	0	137
	5.61	0	1	138
	9.84	1	2	139
	11.66	2	2	140
	13.36	2	3	141
	14.96	3	3	142
	16.48	3	4	143
	17.93	4	4	144
	20.67	5	5	145
	23.23	6	6	146

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Table 25

P00	(7)	.14948 20928 41185 68341 2950
P01	(5)	-.91733 61524 22568 06504 1408
P02	(4)	.17162 53409 77032 29069 29426
P03	(2)	-.15940 61530 98339 41464 58215 2
P04	(-1)	.88539 86594 44178 58984 71317
P05	(-3)	-.32339 99701 99288 23077 89804
P06	(-6)	.81928 32866 42628 89726 4517
P07	(-8)	-.14800 59097 24065 08996 77224
P08	(-11)	.19191 18099 64071 31913 6376
P09	(-14)	-.17515 28892 91554 72140 342
P10	(-17)	.10508 16620 52276 98909 154
P11	(-21)	-.33317 09529 58821 28527 5

Q00	(15)	.91295 37239 25383 20937 02887 5708
Q01	(13)	.35398 49753 12015 84478 23398 2936
Q02	(10)	.62112 85298 92583 91068 05675 6736
Q03	(7)	.62338 79824 34563 45429 63795 4020
Q04	(4)	.36297 72957 26149 51985 25299 7264
Q05	(0)	.99999 99999 99999 99999 99999 998

Table 26

P00	(10)	.38876 80391 09585 90908 67879 71
P01	(9)	-.23844 91990 96843 76179 46648 247
P02	(7)	.44564 04112 85398 97857 34281 292
P03	(5)	-.41354 37059 97827 49467 71803 7902
P04	(3)	.22973 13838 24143 14590 71016 3332
P05	(0)	-.84125 12446 48252 99846 36720 418
P06	(-2)	.21465 47038 84939 42996 15275 9883
P07	(-5)	-.39394 59484 46374 97158 82747 740
P08	(-8)	.52732 03857 53655 32915 41337 83
P09	(-11)	-.51281 79885 12207 68095 08127 3
P10	(-14)	.35194 19585 25010 24678 98604 4
P11	(-17)	-.15737 94220 80423 71430 73432
P12	(-21)	.36080 57427 05061 72922 084

Q00	(19)	.23762 22951 10319 06416 42727 1910
Q01	(16)	.91149 47598 17359 70159 79295 0155
Q02	(14)	.16240 76775 90718 32628 81831 8391
Q03	(11)	.17341 63239 58500 68264 63034 8614
Q04	(8)	.11816 67428 14753 85628 13192 8966
Q05	(4)	.49308 16827 31625 71174 32560 9456
Q06	(0)	.99999 99999 99999 99999 99999 9981

Table 27

P00	(10)	.74775	60485	33535	87861	04089	449
P01	(9)	-.46117	99587	06010	57446	60207	6637
P02	(7)	.87287	13969	93645	90780	25092	4243
P03	(5)	-.82529	09593	60315	37158	57327	4078
P04	(3)	.47016	73272	62552	67854	99865	2557
P05	(1)	-.17798	20890	67089	18089	80982	5192
P06	(-2)	.47424	69337	68945	24133	16794	1155
P07	(-5)	-.92131	27869	04297	57671	50458	1377
P08	(-7)	.13307	89281	07574	23868	69983	3469
P09	(-10)	-.14380	48027	98487	56012	73693	3350
P10	(-13)	.11517	30013	82333	24287	09365	624
P11	(-17)	-.66139	32748	89986	67197	56551	3
P12	(-20)	.25062	68042	45088	43861	70311	2
P13	(-24)	-.49147	93069	58303	47642	3621	
Q00	(19)	.49003	89421	63381	17134	43608	7202
Q01	(17)	.16987	29197	95222	81756	40943	4357
Q02	(14)	.27190	00503	81405	20169	50694	3701
Q03	(11)	.25900	00151	26746	36336	68377	7594
Q04	(8)	.15613	56667	21344	59138	57766	5640
Q05	(4)	.57053	28308	89995	68868	42127	6217
Q06	(0)	.99999	99999	99999	99999	99999	9981

Table 28

P00	(1)	-.13937	06
P01	(0)	.11221	64
Q00	(2)	.25086	153
Q01	(1)	.10000	000

Table 29

P00	(1)	-.24295 5419
P01	(0)	.21242 3053
P02	(-2)	-.51087 885
Q00	(2)	.52670 76349
Q01	(1)	.10000 00000

Table 30

P00	(1)	-.54104 32960 08
P01	(0)	.51989 24163 77
P02	(-1)	-.15716 63731 32
P03	(-3)	.21590 56586 3
P04	(-5)	-.14529 35415 7
Q00	(3)	.13233 14915 4502
Q01	(1)	.10000 00000 000

Table 31

P00	(4)	-.16275 90279 93385 98
P01	(3)	.15389 93071 79208 44
P02	(1)	-.45080 07229 90244 9
P03	(-1)	.59822 36377 80690
P04	(-3)	-.40199 58177 4675
P05	(-5)	.12392 19260 537
Q00	(5)	.39141 15394 29032 994
Q01	(3)	.34305 51303 57363 69
Q02	(1)	.10000 00000 00000 0

Table 32

P00	(4)	-.27390 65549 68637 7157
P01	(3)	.26405 53968 02596 4955
P02	(1)	-.80820 50323 09570 633
P03	(0)	.11634 14895 32709 724
P04	(-3)	-.91268 71527 03922 2
P05	(-5)	.40294 51091 89263 7
P06	(-8)	-.87222 60376 6295
Q00	(5)	.67424 04913 08379 13053
Q01	(3)	.45887 13683 53649 2339
Q02	(1)	.10000 00000 00000 000

Table 33

P00	(6)	-.85852 78246 77332 25274 9
P01	(5)	.81119 10680 75168 56624 8
P02	(4)	-.23775 26245 62644 90177 8
P03	(2)	.31901 03319 95918 29594
P04	(0)	-.22539 23551 84685 4475
P05	(-3)	.85394 48389 51789 12
P06	(-5)	-.14631 86785 70432 2
Q00	(8)	.20648 15831 99978 80161 292
Q01	(6)	.17919 62526 75175 99979 53
Q02	(3)	.64672 57980 90501 20173
Q03	(1)	.10000 00000 00000 0000

Table 34

P00	(7)	-.16907 68886 10051 35420 7692
P01	(6)	.16243 10594 49623 64409 6653
P02	(4)	-.49403 46555 73593 32322 849
P03	(2)	.70728 69474 28936 01998 21
P04	(0)	-.55775 14063 27460 78786 8
P05	(-2)	.25763 31389 51770 69120 1
P06	(-5)	-.68415 46476 77247 6309
P07	(-8)	.86251 15001 53368 09
Q00	(8)	.41471 42544 79652 31830 64828
Q01	(6)	.29247 81603 25869 60684 2579
Q02	(3)	.83848 33679 91673 08957 29
Q03	(1)	.10000 00000 00000 00000 0

Table 35

P00	(7)	-.53901 96315 94916 81628 11732 2112
P01	(6)	.52901 63489 24645 01044 73639 3696
P02	(5)	-.16847 29093 00526 76958 82640 3049
P03	(3)	.26039 47862 81642 48594 41196 154
P04	(1)	-.23154 50667 58157 94135 20357 80
P05	(-1)	.12933 37567 58074 34656 94556 9
P06	(-4)	-.47373 01915 69395 45345 0221
P07	(-6)	.11435 36521 97414 83584 518
P08	(-9)	-.17277 93266 14738 91155 5
P09	(-12)	.13204 13158 95607 3179
Q00	(9)	.13565 75709 55594 63709 20178 0464
Q01	(6)	.66833 52593 63584 90504 46717 547
Q02	(4)	.12941 20177 15908 53519 06894 79
Q03	(1)	.10000 00000 00000 00000 00000 0

Table 36

P00	(1)	.14938 32
P01	(0)	-.18920 10
Q00	(2)	.20832 604
Q01	(1)	.10000 000

Table 37

P00	(1)	.26869 841
P01	(0)	-.35212 836
P02	(-1)	.10383 0382
Q00	(2)	.46983 5223
Q01	(1)	.10000 0000

Table 38

P00	(1)	.61922 38399 04
P01	(0)	-.87284 94601 03
P02	(-1)	.31757 97634 98
P03	(-3)	-.49133 72842 3
P04	(-5)	.36171 97028
Q00	(3)	.12426 95426 845
Q01	(1)	.10000 00000 000

Table 39

P00	(4)	.17996 78635 79003 46
P01	(3)	-.25099 00214 02244 72
P02	(1)	.88760 19472 34476 8
P03	(0)	-.13293 47104 38737 5
P04	(-3)	.97548 67359 4387
P05	(-5)	-.32232 95583 331
Q00	(5)	.35540 44488 64782 36
Q01	(3)	.32545 25859 75531 7
Q02	(1)	.10000 00000 00000 0

Table 40

P00	(4)	.30708 09764 93299 6965
P01	(3)	-.43431 74756 89868 2167
P02	(2)	.16010 42187 34521 4062
P03	(0)	-.25968 01069 42937 304
P04	(-2)	.22213 95245 95699 10
P05	(-4)	-.10491 79827 99093 7
P06	(-7)	.24008 32736 9922
Q00	(5)	.62171 16033 95044 5600
Q01	(3)	.43922 90661 40137 874
Q02	(1)	.10000 00000 00000 00

Table 41

P00	(6)	.92891 25554 24893 24497 1
P01	(6)	-.12955 86679 02750 59005 67
P02	(4)	.45890 29470 50285 03403 8
P03	(2)	-.69559 10718 92243 54847
P04	(0)	.53704 13330 29036 4130
P05	(-2)	-.21804 27168 33896 129
P06	(-5)	.39537 50933 44849 3
Q00	(8)	.18365 79030 43497 23301 09
Q01	(6)	.16483 45341 89213 30228 5
Q02	(3)	.61823 16717 42093 2983
Q03	(1)	.10000 00000 00000 0000

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Table 61

P00	(-3)	.63858 31678 58121 11269 86258
P01	(-1)	.73640 77793 49140 23242 23910
P02	(1)	.22021 61368 19311 07752 5461
P03	(2)	.18214 94183 28523 80717 563
P04	(2)	.28833 09857 05081 48496 0
Q00	(-3)	.80034 53121 28300 35068 15378
Q01	(-1)	.92345 04965 07471 13836 55158
Q02	(1)	.27656 88692 76444 18663 0190
Q03	(2)	.22992 77496 20544 66161 399
Q04	(2)	.37333 13472 94684 52833 2
Q05	(1)	.10000 00000 00000 000

Table 62

P00	(-6)	.10701 03603 20012 56843 69871 7926
P01	(-4)	.26271 24484 85997 43509 07643 3781
P02	(-2)	.20159 27500 01033 71888 84385 4185
P03	(-1)	.58242 72837 47137 75097 74312 877
P04	(0)	.60646 29982 88152 51588 81767 07
P05	(1)	.17997 00561 44264 61010 47463
P06	(0)	.72409 97215 81098 09637 47
Q00	(-6)	.13411 75974 28297 39160 25660 5921
Q01	(-4)	.32934 50492 34663 36130 74909 0780
Q02	(-2)	.25286 34958 85684 42350 80949 6823
Q03	(-1)	.73151 13812 22151 89098 88005 155
Q04	(0)	.76441 59363 90874 08599 37732 37
Q05	(1)	.22969 88239 29893 65985 70015
Q06	(1)	.10000 00000 00000 00000 000

Table 63

P00	(0)	-.28348 14
Q00	(1)	.22698 926
Q01	(1)	.10000 00

Table 64

P00	(-1)	-.99772 2674
P01	(0)	-.48290 1822
Q00	(0)	.79818 49111 3
Q01	(1)	.42773 70171
Q02	(1)	.10000 0000

Table 65

P00	(-1)	-.19261 84719 69
P01	(0)	-.30199 39712 42
P02	(0)	-.65926 31046 2
Q00	(0)	.15409 48098 0454
Q01	(1)	.24961 97461 1053
Q02	(1)	.63175 32603 48
Q03	(1)	.10000 00000 0

Table 66

P00	(-2)	-.26633 64804 31552
P01	(-1)	-.86952 45469 0106
P02	(0)	-.62001 44217 6719
P03	(0)	-.82525 43396 811
Q00	(-1)	.21306 91861 65299 8
Q01	(0)	.70671 68957 02842 9
Q02	(1)	.52924 95256 47962
Q03	(1)	.84503 79644 8168
Q04	(1)	.10000 00000 000

Table 67

P00	(-3)	-.29498	38954	95993	34
P01	(-1)	-.16430	52925	14899	71
P02	(0)	-.24469	78571	78998	31
P03	(1)	-.10688	01768	08973	06
P04	(0)	-.98557	70187	27502	

Q00	(-2)	..23598	71165	12026	143
Q01	(0)	.13267	33327	89317	547
Q02	(1)	.20227	27314	44266	657
Q03	(1)	.94123	66392	83702	36
Q04	(2)	.10696	19287	28938	54
Q05	(1)	.10000	00000	00000	

Table 68

P00	(-4)	-.27795	79066	37698	559
P01	(-2)	-.23545	28402	03787	4278
P02	(-1)	-.59979	13092	88994	4169
P03	(0)	-.54832	35595	49610	3130
P04	(1)	-.16637	90872	91700	0115
P05	(1)	-.11424	78521	78094	888

Q00	(-3)	.22236	63253	18108	57470
Q01	(-1)	.18952	04300	39591	33189
Q02	(0)	.48933	10947	23694	50408
Q03	(1)	.46125	87531	60577	33137
Q04	(2)	.15099	02046	47773	32688
Q05	(2)	.13063	50911	14922	8957
Q06	(1)	.10000	00000	00000	00

Table 69

P00	(-5)	-.23125	06761	18087	10342	
P01	(-3)	-.27638	35226	44865	22186	3
P02	(-1)	-.10735	07066	22251	84758	34
P03	(0)	-.16816	37969	04305	69514	84
P04	(1)	-.10695	27154	02689	40041	01
P05	(1)	-.24206	02553	96667	64922	8
P06	(1)	-.12971	98186	69122	48964	
Q00	(-4)	.18500	05408	95056	78395	3
Q01	(-2)	.22207	03625	93670	99035	69
Q02	(-1)	.87006	16530	14288	02843	36
Q03	(1)	.13871	45363	86924	92036	812
Q04	(1)	.91584	46243	94744	72555	37
Q05	(2)	.22611	30768	07861	73246	56
Q06	(2)	.15556	29964	98904	52539	2
Q07	(1)	.10000	00000	00000	0000	

Table 70

P00	(-8)	-.62785	23539	69707	00067	414	
P01	(-5)	-.11449	13567	56603	45584	69131	
P02	(-4)	-.73332	71636	69595	78227	38888	
P03	(-2)	-.21073	72378	43309	36612	11207	
P04	(-1)	-.28805	40216	16150	99401	28456	
P05	(0)	-.18295	65065	94559	81692	33021	
P06	(0)	-.48708	82841	67550	04239	5339	
P07	(0)	-.42291	00124	36828	29899	817	
P08	(-1)	-.54748	76936	45597	22995	4	
Q00	(-7)	.50228	18831	75821	37616	5670	
Q01	(-5)	.91854	69055	26970	47934	83469	
Q02	(-3)	.59136	16187	09507	52068	75247	7
Q03	(-1)	.17152	23807	24558	28806	34012	4
Q04	(0)	.23849	61587	38669	69646	37635	6
Q05	(1)	.15653	51596	20516	54713	10814	9
Q06	(1)	.44580	68790	50105	84466	15741	
Q07	(1)	.45327	01724	45777	01323	7001	
Q08	(1)	.10000	00000	00000	00000	000	

P00	(-9)	-.39545	33153	29009	82258	93454	
P01	(-7)	-.91328	43730	85233	48281	06070	1
P02	(-5)	-.76844	43911	39726	04464	82783	3
P03	(-3)	-.30406	97003	56627	67560	40852	57
P04	(-2)	-.60987	63616	42016	29252	00891	20
P05	(-1)	-.62323	82098	27715	61109	79174	31
P06	(0)	-.30953	02798	49467	57086	25128	26
P07	(0)	-.66532	35708	90317	73504	09285	7
P08	(0)	-.47776	47262	86506	71716	85813	
P09	(-1)	-.52121	25703	26227	39124	511	
Q00	(-8)	.31636	26522	63212	24941	54166	4
Q01	(-6)	.73227	52206	15324	85492	99992	13
Q02	(-4)	.61851	64061	77042	37271	36295	83
Q03	(-2)	.24635	85751	64099	14177	73551	247
Q04	(-1)	.49978	53036	46616	41786	60703	662
Q05	(0)	.52117	72659	57808	67515	67369	760
Q06	(1)	.26872	51819	97415	36811	54979	458
Q07	(1)	.62218	22223	93576	29102	86099	06
Q08	(1)	.52871	50223	58191	91366	96876	0
Q09	(1)	.10000	00000	00000	00000	00000	

Table 72

P00	(-11)	-.13260	98510	22249	27966	58278	139
P01	(-9)	-.45574	89339	63250	35315	87276	8532
P02	(-7)	-.60151	52467	54584	37504	19444	8304
P03	(-5)	-.39833	25153	24941	92045	27714	6247
P04	(-3)	-.14517	94386	67856	16156	70183	5646
P05	(-2)	-.30076	43544	80162	02303	69495	2288
P06	(-1)	-.35346	13522	70704	38380	44682	5733
P07	(0)	-.22837	02697	90105	80705	79565	3650
P08	(0)	-.75809	96049	20521	99868	27732	6354
P09	(1)	-.11368	00227	06142	36718	09328	5272
P10	(0)	-.58926	72329	19990	06948	16349	5228
P11	(-1)	-.47697	78082	78299	45345	15239	67
Q00	(-10)	.10608	78808	17799	45445	58165	6083
Q01	(-8)	.36515	16882	16525	73209	66758	1252
Q02	(-6)	.48309	62428	16865	68373	89222	5031
Q03	(-4)	.32112	23087	93369	52754	84655	1030
Q04	(-2)	.11773	96547	60994	75986	08714	4977
Q05	(-1)	.24626	22801	35109	49981	27377	6691
Q06	(0)	.29396	54864	77411	47170	75289	7908
Q07	(1)	.19497	98624	44123	69460	13449	5866
Q08	(1)	.67774	22648	74694	68899	18347	2137
Q09	(2)	.11082	45831	16824	83635	51092	9211
Q10	(1)	.69218	70906	30599	73647	23147	2350
Q11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 73

P00	(0)	-.12483 63

Table 74

P00	(0)	-.24321 6949
Q00	(1)	.19457 43965 9
Q01	(1)	.10000 000

Table 75

P00	(-1)	-.40128 61992 78
P01	(0)	-.10410 36634
Q00	(0)	.32102 89681 668
Q01	(1)	.10000 00000 0

Table 76

P00	(-1)	-.48043 54151 253
P01	(0)	-.36944 16147 84
Q00	(0)	.38434 83322 15775
Q01	(1)	.31557 13581 926
Q02	(1)	.10000 00000 0

Table 77

P00	(-2)	-.40872 81668 20474
P01	(-1)	-.68533 13978 4708
P02	(-1)	-.95049 16397 56
Q00	(-1)	.32698 25334 57890 3
Q01	(0)	.56529 54569 85354
Q02	(1)	.10000 00000 0000

Table 78

P00	(-2)	-.37798 02080 07502 52
P01	(0)	-.11249 14322 44983 85
P02	(0)	-.46009 13930 17871
Q00	(-1)	.30238 41664 06031 245
Q01	(0)	.91568 06332 48822 99
Q02	(1)	.41069 51655 87901 5
Q03	(1)	.10000 00000 000

Table 79

P00	(-3)	-.21736 85562 58149 3627
P01	(-1)	-.10432 01991 71354 8141
P02	(-1)	-.91799 92105 21894 78
P03	(-1)	-.89348 05307 6621
Q00	(-2)	.17389 48450 06519 91969
Q01	(-1)	.84361 86165 47350 0166
Q02	(0)	.77542 23825 83396 881
Q03	(1)	.10000 00000 00000 0

Table 80

P00	(-3)	-.17131 98622 19550 32064 1
P01	(-1)	-.12165 72935 83560 25023
P02	(0)	-.18755 81854 48566 3313
P03	(0)	-.53423 69409 11398 14
Q00	(-2)	.13705 58897 75640 26708 34
Q01	(-1)	.98039 66762 60933 39587 6
Q02	(1)	.15492 29982 83888 94633
Q03	(1)	.49343 77014 83753 363
Q04	(1)	.10000 00000 00000 0

Table 81

P00	(-5)	-.53163	91840	76602	83929	034	
P01	(-3)	-.71471	28252	57230	88810	905	
P02	(-1)	-.25791	29837	58615	23563	823	
P03	(0)	-.27165	94441	66338	19674	2	
P04	(0)	-.59899	47737	41924	7092		

Q00	(-4)	.42531	13472	61282	27148	0469
Q01	(-2)	.57398	54234	72770	53348	2333
Q02	(0)	.20924	85883	15250	26531	0283
Q03	(1)	.22731	93319	11403	08435	14
Q04	(1)	.56923	25399	30122	65725	
Q05	(1)	.10000	00000	00000	000	

Table 82

P00	(-8)	-.37821	00773	38777	99893	23684	22
P01	(-5)	-.10421	17433	47611	87167	73307	528
P02	(-4)	-.91390	09970	07620	47110	08218	93
P03	(-2)	-.30942	15184	28176	11153	78538	5
P04	(-1)	-.39142	65981	83816	31215	60795	
P05	(0)	-.14859	68892	41177	93815	0180	
P06	(-1)	-.79097	79932	48585	16111	7	

Q00	(-7)	.30256	80618	71022	39914	58990	283
Q01	(-5)	.83526	98221	03139	88174	39892	004
Q02	(-3)	.73542	04338	36260	50064	55658	380
Q03	(-1)	.25123	14563	07348	45329	06465	38
Q04	(0)	.32509	70478	09407	61392	70655	6
Q05	(1)	.13241	74315	02616	66614	42746	
Q06	(1)	.10000	00000	00000	00000	000	

Table 83

P00	(-4)	.20299	176		
P01	(-6)	-.62769	0786		
P02	(-8)	.64080	9312		
P03	(-10)	-.51237	9953		
Q00	(5)	.20601	73206	16362	52
Q01	(3)	.19379	37619	80724	71
Q02	(1)	.10000	00000	00000	000

Table 84

P00	(-4)	.44898 14054
P01	(-5)	-.14594 95139 6
P02	(-7)	.18465 15149 39
P03	(-9)	-.12612 86344 74
P04	(-12)	.47490 15174 9
P05	(-14)	-.14889 80143 03
Q00	(5)	.82890 01096 11519 4464
Q01	(3)	.47496 66683 22594 0125
Q02	(1)	.10000 00000 00000 0000

Table 85

P00	(-1)	.38569 44034 491
P01	(-2)	-.12308 44056 7225
P02	(-4)	.15185 00575 19334
P03	(-7)	-.99360 49263 1183
P04	(-9)	-.38782 93413 1570
P05	(-12)	-.91857 62355 595
P06	(-14)	.13076 54876 7235
Q00	(8)	.67008 77958 96675 76769 11
Q01	(6)	.38048 43679 83080 45847 16
Q02	(3)	.91275 71468 76670 49575 0
Q03	(1)	.10000 00000 00000 00000 00

Table 86

P00	(2)	.84826	20109	19323	98		
P01	(1)	-.27432	32344	33912	366		
P02	(-1)	.34660	87159	36235	4302		
P03	(-3)	-.23637	88060	04651	0891		
P04	(-6)	.99185	99383	81542	647		
P05	(-8)	-.27215	70769	31295	9196		
P06	(-11)	.49643	65756	15462	900		
P07	(-14)	-.57986	70431	36691	38		
P08	(-17)	.36955	38273	55745	0		
Q00	(12)	.16832	00899	93005	40524	06537	00
Q01	(9)	.79913	72160	71670	12884	32535	2
Q02	(7)	.16769	01071	57409	34384	48726	1
Q03	(4)	.18882	35677	69859	37374	53914	0
Q04	(1)	.10000	00000	00000	00000	00000	

Table 87

P00	(3)	.14733	65624	91392	3534		
P01	(1)	-.48403	16668	91031	24307		
P02	(-1)	.62707	78526	24984	85860		
P03	(-3)	-.44345	63477	37703	41328		
P04	(-5)	.19592	08707	39328	09441	8	
P05	(-8)	-.57907	66332	83208	36569		
P06	(-10)	.11818	44813	27759	24759		
P07	(-13)	-.16653	62193	82123	3350		
P08	(-16)	.15438	27144	62720	9573		
P09	(-20)	-.79209	96531	98236	77		
Q00	(12)	.32668	08396	34565	27909	15278	690
Q01	(10)	.13500	46013	40775	10408	73025	120
Q02	(7)	.24320	12558	04672	73220	26381	392
Q03	(4)	.23070	88173	24016	18054	94102	29
Q04	(1)	.10000	00000	00000	00000	00000	0

Table 88

P00	(6)	.29001	47709	98102	42530	27	
P01	(4)	-.94966	90519	69751	00379	195	
P02	(3)	.12250	18946	07943	86072	9088	
P03	(0)	-.86253	60649	33020	96117	396	
P04	(-2)	.38002	55604	71199	68408	4702	
P05	(-4)	-.11252	75127	68698	79077	1041	
P06	(-7)	.23246	27080	22246	89089	912	
P07	(-10)	-.33918	02217	85585	52000	53	
P08	(-13)	.34407	42671	70818	04416	33	
P09	(-16)	-.22724	75441	36718	12037	4	
P10	(-20)	.78744	27397	63408	1298		
Q00	(15)	.63717	05740	40533	69932	10003	2182
Q01	(13)	.26230	90563	65019	01674	32603	3140
Q02	(10)	.49093	25879	74359	01828	41919	6600
Q03	(7)	.52853	00187	40065	81960	03300	1593
Q04	(4)	.33253	42922	75896	11620	01663	6228
Q05	(0)	.99999	99999	99999	99999	99999	998

Table 89

P00	(6)	.93120	36319	14513	68868	71506	
P01	(5)	-.31177	92427	35663	77076	91157	80
P02	(3)	.41626	19277	53886	80718	83211	81
P03	(1)	-.30750	44187	57804	04514	50202	86
P04	(-1)	.14451	79583	21058	61004	58782	184
P05	(-4)	-.46637	44438	01798	29433	86963	78
P06	(-6)	.10816	36814	63618	95593	55130	27
P07	(-9)	-.18513	08184	39336	83021	03298	4
P08	(-12)	.23654	95366	51135	73527	27736	2
P09	(-15)	-.22466	79473	00219	43783	15968	
P10	(-18)	.15432	73980	13214	12705	0139	
P11	(-22)	-.71141	90603	23767	22478	982	
P12	(-25)	.17556	95004	80043	95761	31	
Q00	(16)	.23850	61753	12803	12263	92714	2798
Q01	(13)	.78483	32318	86301	31515	58102	2851
Q02	(11)	.11558	30025	70009	44027	40904	9189
Q03	(7)	.96068	50934	32748	29529	93880	0131
Q04	(4)	.45557	66612	64923	13473	93437	5886
Q05	(0)	.99999	99999	99999	99999	99999	9981

Table 90

P00	(10)	.26986	70038	11352	44316	15620	4964
P01	(8)	-.90176	75690	80037	33883	80979	9822
P02	(7)	.12007	20456	63397	43291	07669	5535
P03	(4)	-.88434	85474	33530	76915	56871	6418
P04	(2)	.41448	77690	04247	89867	34527	0330
P05	(0)	-.13355	06055	06029	36758	79335	2234
P06	(-3)	.31004	56751	37885	65556	98860	5205
P07	(-6)	-.53379	79988	16690	71517	76670	5530
P08	(-9)	.69224	30900	72402	14935	17154	2631
P09	(-12)	-.67844	76576	41606	51182	97457	757
P10	(-15)	.49683	23159	53018	57241	82233	71
P11	(-18)	-.26257	63531	59569	85512	02774	25
P12	(-22)	.92036	48356	03006	19197	98818	
P13	(-25)	-.16751	62799	21274	57170	0417	
Q00	(19)	.68573	00317	48900	22953	31374	1258
Q01	(17)	.22662	55663	71126	46000	15300	0006
Q02	(14)	.34492	39475	86812	85396	24864	8017
Q03	(11)	.31148	55341	78616	63294	36492	6292
Q04	(8)	.17739	07090	08663	98418	25548	1197
Q05	(4)	.60974	92038	27939	03967	29757	9980
Q06	(0)	.99999	99999	99999	99999	99999	9981

Table 91

P00	(0)	-.20607	1
P01	(-1)	.14968	33
Q00	(2)	.26497	890
Q01	(1)	.10000	0000

Table 92

P00	(0)	-.49253 3731
P01	(-1)	.36707 01976
P02	(-3)	-.86537 1815
P03	(-5)	.95112 542
Q00	(2)	.96846 09262 2
Q01	(1)	.10000 00000 0

Table 93

P00	(3)	-.13096 26454 741
P01	(1)	.95515 69069 298
P02	(0)	-.21866 93900 307
P03	(-2)	.21908 80766 77
P04	(-5)	-.95956 60178 6
Q00	(5)	.25110 37428 88197
Q01	(3)	.26650 39594 0456
Q02	(1)	.10000 00000 0000

Table 94

P00	(3)	-.37328 28672 18625 08
P01	(2)	.28658 53788 40984 86
P02	(0)	-.73435 86789 78936 34
P03	(-2)	.91354 16230 05872 9
P04	(-4)	-.63482 86598 73246
P05	(-6)	.25426 14774 33927
P06	(-9)	-.51910 48562 918
Q00	(5)	.79282 44466 40072 382
Q01	(3)	.49746 03427 02346 787
Q02	(1)	.10000 00000 00000 00

Table 95

P00	(6)	-.13020 20114 56138 4990
P01	(4)	.97628 93991 26582 5277
P02	(3)	-.23858 66247 99477 8895
P03	(1)	.27549 71430 36142 112
P04	(-b)	-.17165 16215 53591 337
P05	(-4)	.58647 23355 10818 2
P06	(-7)	-.93139 50877 41343
Q00	(8)	.26463 53567 18163 84971 8
Q01	(6)	.21166 22318 28460 45443
Q02	(3)	.70254 20532 21274 3374
Q03	(1)	.10000 00000 00000 000

Table 96

P00	(6)	-.24760 17926 52527 41902 1
P01	(5)	.18907 22917 73495 97024 90
P02	(3)	-.47993 57093 78080 49092 7
P03	(1)	.59116 06052 53432 22151
P04	(-1)	-.41022 37311 28822 53525
P05	(-3)	.16991 56013 33390 3385
P06	(-6)	-.41208 17107 40655 423
P07	(-9)	.48574 49149 77159 6
Q00	(8)	.52139 36987 01854 07142 563
Q01	(6)	.34125 44113 64408 75227 24
Q02	(3)	.90591 54921 41895 59421 5
Q03	(1)	.10000 00000 00000 00000

Table 97

P00	(6)	-.44206	06316	64703	01796	451	
P01	(5)	.34214	41074	34521	57626	3525	
P02	(3)	-.89254	78599	57577	94209	370	
P03	(2)	.11496	76166	69222	15233	861	
P04	(-1)	-.85576	16184	35589	10704	68	
P05	(-3)	.39672	39664	02055	75113	8	
P06	(-5)	-.11721	1[illegible]28	76047	61944	7	
P07	(-8)	.21230	06490	96124	9958		
P08	(-11)	-.19314	70247	11626	33		
Q00	(8)	.95593	68378	23433	56718	38872	
Q01	(6)	.52162	95697	57600	15285	3857	
Q02	(4)	.11334	02547	03917	20534	6133	
Q03	(1)	.10000	00000	00000	00000	00	

Table 98

P00	(6)	-.74948	40835	52947	95013	54570	
P01	(5)	.58607	36500	14057	65391	95188	5
P02	(4)	-.15604	24690	08402	27509	68823	4
P03	(2)	.20763	89722	59504	99903	04243	
P04	(0)	-.16231	44956	84898	41305	45500	
P05	(-3)	.81014	27767	72721	72414	021	
P06	(-5)	-.26881	85626	13405	40798	431	
P07	(-8)	.59527	64732	95516	84333	3	
P08	(-11)	-.83610	84260	33883	2652		
P09	(-14)	.60496	10764	26828	470		
Q00	(9)	.16542	09156	28346	92850	90171	514
Q01	(6)	.76430	83123	49907	38342	71989	0
Q02	(4)	.13849	74248	88346	52281	39922	7
Q03	(1)	.10000	00000	00000	00000	0000	

Table 99

P00	(9)	-.49021 69289 96935 89095 90583 099
P01	(8)	.37887 00099 71689 89776 47469 313
P02	(6)	-.98606 97420 47008 39755 11624 520
P03	(5)	.12679 19780 20370 47647 51433 354
P04	(2)	-.94542 09365 26442 76315 77261 3
P05	(0)	.44330 54923 37280 29789 19913 1
P06	(-2)	-.13563 95773 91295 59396 51633
P07	(-5)	.27041 43017 90737 13920 6859
P08	(-8)	-.33084 37294 51362 01058 36
P09	(-11)	.19811 28563 28684 43769
Q00	(12)	.10578 28193 09925 49776 07431 4239
Q01	(9)	.58334 85238 55804 31338 12775 7567
Q02	(7)	.14031 15784 39292 43805 18191 754
Q03	(4)	.17675 97280 84814 38454 77862 05
Q04	(1)	.10000 00000 00000 00000 00000

Table 100

P00	(0)	.38499 26
P01	(-1)	-.10257 45
P02	(-3)	-.99144 1
P03	(-4)	.88653 3

Table 101

P00	(2)	.41030 25119
P01	(0)	-.45656 6286
P02	(0)	-.13721 56329
P03	(-2)	.48588 1125
P04	(-4)	-.64130 874
Q00	(2)	.82380 3953
Q01	(1)	.10000 00000

Table 102

P00	(5)	.10450 83687 0218
P01	(3)	-.11075 40638 660
P02	(2)	-.34640 97647 000
P03	(1)	.11944 57068 158
P04	(-1)	-.14611 16860 58
P05	(-4)	.72567 86922 3
Q00	(5)	.20765 43798 715
Q01	(3)	.23840 70518 719
Q02	(1)	.10000 00000 00

Table 103

P00	(5)	.31529 54135 59965 38
P01	(3)	-.52791 22787 04107 20
P02	(3)	-.10218 16964 28659 71
P03	(1)	.40436 55506 69910 3
P04	(-1)	-.61755 69053 96536 5
P05	(-3)	.48943 49415 00294
P06	(-5)	-.21556 62247 7158
P07	(-8)	.47269 10861 318
Q00	(5)	.70257 55445 39365 43
Q01	(3)	.46530 36544 84571 8
Q02	(1)	.10000 00000 00000

Table 104

P00	(8)	.10489 91483 58853 28361
P01	(6)	-.14945 09100 32166 8417
P02	(5)	-.34271 90179 56230 3015
P03	(4)	.12822 17142 21833 1849
P04	(2)	-.18175 28683 60134 052
P05	(0)	.12931 94178 37777 578
P06	(-3)	-.48672 42651 42390 5
P07	(-6)	.83271 64077 3054
Q00	(8)	.22346 44320 54671 6901
Q01	(6)	.18722 06165 80078 6967
Q02	(3)	.65648 11592 66024 83
Q03	(1)	.10000 00000 00000 00

Table 105

P00	(8)	.20417 96894 49057 51578 30
P01	(6)	-.33393 06382 10082 53297 8
P02	(5)	-.66198 95967 02600 89168 5
P03	(4)	.25939 44637 98960 40804 0
P04	(2)	-.39267 47810 00176 45785
P05	(0)	.31122 90776 17902 7349
P06	(-2)	-.14203 94275 29152 7491
P07	(-5)	.37145 39422 32842 39
P08	(-8)	-.46512 66523 59789
Q00	(8)	.45185 89611 68870 57499 3
Q01	(6)	.30793 62609 90701 83211 4
Q02	(3)	.85665 58332 22222 0197
Q03	(1)	.10000 00000 00000 000

Table 106

P00	(8)	.37108	72279	66610	48077	918
P01	(6)	-.66697	24732	75913	51646	374
P02	(6)	-.11955	04519	48597	50702	2065
P03	(4)	.48461	75629	79315	38342	683
P04	(2)	-.76785	72335	38729	03850	28
P05	(0)	.65286	01465	06453	20932	1
P06	(-2)	-.33347	72483	93308	96177	6
P07	(-4)	.10626	19263	89562	05928	
P08	(-7)	-.20462	91067	26072	814	
P09	(-10)	.19581	86247	96144	75	
Q00	(8)	.84482	19323	84230	25211	123
Q01	(6)	.47771	31520	03713	35445	42
Q02	(4)	.10810	07969	03112	20740	71
Q03	(1)	.10000	00000	00000	00000	

Table 107

P00	(8)	.63803	84658	30724	14808	61248	4
P01	(7)	-.12276	92737	99977	65279	65709	0
P02	(6)	-.20447	41359	43376	43633	46509	9
P03	(4)	.85048	79008	93395	49334	67056	
P04	(3)	-.13930	80736	47275	56335	72635	
P05	(1)	.12439	28622	88223	27378	7410	
P06	(-2)	-.68402	34491	90933	47396	676	
P07	(-4)	.24478	66706	47433	92551	90	
P08	(-7)	-.57642	15463	90718	64275		
P09	(-10)	.85224	09969	79882	2919		
P10	(-13)	-.64388	23327	29963	77		
Q00	(9)	.14843	42289	30145	72406	24265	1
Q01	(6)	.70794	40883	12729	54900	2266	
Q02	(4)	.13295	00361	48540	55562	6430	
Q03	(1)	.10000	00000	00000	00000	00	

Table 108

P00	(11)	.40489	63600	75052	76000	65719	626
P01	(9)	-.72471	90548	32039	57218	89482	59
P02	(9)	-.13043	31545	56085	90706	88819	191
P03	(7)	.52763	57996	93596	02603	59607	66
P04	(5)	-.83505	32867	18032	82749	54580	18
P05	(3)	.71172	62808	08521	64881	15549	0
P06	(1)	-.36799	08248	11944	01432	21538	
P07	(-1)	.12154	33144	52373	85343	81078	
P08	(-4)	-.25790	73771	05876	80888	348	
P09	(-7)	.33247	16339	10476	83287	5	
P10	(-10)	-.20814	07448	39659	67698		

Q00	(11)	.92060	62224	60625	96585	20822	080
Q01	(9)	.52261	91871	71925	27396	53776	10
Q02	(7)	.12982	20071	90860	34515	18822	1
Q03	(4)	.16958	26901	20732	33721	18141	
Q04	(1)	.10000	00000	00000	00000	000	

Table 109

P00	(0)	.80114	1

Table 110

P00	(0)	.79793	031
P01	(0)	.14353	62

Table 111

P00	(0)	.26171	86321	89
P01	(0)	.84694	40441	3
P02	(0)	.10026	59951	

Q00	(0)	.32801	56089	22
Q01	(1)	.10000	00000	00

Table 112

P00	(-1)	.29768 08560 65044 9
P01	(0)	.64266 87693 51174 0
P02	(1)	.24092 62155 53313 3
P03	(1)	.11289 48920 7277
Q00	(-1)	.37308 76252 13223 6
Q01	(0)	.79847 04670 22731 3
Q02	(1)	.28770 61761 21412 3
Q03	(1)	.10000 00000 0000

Table 113

P00	(-2)	.29177 23301 03545 2698
P01	(0)	.12643 64421 28204 2419
P02	(1)	.13002 12267 53963 0771
P03	(1)	.31941 66311 56968 244
P04	(1)	.11880 13976 29480 7
Q00	(-2)	.36568 23861 93180 7169
Q01	(0)	.15777 89259 40426 6010
Q02	(1)	.16006 97941 23271 6622
Q03	(1)	.37307 27640 40664 179
Q04	(1)	.10000 00000 00000 0

Table 114

P00	(-3)	.22980 01486 24013 96508 0
P01	(-1)	.16707 75458 84828 84036 04
P02	(0)	.34080 28938 30209 45238 6
P03	(1)	.22320 60399 09037 91011 6
P04	(1)	.40303 37152 13244 86447
P05	(1)	.12405 96523 19948 311
Q00	(-3)	.28801 17750 27570 93582 3
Q01	(-1)	.20886 06282 08306 18706 65
Q02	(0)	.42327 26378 27814 35280 6
Q03	(1)	.27219 15826 73522 26423 8
Q04	(1)	.46081 70539 68621 26929
Q05	(1)	.10000 00000 00000 000

Table 115

P00	(-4)	.15426 46476 00407 32249 3139
P01	(-2)	.16891 89908 35378 88002 4701
P02	(-1)	.57569 13494 23021 95364 3144
P03	(0)	.74057 77017 02174 50336 082
P04	(1)	.34847 89909 83862 61862 544
P05	(1)	.49264 24082 52074 82083 30
P06	(1)	.12887 31078 30838 78760
Q00	(-4)	.19334 20637 25579 84606 1064
Q01	(-2)	.21134 60429 05612 97880 2364
Q02	(-1)	.71759 67531 55483 36887 3148
Q03	(0)	.91511 46518 87836 75065 332
Q04	(1)	.42082 75526 89818 87006 379
Q05	(1)	.55182 58685 98997 09120 24
Q06	(1)	.10000 00000 00000 00000

Table 116

P00	(-6)	.91542 73166 01801 35379 53168
P01	(-3)	.14050 23724 04361 82491 28906 71
P02	(-2)	.72029 91897 25919 28666 87355 8
P03	(0)	.15422 94860 24976 07058 23162 07
P04	(1)	.14134 55744 61436 77506 51769 9
P05	(1)	.51099 56996 33866 77131 83117
P06	(1)	.58880 28195 15982 13693 8904
P07	(1)	.13335 73488 24604 00300 79
Q00	(-5)	.11473 17997 58182 81171 90066 2
Q01	(-3)	.17587 84875 36209 90399 24282 15
Q02	(-2)	.89948 56204 08013 28665 63278 9
Q03	(0)	.19164 45435 10156 07157 85685 38
Q04	(1)	.17371 77200 47083 19589 29846 0
Q05	(1)	.61096 82370 19232 01646 10470
Q06	(1)	.64658 77938 52166 80188 3268
Q07	(1)	.10000 00000 00000 00000 00

Table 117

P00	(-8)	.31889 82066 31170 67677 07462 7421
P01	(-6)	.74015 51139 53709 60952 12019 4978
P02	(-4)	.61627 66651 50786 62771 16400 6352
P03	(-2)	.23579 19146 84851 97028 41896 0133
P04	(-1)	.44186 71777 76314 86434 30727 8616
P05	(0)	.40086 04754 91618 36898 66248 7139
P06	(1)	.16348 98988 36712 72553 49720 7647
P07	(1)	.25499 83597 63221 52136 76360 244
P08	(1)	.10770 34108 12787 39235 89097 5
P09	(-1)	.38287 23939 54369 12713 502

Q00	(-8)	.39967 96307 35405 80071 44966 4561
Q01	(-6)	.92689 74688 16920 76335 96213 1532
Q02	(-4)	.77065 80523 57457 19272 62984 2557
Q03	(-2)	.29409 39568 61436 75684 65431 3069
Q04	(-1)	.54842 59780 55207 56751 45590 7765
Q05	(0)	.49263 43547 83712 99934 30654 0140
Q06	(1)	.19653 96658 71985 60644 89478 8772
Q07	(1)	.28937 84853 70369 72522 23957 200
Q08	(1)	.10000 00000 00000 00000 00000 0

Table 118

P00	(0)	79826 41

Table 119

P00	(0)	.79788 50474
P01	(0)	.14883 228

Table 120

P00	(0)	.79160 47783 202
P01	(0)	.94630 40026

Q00	(0)	.99212 94575 874
Q01	(1)	.10000 00000 0

Table 121

P00	(0)	.12157 43742 73508 886
P01	(1)	.13014 75578 01039 8
P02	(1)	.10141 30036 3672
Q00	(0)	.15237 08820 12241 144
Q01	(1)	.16025 88201 25634 9
Q02	(1)	.10000 00000 0000

Table 122

P00	(-1)	.17622 49333 50556 7422
P01	(0)	.36309 39137 55769 529
P02	(0)	.86193 76570 42028 0
P03	(-1)	.94223 76424 66
Q00	(-1)	.22086 52003 15733 6961
Q01	(0)	.45092 95127 78684 908
Q02	(1)	.10000 00000 00000 00

Table 123

P00	(-2)	.82481 21435 11961 18371
P01	(0)	.29446 05096 13772 46280
P02	(1)	.17169 93925 97167 8786
P03	(1)	.10598 26665 24018 4
Q00	(-1)	.10337 48720 09304 21309 8
Q01	(0)	.36711 32407 29911 55930
Q02	(1)	.20850 97878 47086 0234
Q03	(1)	.10000 00000 00000 0

Table 124

P00	(-3)	.84595 73108 88274 00367 31
P01	(-1)	.46505 71664 06270 21781 67
P02	(0)	.50632 64376 25484 43572
P03	(0)	.88294 16486 68464 950
P04	(-1)	.84124 99827 58820
Q00	(-2)	.10602 50257 30167 75779 115
Q01	(-1)	.58087 47520 84425 65274 6
Q02	(0)	.62389 96900 97812 36934
Q03	(1)	.10000 00000 00000 0000

Table 125

P00	(-4)	.27180 32012 00859 59381 45902
P01	(-2)	.30059 53731 79950 21313 25580
P02	(-1)	.84659 28489 77458 59615 2819
P03	(0)	.63992 21281 03093 52442 57
P04	(0)	.90096 22676 22894 82737
P05	(-1)	.76918 53056 21486 88
Q00	(-4)	.34065 47946 32646 68373 68951
Q01	(-2)	.37610 17030 78123 95073 65563
Q02	(0)	.10540 60748 03912 08805 71610
Q03	(0)	.78295 96059 51999 86753 85
Q04	(1)	.10000 00000 00000 00000 0

Table 126

P00	(-6)	.21661	27774	23535	11519	11641	6720
P01	(-4)	.51753	28326	48813	61731	93721	9217
P02	(-2)	.38320	13753	14743	64305	91107	4996
P03	(0)	.10544	46923	58985	37410	02893	1679
P04	(1)	.10248	03192	51418	24751	45179	07
P05	(1)	.27699	14641	93746	75055	22836	
P06	(1)	.11515	35887	56801	75997	948	

Q00	(-6)	.27148	38562	68092	38207	69719	2771
Q01	(-4)	.64812	21834	53192	32835	71746	7651
Q02	(-2)	.47906	17214	21613	48574	52526	9971
Q03	(0)	.13126	93963	35399	97828	43557	5346
Q04	(1)	.12606	63536	21396	88526	48028	81
Q05	(1)	.32571	88662	43734	76015	57534	
Q06	(1)	.10000	00000	00000	00000	000	

Table 127

P00	(0)	.37153	0

Table 128

P00	(0)	.91799	04

Q00	(1)	.24484	9551
Q01	(1)	.10000	00

Table 129

P00	(-1)	.35669	13540	857
P01	(0)	.35834	60148	90
P02	(0)	.24641	74623	8

Q00	(-1)	.95117	70607	919
Q01	(0)	.99719	87212	38
Q02	(1)	.10000	00000	00

Table 130

P00	(-2)	.39385 06567 45841
P01	(0)	.10479 08570 67108 1
P02	(0)	.49719 52741 8047
P03	(0)	.21946 39514 443
Q00	(-1)	.10502 68420 85588 4
Q01	(0)	.28403 71931 37274 5
Q02	(1)	.14397 36572 77058
Q03	(1)	.10000 00000 0000

Table 131

P00	(-2)	.43854 62480 32497 7
P01	(0)	.16621 61732 22031 76
P02	(1)	.13531 74320 74168 58
P03	(1)	.19606 58746 53157
Q00	(-1)	.11694 56661 99834 70
Q01	(0)	.44835 94975 57159 26
Q02	(1)	.37930 56623 80951 96
Q03	(1)	.65181 27362 09502
Q04	(1)	.10000 00000 0000

Table 132

P00	(-3)	.36093 15747 36395 4258
P01	(-1)	.23950 45846 35302 3802
P02	(0)	.42360 33418 62362 0769
P03	(1)	.21642 09003 15222 3141
P04	(1)	.22313 97735 87148 62
Q00	(-3)	.96248 41993 17764 8804
Q01	(-1)	.64288 97605 50296 1820
Q02	(1)	.11567 83388 82575 72521
Q03	(1)	.62198 10567 84424 8009
Q04	(1)	.78553 15333 79569 99
Q05	(1)	.10000 00000 00000 0

Table 133

P00	(-4)	.25008 39058 12557 32009 5
P01	(-2)	.25631 54934 15145 64229 59
P02	(-1)	.79248 95736 43978 86954 0
P03	(0)	.87668 28172 75923 80768 5
P04	(1)	.31735 44765 74155 62693 2
P05	(1)	.24894 22245 98367 4780
Q00	(-4)	.66689 04155 00985 68419 1
Q01	(-2)	.68642 56279 99100 70826 98
Q02	(0)	.21426 77055 09815 09558 38
Q03	(1)	.24251 95142 18104 32784 80
Q04	(1)	.93498 12877 26198 72073 1
Q05	(1)	.92402 92424 90837 9926
Q06	(1)	.10000 00000 00000 000

Table 134

P00	(-7)	.73333 52319 74602 59305 9416
P01	(-4)	.12505 17156 34547 60692 84262 0
P02	(-3)	.71920 78244 98891 78985 03751
P03	(-1)	.17475 85404 59542 58171 34770 1
P04	(0)	.18400 02986 70065 26965 63356
P05	(0)	.76913 70830 15003 00582 9948
P06	(0)	.98586 82858 88468 79781 308
P07	(0)	.15977 08382 47871 79639 6
Q00	(-6)	.19555 60618 59899 11689 11339
Q01	(-4)	.33432 67994 62691 26989 13296 4
Q02	(-2)	.19323 20912 31100 52144 47035 3
Q03	(-1)	.47415 83644 32083 54175 53157 7
Q04	(0)	.50969 59770 13651 58821 59382
Q05	(1)	.22369 49501 40285 91912 37510
Q06	(1)	.32930 84754 59172 96936 6803
Q07	(1)	.10000 00000 00000 00000 00

Table 135

P00	(-8)	.36111	80301	32006	60827	40357	5
P01	(-6)	.81145	61281	87192	43783	87215	07
P02	(-4)	.64582	46121	25622	21539	81474	08
P03	(-2)	.23209	79894	61025	60507	53950	427
P04	(-1)	.39816	84579	49710	12131	58365	382
P05	(0)	.31711	38119	74933	88552	35142	15
P06	(1)	.10492	35401	39107	52789	58632	33
P07	(1)	.11002	45412	86154	21600	97987	
P08	(0)	.15038	01970	96227	06814	898	

Q00	(-8)	.96298	14136	85353	29239	89763	8
Q01	(-5)	.21680	96052	18401	43963	85979	941
Q02	(-3)	.17315	89141	01649	19693	62766	814
Q03	(-2)	.62629	53206	32515	50586	94285	656
Q04	(0)	.10875	99449	74536	61982	08240	8305
Q05	(0)	.88795	88123	81732	82127	37040	37
Q06	(1)	.31075	71887	54958	61560	12276	93
Q07	(1)	.37972	62346	54141	80108	92694	
Q08	(1)	.10000	00000	00000	00000	0000	

Table 136

P00	(-9)	.16531	34800	74504	54149	13540	2613
P01	(-7)	.47226	56937	08242	36902	35400	3351
P02	(-5)	.49599	48424	50523	61104	45213	5303
P03	(-3)	.24687	39670	48998	20217	88576	9539
P04	(-2)	.62650	67551	76413	59776	31899	7012
P05	(-1)	.81261	40206	98215	83157	61362	5263
P06	(0)	.51168	40555	76262	27316	90271	3923
P07	(1)	.13822	02042	00309	76875	94465	7754
P08	(1)	.12130	37213	65758	69809	24094	17
P09	(0)	.14218	24538	91217	62423	71204	

Q00	(-9)	.44083	59468	65345	55762	12489	8219
Q01	(-6)	.12613	03840	48951	33718	43496	4070
Q02	(-4)	.13281	27516	07318	81364	42223	8537
Q03	(-3)	.66401	91712	22370	37008	75465	8789
Q04	(-1)	.16984	98012	20044	54797	45432	9829
Q05	(0)	.22354	56354	40768	90747	03665	3726
Q06	(1)	.14488	00605	83911	49658	69750	4711
Q07	(1)	.41690	52260	10898	32492	16564	6470
Q08	(1)	.43213	47211	26016	20912	08723	37
Q09	(1)	.10000	00000	00000	00000	00000	0

Table 137

P00	(0)	.37458 57

Table 138

P00	(0)	.86491 9325
Q00	(1)	.23064 57218
Q01	(1)	.10000 000

Table 139

P00	(0)	.18215 96605 0727
P01	(1)	.11888 51398 733
Q00	(0)	.48575 90947 5685
Q01	(1)	.33827 89537 272
Q02	(1)	.10000 00000 0

Table 140

P00	(-1)	.18987 17407 19799 9
P01	(0)	.27843 37349 36926
P02	(0)	.26832 97608 813
Q00	(-1)	.50632 46419 20575 4
Q01	(0)	.76464 16617 64550
Q02	(1)	.10000 00000 0000

Table 141

P00	(-1)	.14702 09217 28495 543
P01	(0)	.40140 35450 04122 70
P02	(1)	.14029 77934 78162
Q00	(-1)	.39205 57912 76005 192
Q01	(1)	.10875 61894 18666 134
Q02	(1)	.41783 06117 40593 2
Q03	(1)	.10000 00000 000

Table 142

P00	(-2)	.10490 55786 90264 87075
P01	(-1)	.46757 15764 93703 1974
P02	(0)	.36133 93860 53303 67
P03	(0)	.24840 19545 88062
Q00	(-2)	.27974 82098 40706 63015
Q01	(0)	.12590 96521 49642 23368
Q02	(1)	.10158 90284 54324 931
Q03	(1)	.10000 00000 00000 0

Table 143

P00	(-3)	.67527 82429 94108 22921 6
P01	(-1)	.45405 05075 71004 91445
P02	(0)	.64276 59055 74611 8858
P03	(1)	.15712 41437 68075 125
Q00	(-2)	.18007 41981 31762 20046 63
Q01	(0)	.12186 79599 69092 74713 1
Q02	(1)	.17655 78600 99397 70151
Q03	(1)	.48532 60560 01904 715
Q04	(1)	.10000 00000 00000 0

Table 144

P00	(-4)	.37040 56364 63070 33570 19
P01	(-2)	.35309 34949 66191 37899 31
P02	(-1)	.80701 01997 53211 36550 4
P03	(0)	.43133 69342 68374 39405
P04	(0)	.23391 55386 51196 62
Q00	(-4)	.98774 83639 01520 89637 52
Q01	(-2)	.94590 40523 35245 73955 64
Q02	(0)	.21924 33556 76564 53729 92
Q03	(1)	.12374 19308 85688 59614 8
Q04	(1)	.10000 00000 00000 000

Table 145

P00	(-6)	.94930 79418 11991 57273 09831
P01	(-3)	.16075 43730 22251 27163 13694 0
P02	(-2)	.77335 28519 02406 91819 4463
P03	(0)	.11987 37733 29894 48244 2680
P04	(0)	.49341 54397 22331 85877 03
P05	(0)	.22250 44254 31231 5533
Q00	(-5)	.25314 87844 83197 75272 88082 9
Q01	(-3)	.42978 58539 91450 71420 95957 3
Q02	(-1)	.20808 27022 88222 51244 85575
Q03	(0)	.32835 79236 38519 59384 8115
Q04	(1)	.14413 59242 72963 84304 987
Q05	(1)	.10000 00000 00000 00000

Table 146

P00	(-7)	.19041 64201 49320 00401 66644 433
P01	(-5)	.51070 11742 18620 71543 49179 564
P02	(-3)	.43223 69476 12937 08590 35537 784
P03	(-1)	.13933 22107 43533 37539 78200 97
P04	(0)	.16386 94759 05001 86073 62037 3
P05	(0)	.55014 00927 31402 10367 1207
P06	(0)	.21306 67965 31005 17316 2
Q00	(-7)	.50777 71203 98186 67737 77747 479
Q01	(-4)	.13640 91322 81806 39745 37572 5758
Q02	(-2)	.11585 49537 50768 02094 73433 0894
Q03	(-1)	.37648 95073 87993 21602 21047 64
Q04	(0)	.45239 28490 81329 42891 96557 1
Q05	(1)	.16340 20412 61950 31413 44145
Q06	(1)	.10000 00000 00000 00000 00