NBS TECHNICAL NOTE 1147

U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

Test Problems and Results for OMNITAB 80

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Test Problems and Results for OMNITAB 80

Sally T. Peavy and Shirley G. Bremer

Center for Applied Mathematics
National Engineering Laboratory
National Bureau of Standards
Washington, DC 20234

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Test Problems and Results for OMNITAB 80

Sally T. Peavy and Shirley G. Bremer

The lack of test problems and results for many computer software packages is a great hindrance to both the systems programmer and the general user. In this publication a set of 69 test problems and results for the OMNITAB 80 system is provided to assist individuals in checking the installation of the OMNITAB 80 system on their particular computer. The general user will also find these descriptive examples instructive in the use of the OMNITAB 80 system.

Key words: Accuracy; ANS FORTRAN; computer system installation; examples; OMNITAB 80; software; test problems.

OMNITAB 80 is a high quality integrated general purpose programming language and statistical software computing system. The OMNITAB 80 computing system enables the nonprogrammer to use a digital computer to perform data, statistical, and numerical analysis without having any prior knowledge of computers or computer languages. The user writes simple instructions in his or her own native language to obtain accurate results simply and effectively. The instructions reference reliable, varied, and sophisticated algorithms for analysis and manipulation of data. The tedious task of formatting data for input and output is alleviated by OMNITAB 80 through free field input and readable and automatic output. If desired, considerable flexibility is allowed in the printing of results with user supplied formats. The system permits the user to perform simple arithmetic, complex arithmetic and trigonometric calculations, data manipulation, special function calculations, statistical analysis and operations on matrices and arrays. The OMNITAB 80 system may be used with equal ease either interactively or with submitted runs to the computer facility.

OMNITAB was originally conceived and developed by Joseph Hilsenrath and his co-workers and was fully documented in Hilsenrath et al. (1966). Since then OMNITAB has been completely rewritten and expanded, while carefully maintaining the original spirit and philosophy. OMNITAB II was made available in 1970 and was a machine independent system (see Hogben et al. 1971). The current version is called NBS OMNITAB 80 Version 6.0. This publication is the first of several which constitute the documentation of the OMNITAB 80 system. It contains 69 test problems and their results which can be used to determine whether a systems programmer has successfully installed and implemented the OMNITAB 80 system.

The OMNITAB 80 system was not only developed with the user in mind, but the systems programmer as well. All the subprograms in the system are written in a portable subset of American National Standard FORTRAN and checked with the PFORT Verifier. The use of any FORTRAN statement which cannot be successfully compiled on a large computer is avoided.

OMNITAB 80 is transportable to any computer configuration sufficiently large to accommodate it. Necessary modifications for a particular computer are outlined in Bremer et al. This is reference material, since all modifications are made prior to the distribution of the OMNITAB 80 system.

All FORTRAN compilers do not interpret FORTRAN statements in the same manner. Considerable effort has been expended to keep the need to make modifications to an absolute minimum. Thus, it is essential that the system analyst have a means of determining whether the system performs as it originally was designed to do. It is important to the user to know what to expect from a software system when he or she inputs his or her data as well as to know how to use the package.

In 1970 a set of 52 test problems and results for OMNITAB II (Varner et al.) was published. OMNITAB 80 has many new instructions. The new set of test problems includes these new instructions as well as modifications of the original test problems for easier reading and understanding.

This note contains a set of 69 test problems and results for all of the OMNITAB 80 commands in Version 6.0 with the following exceptions: (a) PUNCH, NHISTOGRAM, EXTREMA, CONTENTS, and DESCRIBE; (b) commands related to interactive use of OMNITAB 80 such as CRT, INTERACTIVE, etc.; (c) commands invoking any language other than English or Spanish; (d) all the commands for using magnetic tapes or auxiliary memory units; and (e) commands related to the CALCOMP PLOTTER. The commands MAXMIN, a synonym for EXTREMA, and HISTOGRAM, similar to NHISTOGRAM, were both used. In most instances only one version of a command was used since it was too cumbersome to supply test problems for all possibilities. The test problems were constructed so as to minimize the output and make it possible to determine major errors at a glance. The test problems F1 through F10 reference the FORMAT instructions and are grouped together at the end. A table of contents is given on pages vi and vii.

The checks in the test problems are gross error checks. They are to be used to determine whether the entire OMNITAB system has been successfully installed. They are not intended as a definitive test for each instruction. Each instruction has undergone a far more rigorous testing for both programming and numerical accuracy. In addition, some errors which escaped detection in the initial testing were subsequently found in the extensive use of the instructions by users at the National Bureau of Standards and later corrected. The results of the test problems are based on the use of OMNITAB 80 with a computer having a 36 binary bit word length. When the same problems are run on a computer with a different word length and with different precisions the results may differ depending on the particular computer in use. The set of test problems and results is published here for convenient use and reference. The same set of test problems and results is available on the magnetic tape which contains the OMNITAB 80 system and can be ordered from the Office of Standard Reference Data, A-323 Physics Building, National Bureau of Standards, Washington, D.C. 20034.

The arrangement of the test problems is similar to the new OMNITAB 80 User's Reference Manual to be published later. Part C of the Manual describes each OMNITAB 80 instruction in detail. The test problems start with instructions listed in Part C, Section 3 through Section 13, except test 59 which is described in C.1.7.

Each set of test problems begins with the command OMNITAB. Information on the OMNITAB instruction includes the title of the test and, in parentheses, the section number or numbers associated with the commands being tested, as described in Part C of the new and unpublished OMNITAB 80 User's Reference Manual.

The command ACCURACY was added to the system primarily for the purpose of testing the implementation of new commands. The instruction has been used in this set of test problems and allows the reader to see at a glance whether anticipated results agree with the actual results. When used in conjunction with the instruction AVERAGE, it is possible to summarize the accuracy of a large set of calculations in a single number. The instruction ACCURACY compares two (sets of) numbers and gives the number of first significant digits they have in common. Further details are given in Hogben et al. (1971).

In each test problem the data used as input are assumed to be exact. The results determine whether the calculations have been performed successfully. If anyone desires to assess the effect of errors in input data on the final results he or she could use the instruction ROUND with the input data and repeat the test problem. For example, one could ROUND the original data to seven significant digits and see what effect this has on the final results.

Mathematical identities are frequently used to obtain a single result which simultaneously verifies several computed quantities. See, for example, test 12 on hyperbolic functions. For the special functions, frequent reference is made to Abramowitz and Stegun (1964).

This is a rare attempt to provide a comprehensive set of test problems and results for a computer software package. The results should be very useful, both to the user and the installer of the OMNITAB 80 system. Readers are encouraged to express their comments, experiences, and criticisms. The valuable assistance received from all members of the Statistical Engineering Division is gratefully acknowledged. A special thanks is extended to Ilse E. Putman and Carla G. Messina for preparing the text and the examples, respectively, for computerized phototypesetting. Last, but not least, we extend our appreciation to David Hogben for his valuable assistance.

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TABLE OF CONTENTS FOR TEST PROBLEM LISTINGS

OMNITAB prints PAGE and number at the extreme right of the top line of each page. The page number for this table of contents appears at the bottom of each page. Numbering does not begin anew with each set of instructions as does the OMNITAB page number.

```
OMNITAB 80 TEST 1 CPLOT AND NCPLOT INSTRUCTIONS. (3.2)           PAGE    1

HOR-       X     ,VER-     SINE     (A),    COSINE    (B),
POINTS PLOTTED   50, POINTS NOT PLOTTED - OUT OF BOUND   32
             +---------+---------+----X----+---------+---------+
     1.0000 +                       B B B           A A A       +
            -                     B       B       A       A     -
            -                   B           B   A           A   -
            -                 B               B               A -
S           -                               A                   -
I           -               B                   B               -
N           -             B               A       B             -
            -                                                   -
X           -           B               A           B           -
            -                                                   -
      .00021X         B               A               B         X
            -                                                   -
C           -       B               A                   B       -
O           -                                                   -
S           -     B               A                       B     -
            -                                                   -
X           -   B               A                           B   -
            - B               A                               B -
            -   A           A                                   -
            -     A       A                                     -
     -.99957+       A A A                                       +
             +---------+---------+----X----+---------+---------+
            -2.5                  0.                       2.5
                            GRAPH 1   CPLOT


HOR-       X     ,VER-     SINE     (1),    COSINE    (3),
POINTS PLOTTED   62, POINTS NOT PLOTTED - OUT OF BOUND   20
             +---------+---------+---------+----X----+---------+---------+---------+
S    1.0000 +                              3  3 3 3  3        1 1  1 1 1            +
I           -                            3             3 1  1             1         -
N           -                       3  3               1 3  3               1 1     -
            -                     3                  1        3                  1  -
X           -                   3                 1             3                  1-
            X                3                  1                  3                X
C           -1             3                  1                      3              -
O           -  1         3                 1                           3            -
S           -     1 1 3                  1                                3         -
            -     3 3 1             1  1                                    3 3     -
X    -.99957+3 3         1 1 1  1 1                                              3 3+
             +---------+---------+---------+----X----+---------+---------+---------+
            -3.               -1.2857           0.           1.2857                3.
                                      GRAPH 2   NCPLOT
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
LABEL X, SINE, COSINE

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (X) IS IN COL (1), (SINE) IS IN COL (2)
       (COSINE) IS IN COL (3)

GENERATE NOS. FROM -4. IN STEPS OF (.2) THRU 4.0 IN X

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   41.

SIN OF X PUT IN SINE
COS OF X PUT IN COSINE
TITLEY     SIN X   COS X
TITLEX                       GRAPH 1   CPLOT
WIDTH 75 CHARACTERS PER LINE
LENGTH 30 LINES PER PAGE
CPLOT SINE, SYMBOL 11. AND COSINE, SYMBOL 12. VS X FROM -2.5 TO +2.5
SPACE 5
WIDTH 90 CHARACTERS PER LINE
LENGTH 20 LINES PER PAGE
TITLEY SIN X COS X
TITLEX                         GRAPH 2   NCPLOT
NCPLOT SINE, SYMBOL 1. AND COSINE, SYMBOL 3. VS X FROM -3.0 TO +3.0


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```
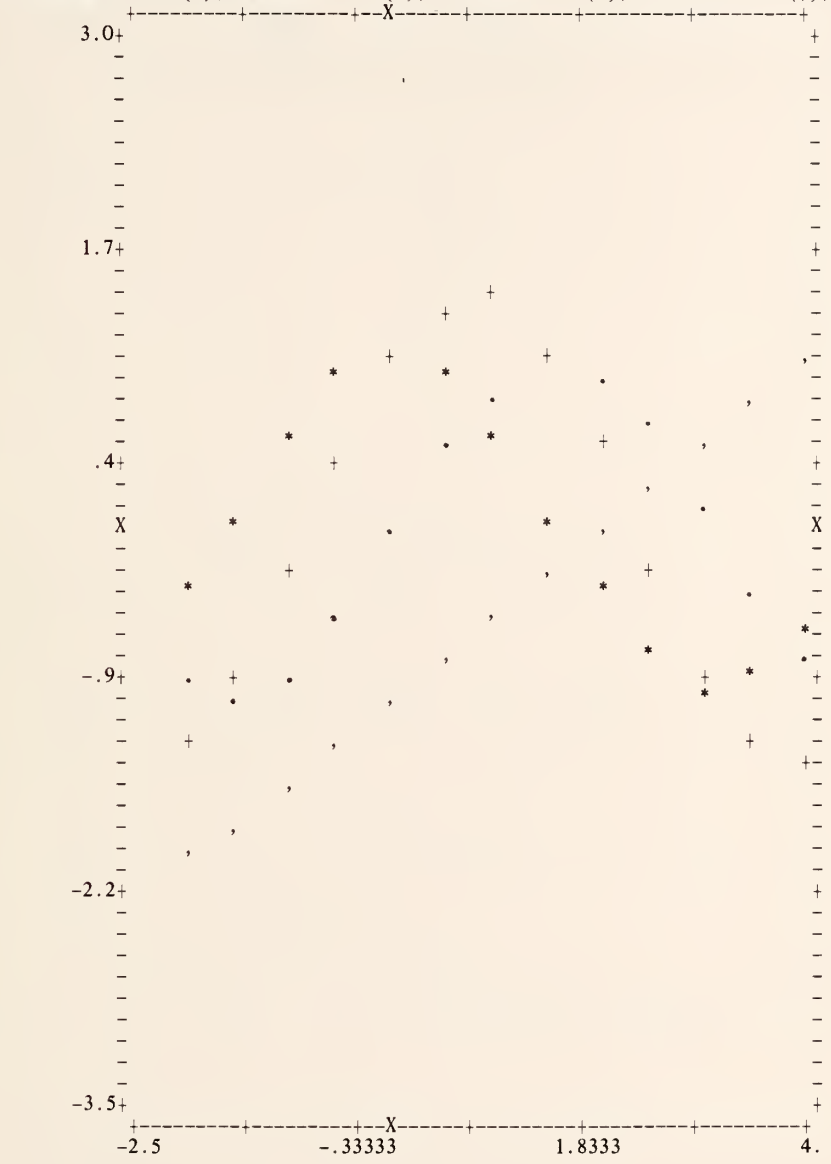
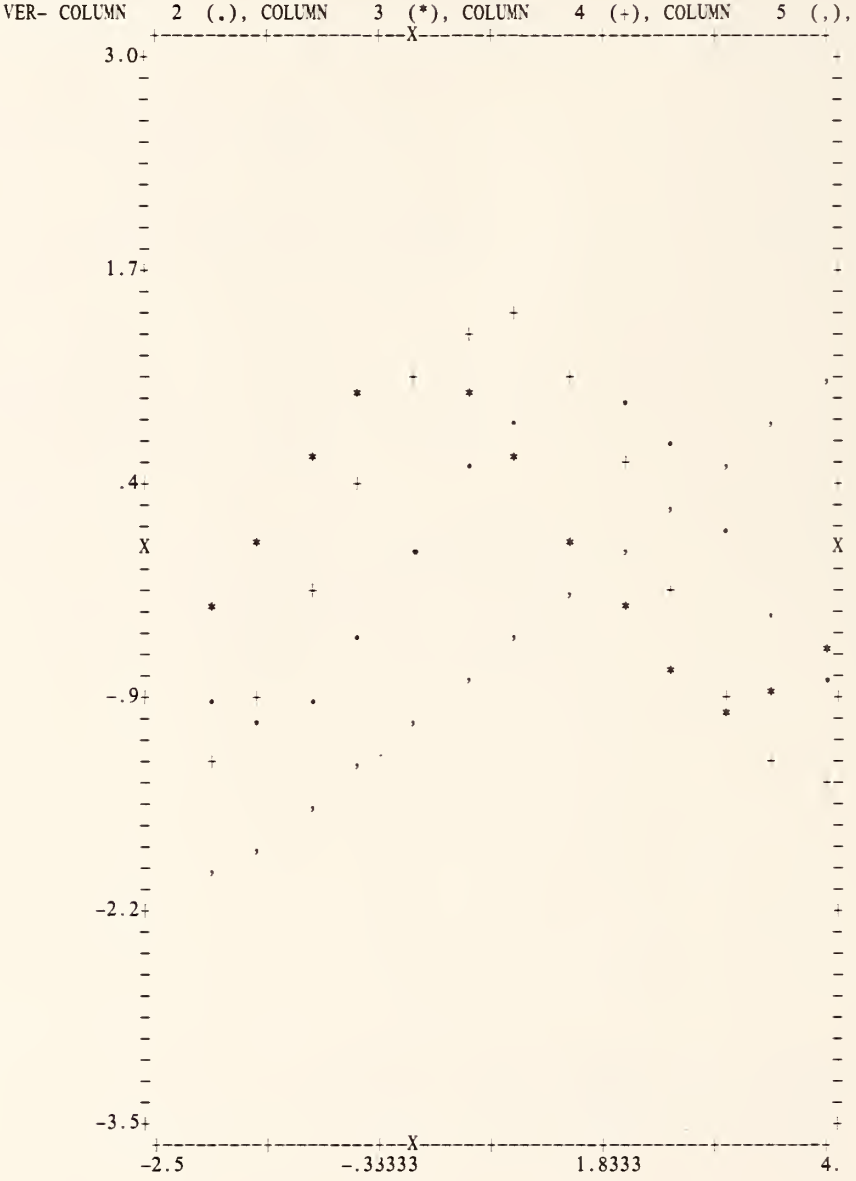

OMNITAB 80 TEST 2 NICE PLOT, TITLES, WIDTH AND LENGTH INSTR. (3.3), (3 PAGE 1
INSTRUCTION IS NICE PLOT.
HOR- COLUMN 1
VER- COLUMN 2 (.), COLUMN 3 (*), COLUMN 4 (+), COLUMN 5 (,),

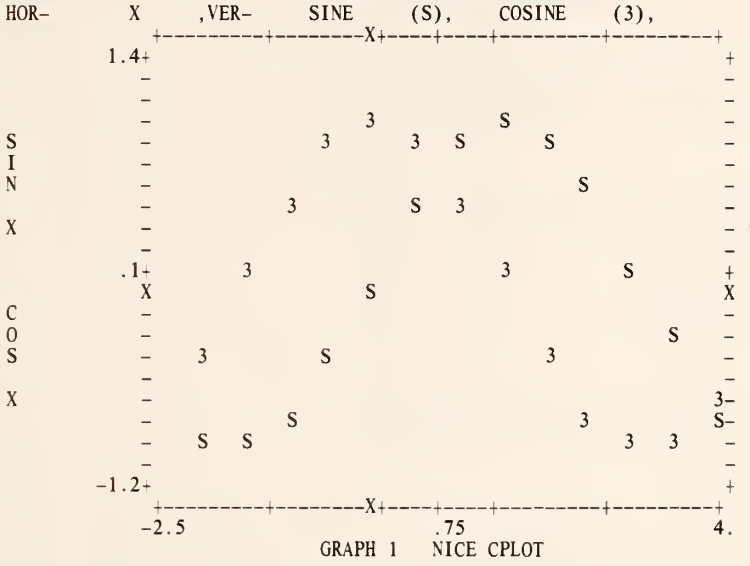


OMNITAB 80 TEST 2 NICE PLOT, TITLES, WIDTH AND LENGTH INSTR. (3.3), (3 PAGE 2
INSTRUCTION IS NICE NPLOT.

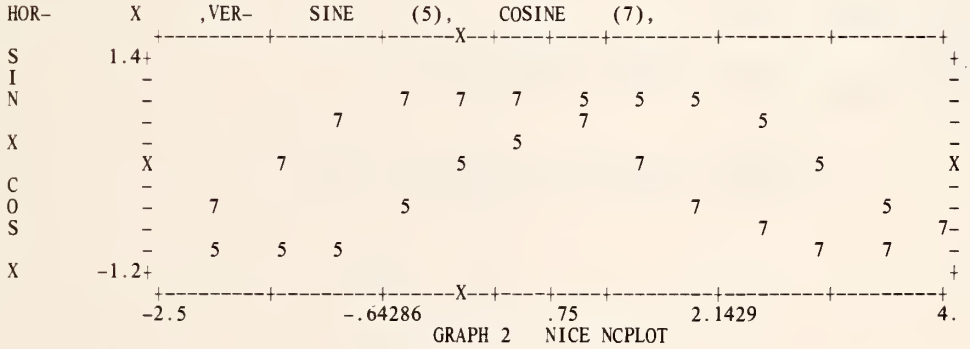
HOR- COLUMN 1
VER- COLUMN 2 (.), COLUMN 3 (*), COLUMN 4 (+), COLUMN 5 (,),



OMNITAB 80 TEST 2 NICE PLOT, TITLES, WIDTH AND LENGTH INSTR. (3.3), (3.4)3
INSTRUCTIONS ARE NICE CPLOT AND NICE NCPLOT.



GRAPH 1 NICE CPLOT



GRAPH 2 NICE NCPLOT

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE NOS FROM -2.0 IN STEPS OF .5 THRU 4. IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   13.

SIN OF COL 1 PUT IN COL 2
COS OF COL 1 PUT IN COL 3
ADD COL 2 TO COL 3 PUT RESULT IN COL 4
MULTIPLY COL 1 BY .5 THEN BY 1.0 ADD -1.0 PUT IN COL 5
WIDTH 80 CHARACTERS PER LINE
TITLE1  INSTRUCTION IS NICE PLOT.
NICE PLOT COLS 2 3 4 5 VERSUS COL 1
TITLE1  INSTRUCTION IS NICE NPLOT.
NEW PAGE
NICE NPLOT COLS 2 3 4 5 VERSUS COL 1
LABEL X, SINE, COSINE

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (X) IS IN COL (1), (SINE) IS IN COL (2)
       (COSINE) IS IN COL (3)

TITLEY     SIN X   COS X
TITLEX                       GRAPH 1   NICE CPLOT
WIDTH 75 CHARACTERS PER LINE
LENGTH 30 LINES PER PAGE
TITLE1  INSTRUCTIONS ARE NICE CPLOT AND NICE NCPLOT.
NICE CPLOT SINE, SYMBOL 29. AND COSINE, SYMBOL 3. VS X
SPACE 5
WIDTH 90 CHARACTERS PER LINE
LENGTH 20 LINES PER PAGE
TITLEY SIN X COS X
TITLEX                         GRAPH 2   NICE NCPLOT
NICE NCPLOT SINE, SYMBOL 5. AND COSINE, SYMBOL 7. VS X
WIDTH 100 LINES PER PAGE

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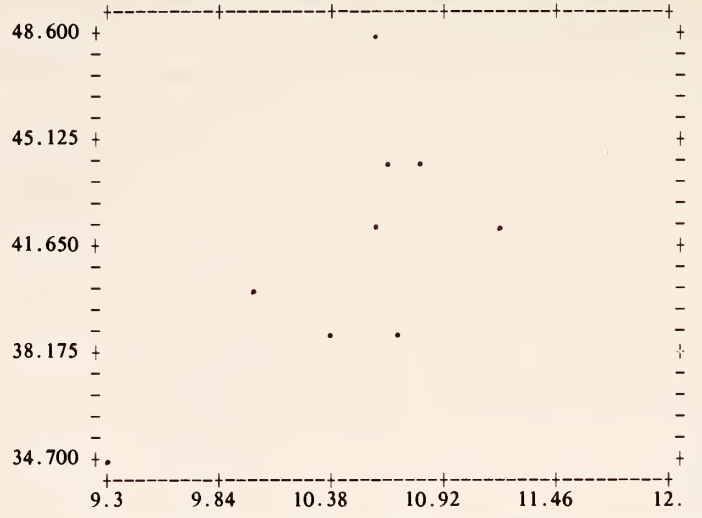
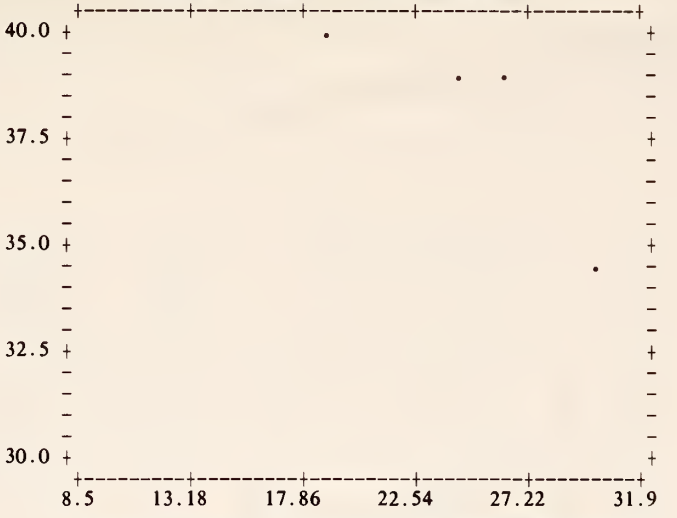
PLOT OF COLUMN 11 VERSUS REL. INCOME



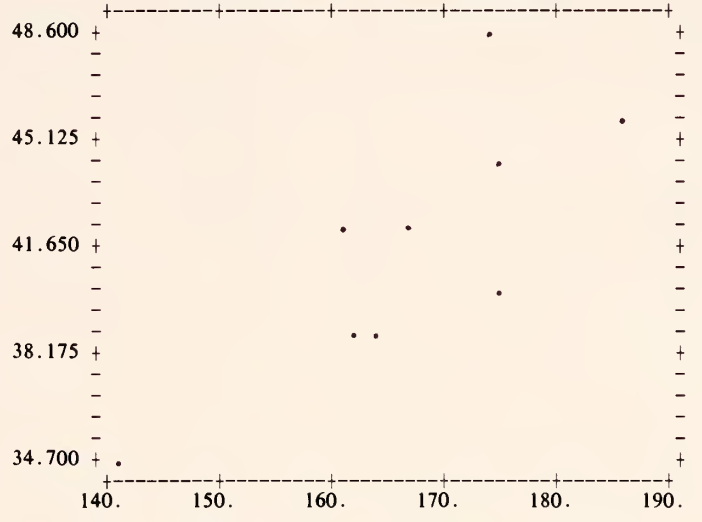
9 POINTS PLOTTED 0 POINTS OUT OF BOUNDS NOT PLOTTED

PLOT OF COLUMN 11 VERSUS COLUMN 13



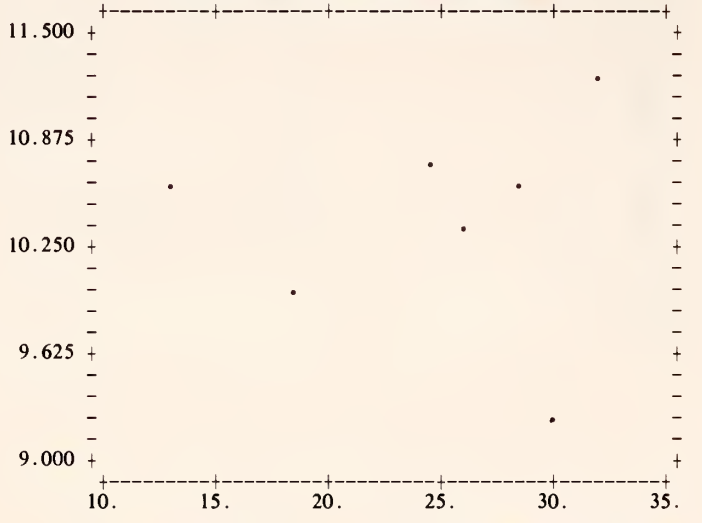
4 POINTS PLOTTED 5 POINTS OUT OF BOUNDS NOT PLOTTED

PLOT OF COLUMN 11 VERSUS COLUMN 14



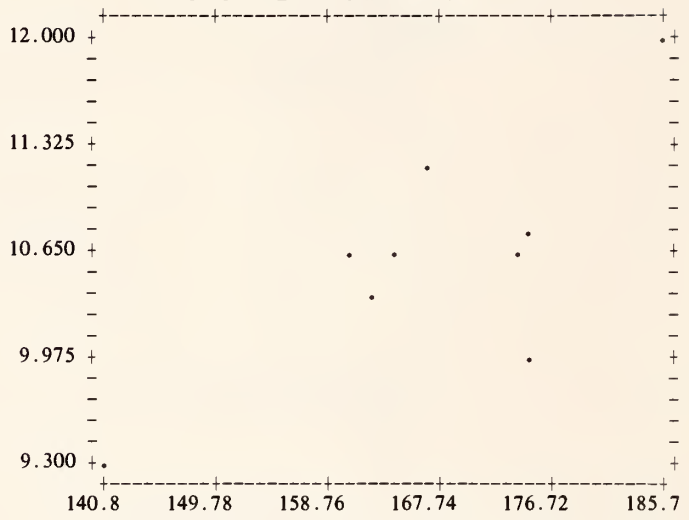
9 POINTS PLOTTED 0 POINTS OUT OF BOUNDS NOT PLOTTED

PLOT OF REL. INCOME VERSUS COLUMN 13



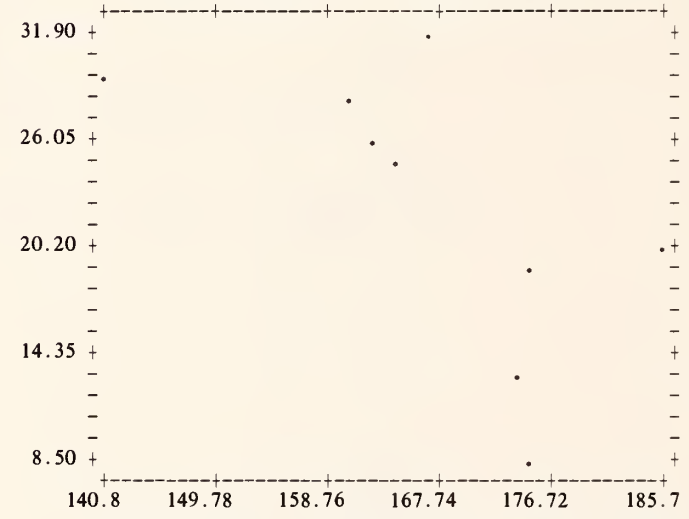
7 POINTS PLOTTED 2 POINTS OUT OF BOUNDS NOT PLOTTED

PLOT OF REL. INCOME VERSUS COLUMN 14



9 POINTS PLOTTED 0 POINTS OUT OF BOUNDS NOT PLOTTED

PLOT OF COLUMN 13 VERSUS COLUMN 14



9 POINTS PLOTTED 0 POINTS OUT OF BOUNDS NOT PLOTTED

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ DATA INTO COLUMNS 11, 12, 13 AND 14
42.2   11.2   31.9   167.1
48.6   10.6   13.2   174.4
42.6   10.6   28.7   160.8
39.0   10.4   26.1   162.0
34.7    9.3   30.1   140.8
44.5   10.8    8.5   174.6
39.1   10.7   24.3   163.7
40.1   10.0   18.6   174.5
45.9   12.0   20.4   185.7

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    9.

SCORRELATION FOR 4 VARIABLES IN COLS 11 *** 14 STORE 1,41
TITLE1 DRAPER AND SMITH EXAMPLE (PAGE 216).
LABEL REL. INCOME, 12

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (REL. INCOME) IS IN COL (12)

FOURPLOTS 11VS12, 11,30.,40.VS13, 11VS14,140.,190., 12,9.,11.5VS13,10.,35.
WIDTH 80
TWOPLOTS PLOT ONE OF COL 12 VS COL 14, PLOT TWO OF COL 13 VS COL 14

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```
 STEM AND LEAF DISPLAY FOR COLUMN   9

DEPTH SCRAWL   STEM     LEAF

  1    *     -07/-06  (  7/
  1          -05/-04  )
  2          -03/-02  (  8/
  4          -01/-00  )  /32
  4          +00/+01  (
  5          +02/+03  )  /9
  6          +04/+05  (  5/
  7          +06/+07  )  2/
  9          +08/+09  (  28/
 11          +10/+11  )  4/1
 13          +12/+13  (  36/
 17    H     +14/+15  )  01/48
 23          +16/+17  (  4469/37
 29          +18/+19  )  18/1999
       M     +20/+21  (  449/337
 24          +22/+23  )  0/117
 20    H     +24/+25  (  001249/127
 11          +26/+27  )  079/3666
  4          +28/+29  (  /7
  3          +30/+31  )
  3          +32/+33  (  /0
  2          +34/+35  )
  2    *     +36/+37  (  /47

SCRAWL (N=  59, *= -77.000000, H= 147.50000, M= 204.00000, H= 246.50000, *= 377.00000)

    EACH STEM UNIT IS     10
    EACH LEAF UNIT IS      1
        -07/-06  (  7 READS AS  -77
        +36/+37  (  7 READS AS  377

FOR THE ABOVE STEM AND LEAF DISPLAY, THE FOLLOWING VARIABLES WERE USED
    I =   1, J =   2, K =   1, L =   1


********************************************************************************

 THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR  201  0.0  0.0.

   201    0.0000000-00    0.0000000-00

********************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET  IN COL 9 THE FOLLOWING DATA
      -77      -38       -3       -2      104      111      123      126
      140      141      154      158      164      164      166      169
      173      177      181      188      191      199      199      199
       39       45       62       82       88      204      204      209
      213      213      217      220      330      297      273      276
      276      276      260      267      269      251      252      257
      240      240      241      242      244      249      231      231
      377      237      374

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   59.

STEM LEAF OF COL 9,I=1,J=2,K=1 AND L=1 PUT SCRAWL IN COL 1 AND DEPTH IN COL 2
SSTEM LEAF OF COL 9 I=1,J=2,K=1,L=1 PUT SCRAWL IN COL 3 AND DEPTH IN COL 4
SUB  COL 1 FROM COL  3  PUT IN COL 5
SUB  COL 2 FROM  COL 4 PUT IN COL 6
SUM    COL 5   ROW 1 THRU ROW 8  RESULT IN COL 7
SUM    COL 6   ROW 2 THRU  **1,2** RESULT IN COL 8
RESET V TO THE VALUE IN *1,2*
ADD 1.0 TO THE VALUE OF *V* AND PUT RESULT IN COL 11
SUM    COL 2   ROW 2 THRU **1,11** RESULT IN COL 10
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE  THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR  201  0.0  0.0.
SPACE
ABRIDGE ROW 1 FOR 3.0 COLS, COL 10 INT (0) -5 PLACES, COL 7,8,0, COL 8,8,0
$ THE LAST TWO COLS (7 AND 8) ARE PRINTED AS FLOATING PT. NOS WITH 8 SIG. DIGS.
SPACE
NOTE ***************************************************************************
```

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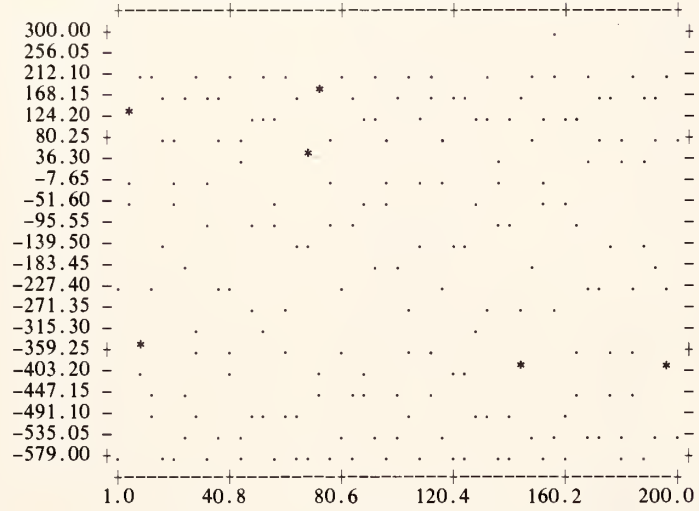
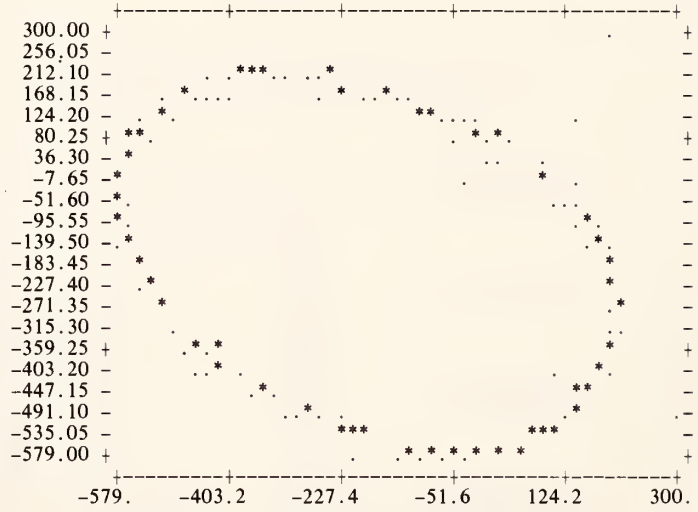
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

THE FOLLOWING IS THE OUTPUT FROM THE INSTRUCTION STATPLOT.

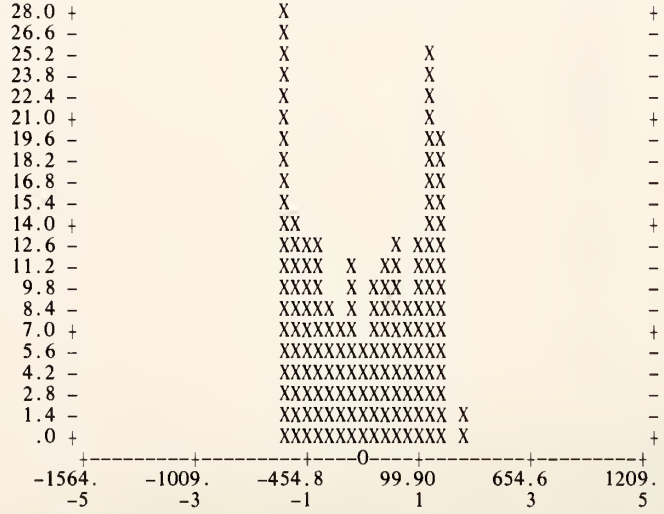
PLOT OF COLUMN 1 , X(I), VERSUS I



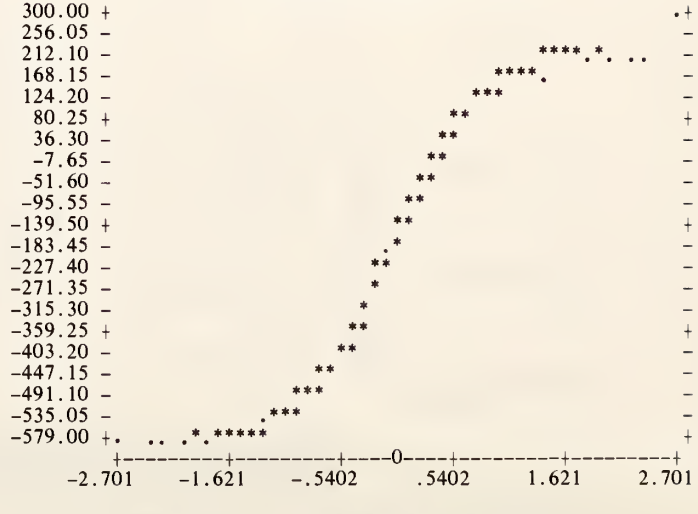
PLOT OF X(I) VERSUS X(I-1)



HISTOGRAM



NORMAL PROBABILITY PLOT

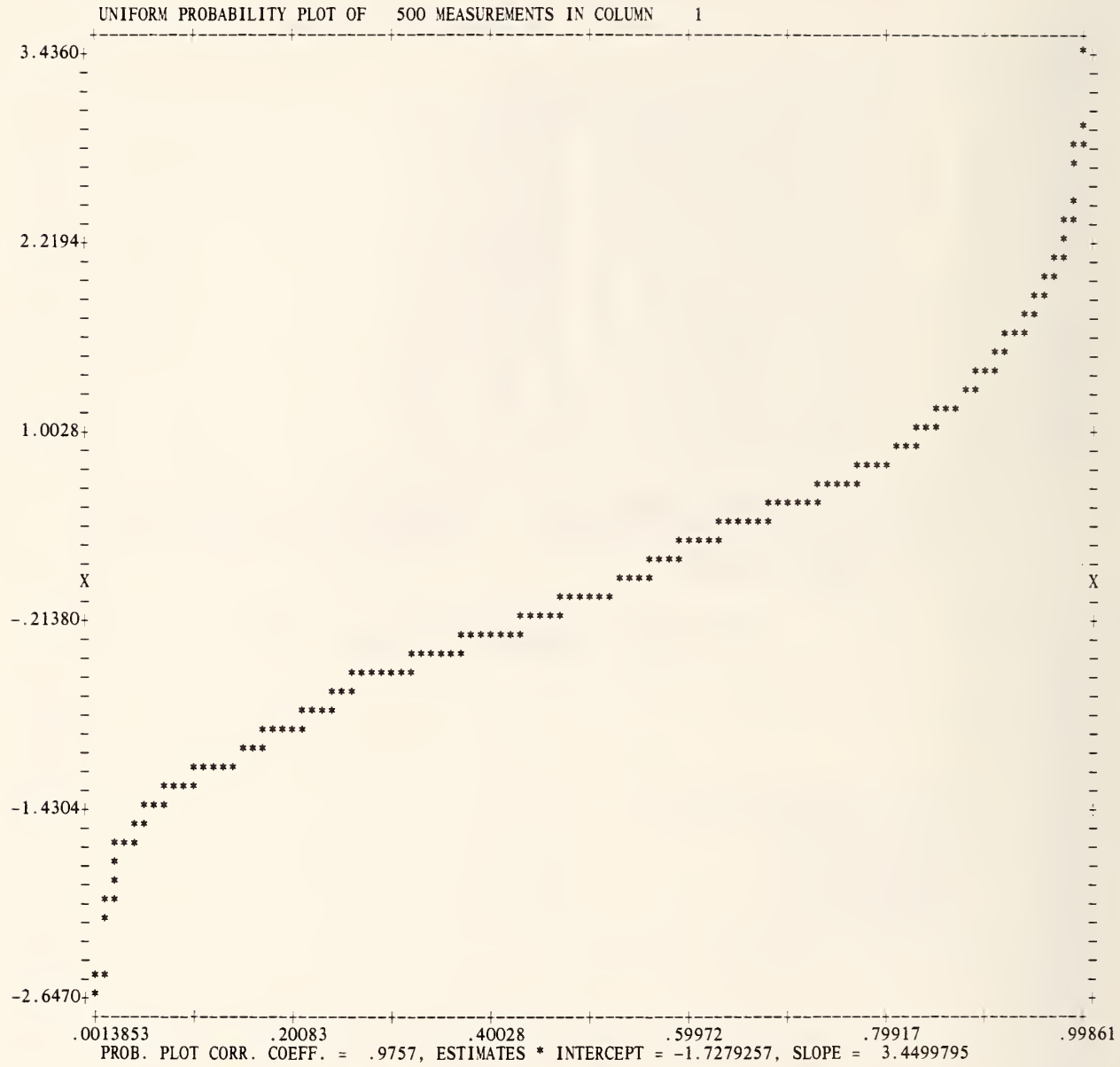


NUMBER OF MEASUREMENTS = 200
CLASS WIDTH = .2 STANDARD DEVIATIONS = 55.466433
0 OBSERVATIONS WERE IN EXCESS OF 5 STANDARD DEVIATIONS
ABOUT THE SAMPLE MEAN AND WERE NOT PRINTED IN THE HISTOGRAM

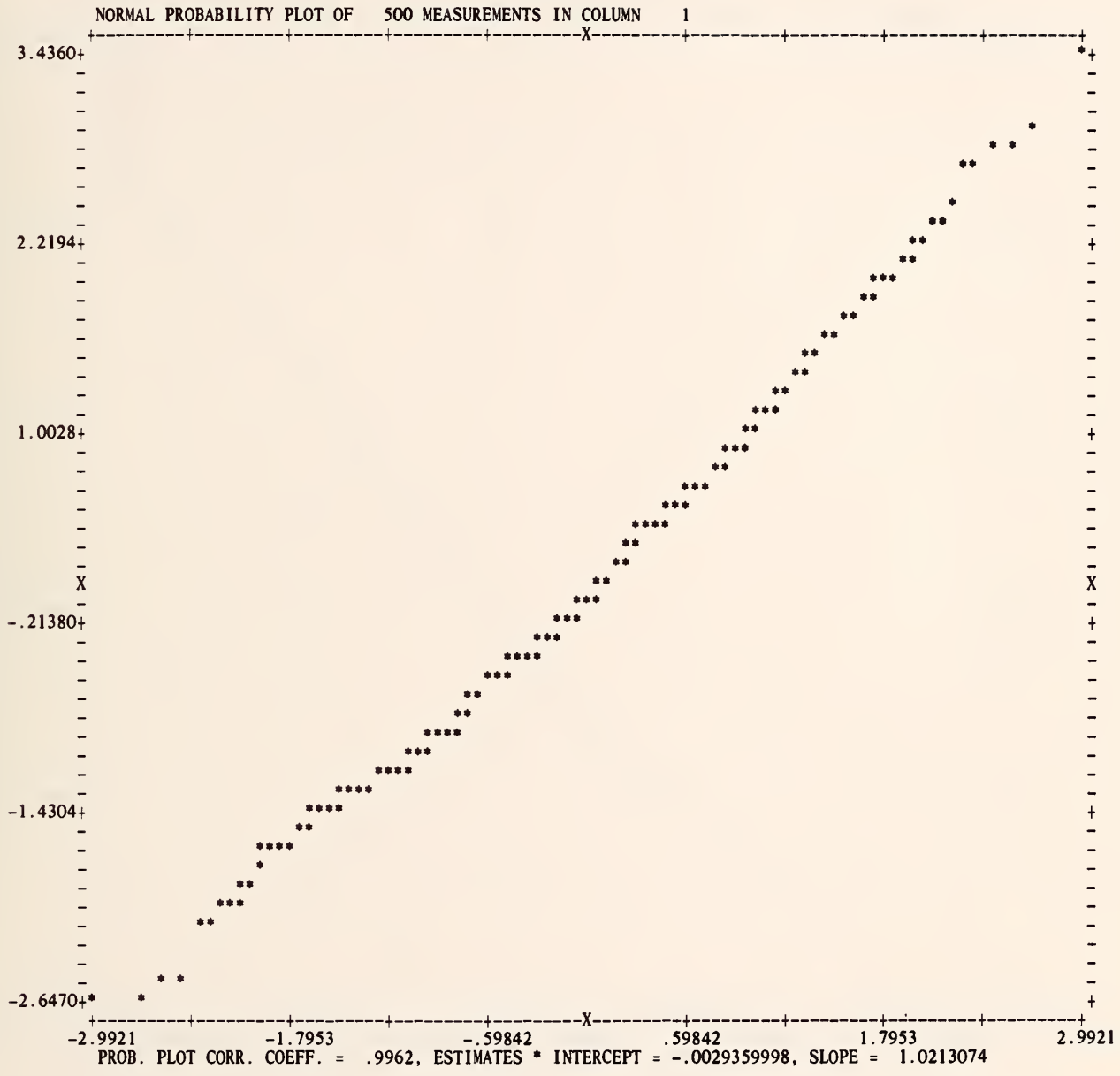
PROBABILITY PLOT CORRELATION COEFFICIENT = .9540
SCRAWL (N= 200, *= -579.00000, H= -453.00000,
M= -162.00000, H= 94.000000, *= 300.00000)
MEAN = -177.43500, STD. DEV. = 277.33217

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET LEW BEAM DEFLECTION DATA INTO COLUMN 1
-213 -564 -035 -015 +141 +115 -420 -360 +203 -338
-431 +194 -220 -513 +154 -125 -559 +092 -021 -579
-052 +099 -543 -175 +162 -457 -346 +204 -300 -474
+164 -107 -572 -008 +083 -541 -224 +180 -420 -374
+201 -236 -531 +083 +027 -564 -112 +131 -507 -254
+199 -311 -495 +143 -046 -579 -090 +136 -472 -338
+202 -287 -477 +169 -124 -568 +017 +048 -568 -135
+162 -430 -422 +172 -074 -577 -013 +092 -534 -243
+194 -355 -465 +156 -081 -578 -064 +139 -449 -384
+193 -198 -538 +110 -044 -577 -006 +066 -552 -164
+161 -460 -344 +205 -281 -504 +134 -028 -576 -118
+156 -437 -381 +200 -220 -540 +083 +011 -568 -160
+172 -414 -408 +188 -125 -572 -032 +139 -492 -321
+205 -262 -504 +142 -083 -574 -000 +048 -571 -106
+137 -501 -266 +190 -391 -406 +194 -186 -553 +083
-013 -577 -049 +103 -515 -280 +201 +300 -506 +131
-045 -578 -080 +138 -462 -361 +201 -211 -554 +032
+074 -533 -235 +187 -372 -442 +182 -147 -566 +025
+068 -535 -244 +194 -351 -463 +174 -125 -570 +015
+072 -550 -190 +172 -424 -385 +198 -218 -536 +096

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO  200.

TITLE3  THE FOLLOWING IS THE OUTPUT FROM THE INSTRUCTION STATPLOT.
STATPLOTS OF COLUMN 1

          NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C.  20234
                OMNITAB 80  VERSION 6.00      MARCH  2, 1981
```

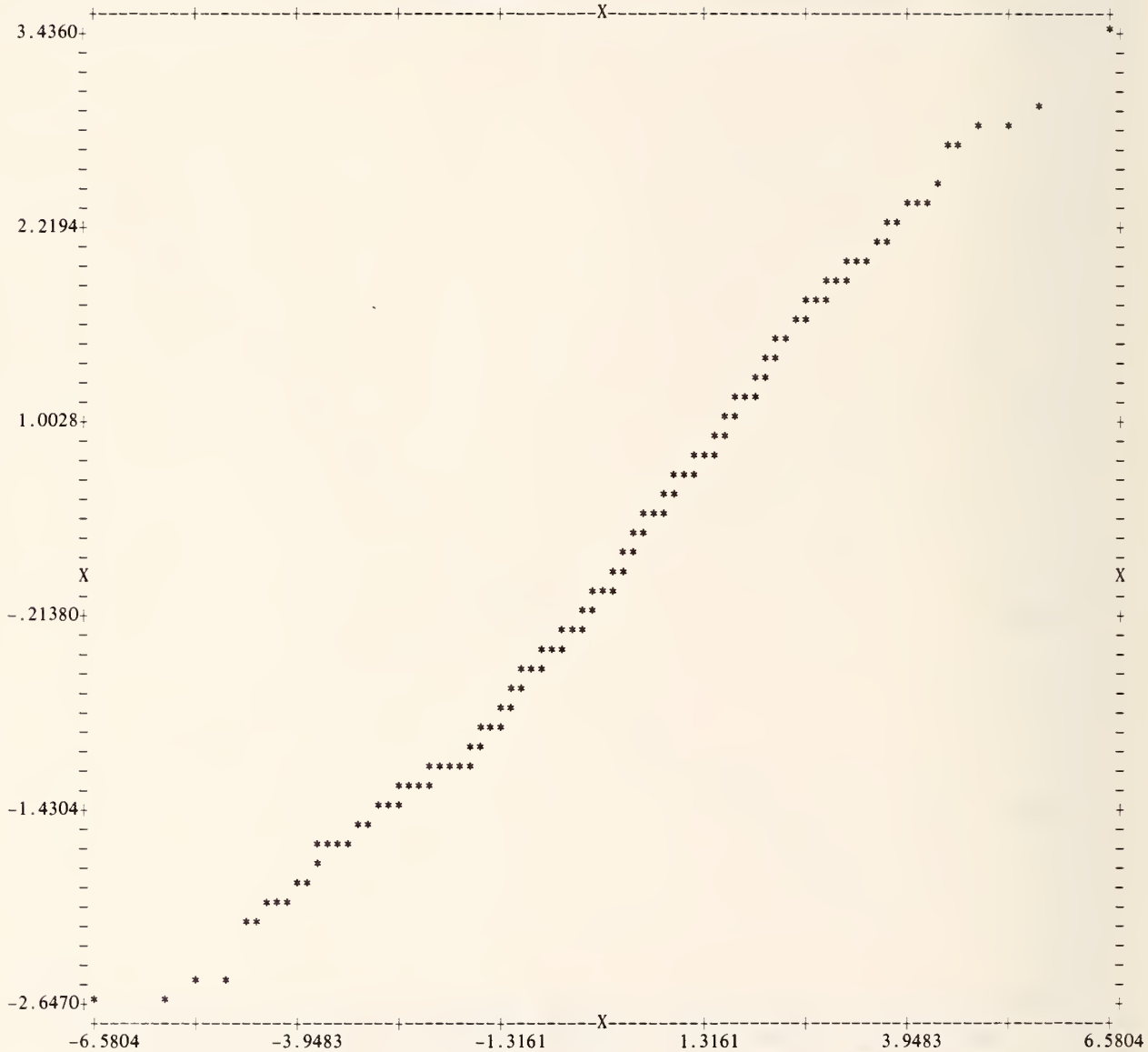


PROB. PLOT CORR. COEFF. = .9757, ESTIMATES * INTERCEPT = -1.7279257, SLOPE = 3.4499795



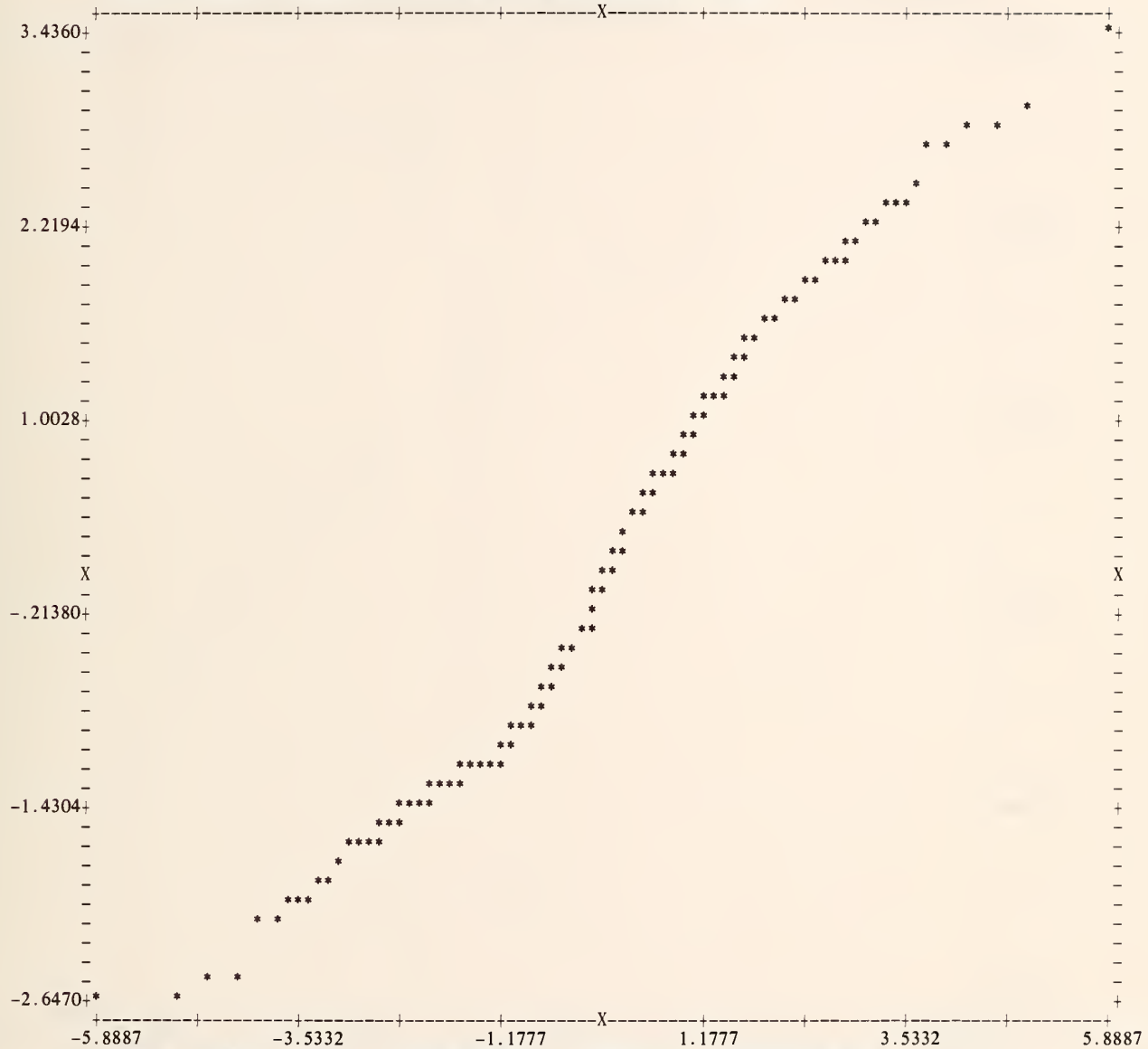
PROB. PLOT CORR. COEFF. = .9962, ESTIMATES * INTERCEPT = -.0029359998, SLOPE = 1.0213074

LOGISTIC PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1

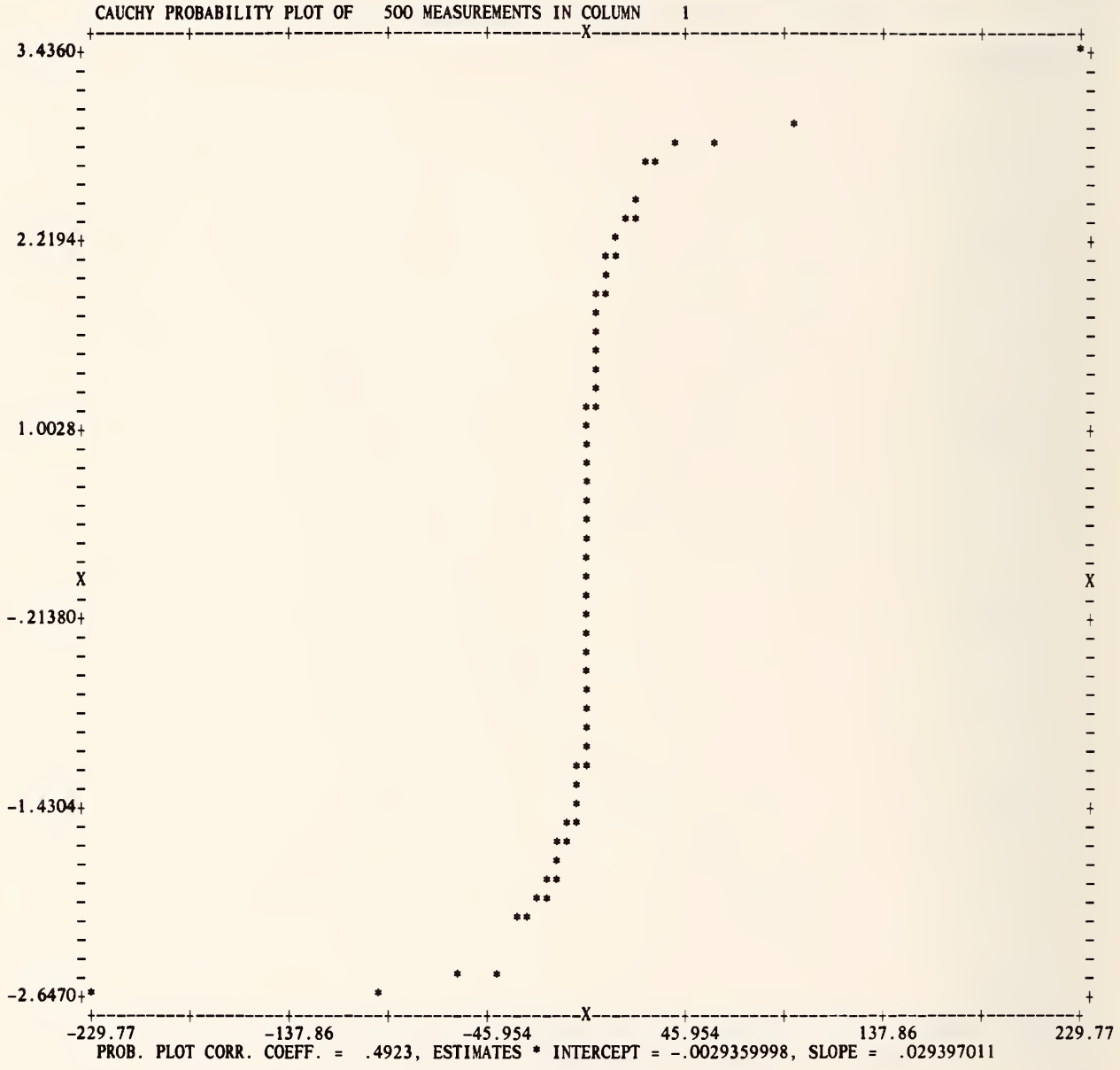


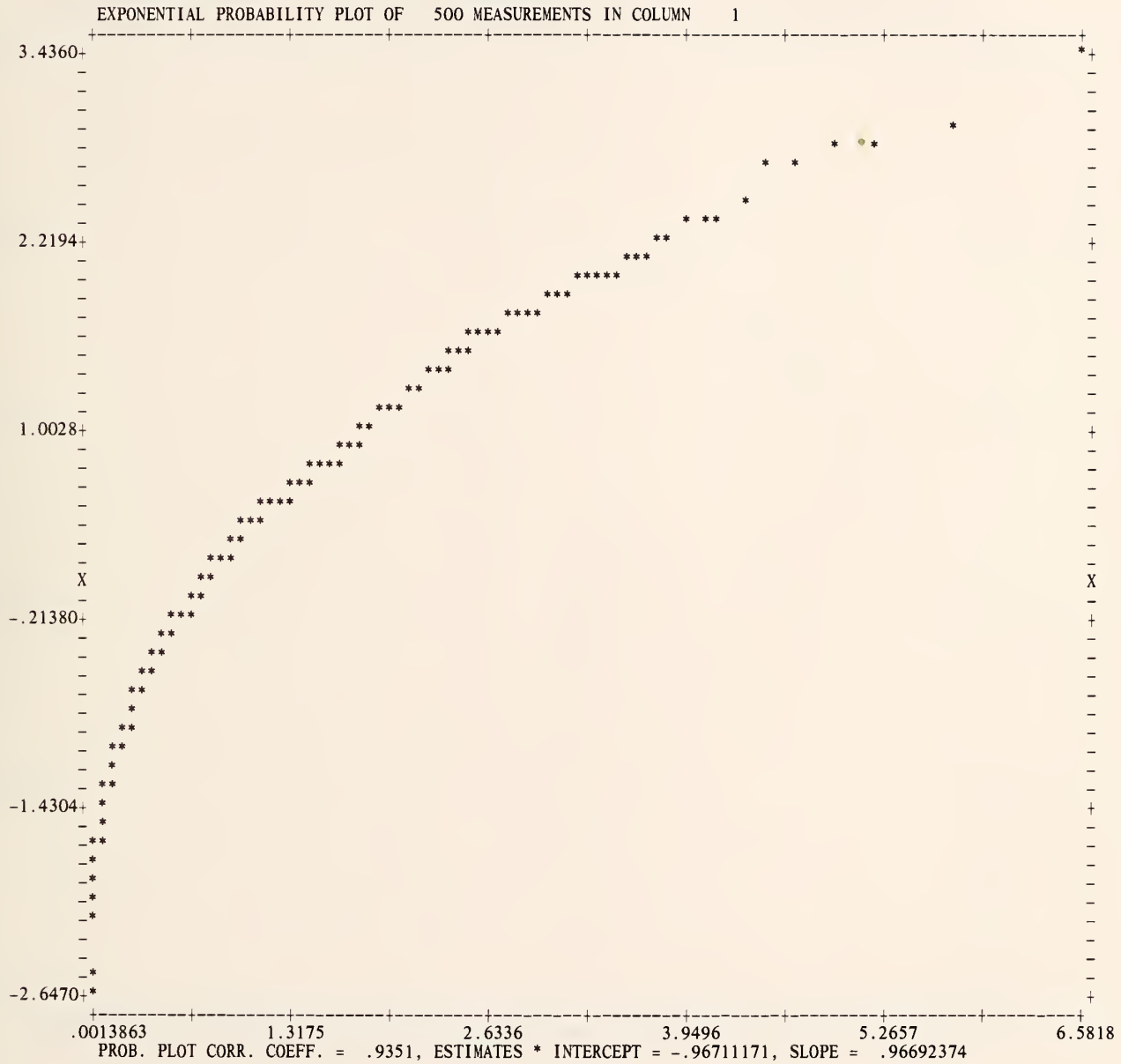
PROB. PLOT CORR. COEFF. = .9928, ESTIMATES * INTERCEPT = -.0029359998, SLOPE = .56394400

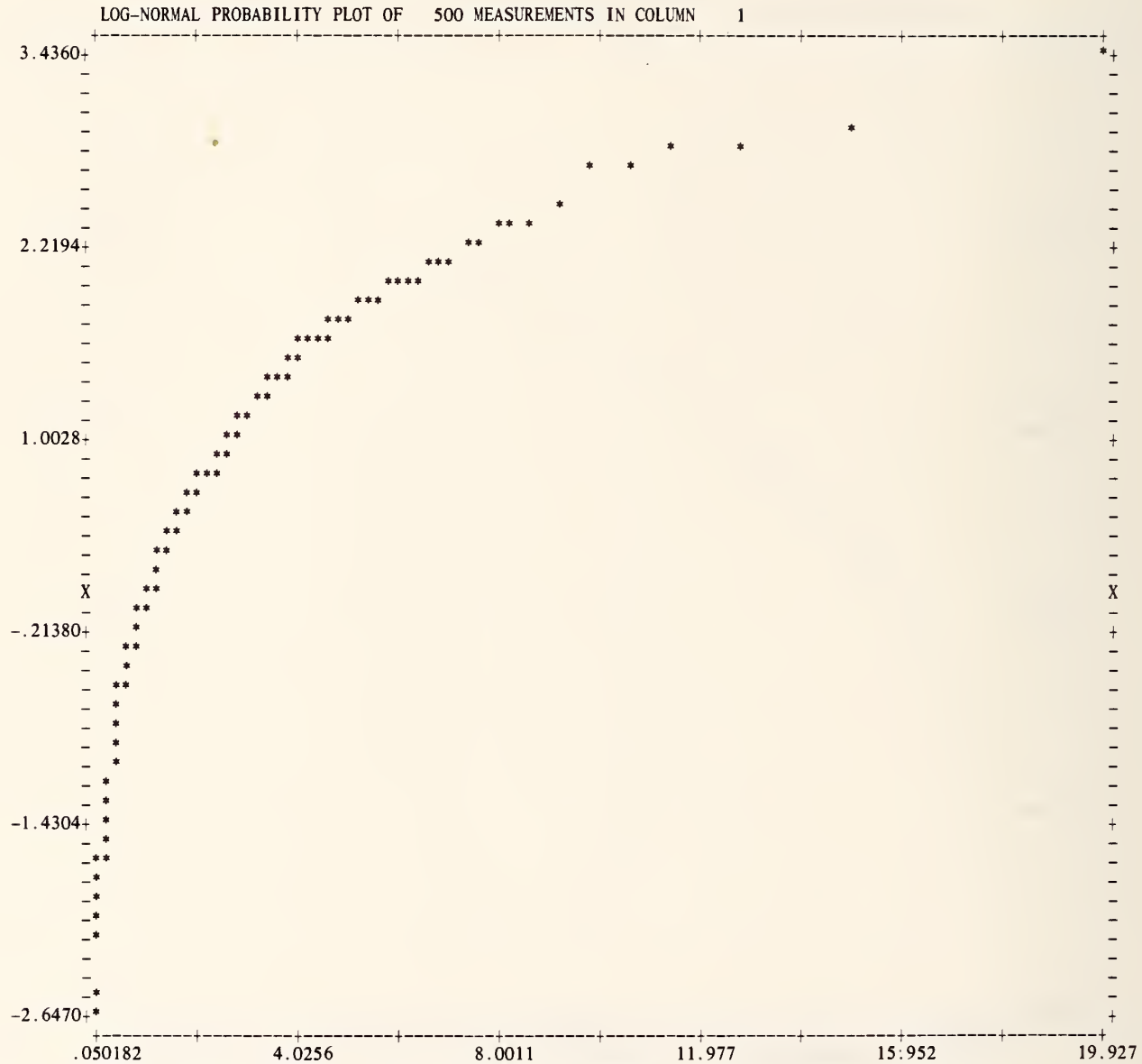
DOUBLE EXPONENTIAL PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1

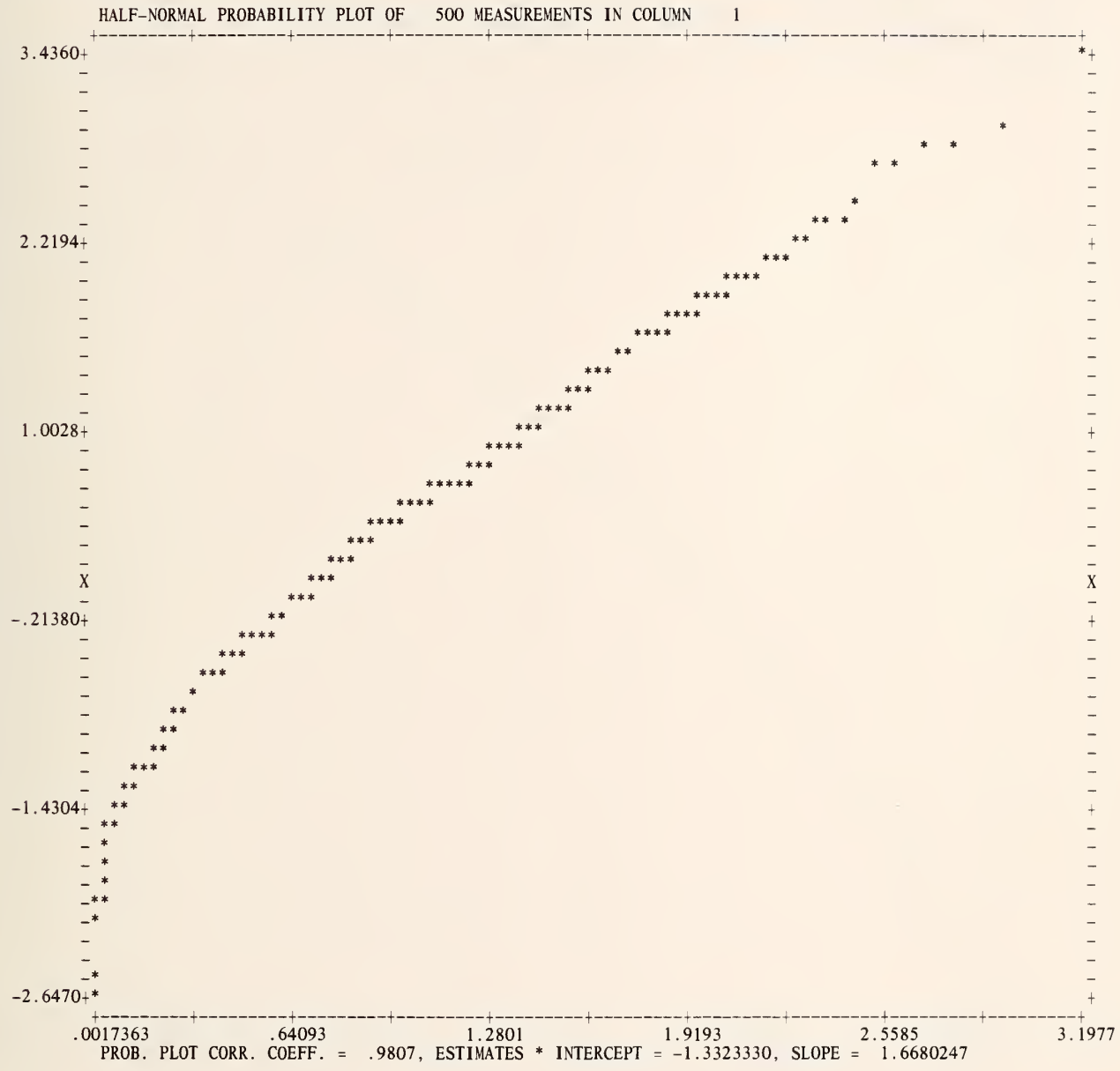


PROB. PLOT CORR. COEFF. = .9790, ESTIMATES * INTERCEPT = -.0029359998, SLOPE = .71637579

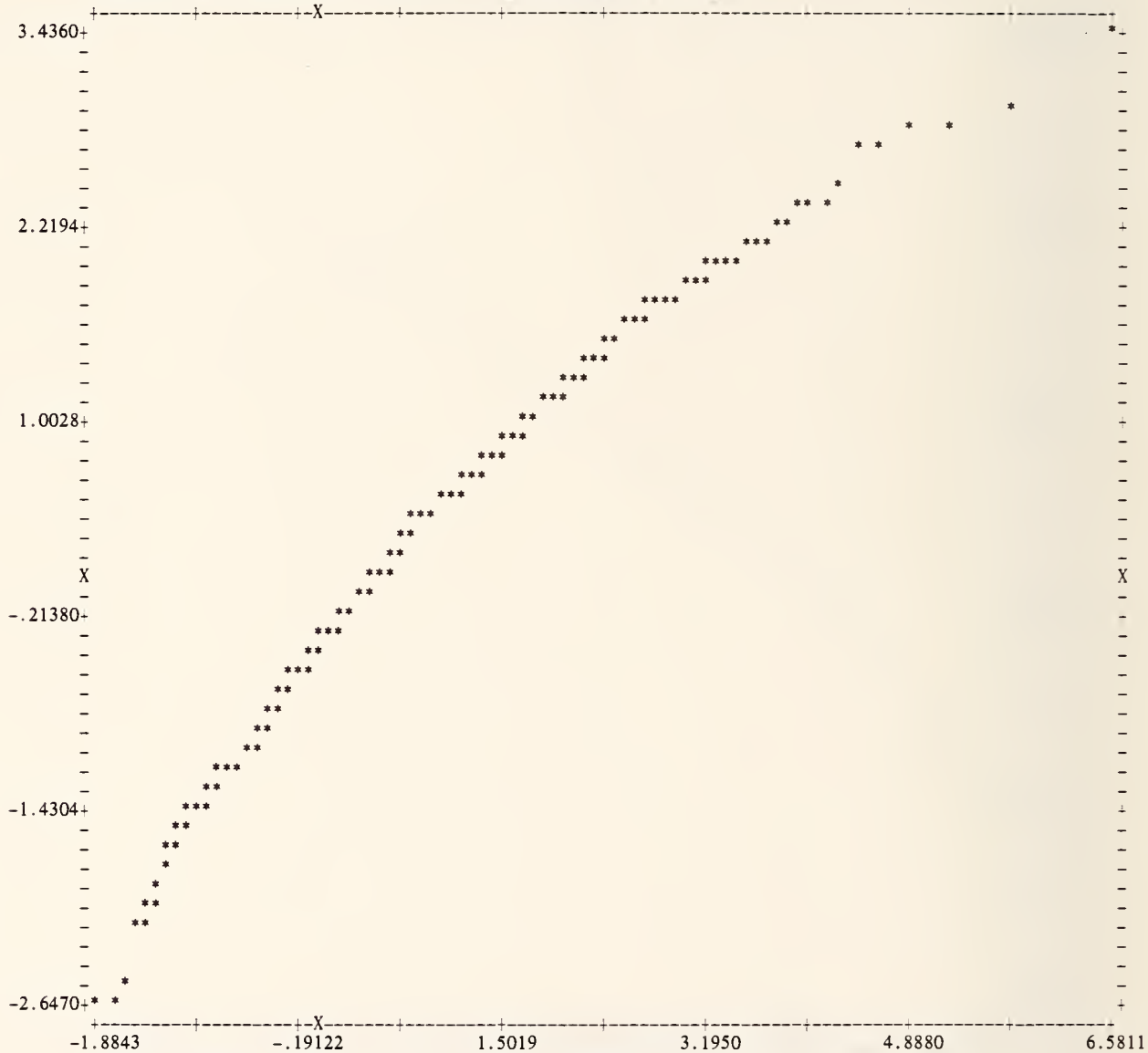

CAUCHY PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1
3.4360
2.2194
1.0028
X
-.21380
-1.4304
-2.6470
-229.77
-137.86
-45.954
45.954
137.86
229.77
PROB. PLOT CORR. COEFF. = .4923, ESTIMATES * INTERCEPT = -.0029359998, SLOPE = .029397011


EXPONENTIAL PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1
3.4360
2.2194
1.0028
-.21380
-1.4304
-2.6470
.0013863
1.3175
2.6336
3.9496
5.2657
6.5818
PROB. PLOT CORR. COEFF. = .9351, ESTIMATES * INTERCEPT = -.96711171, SLOPE = .96692374

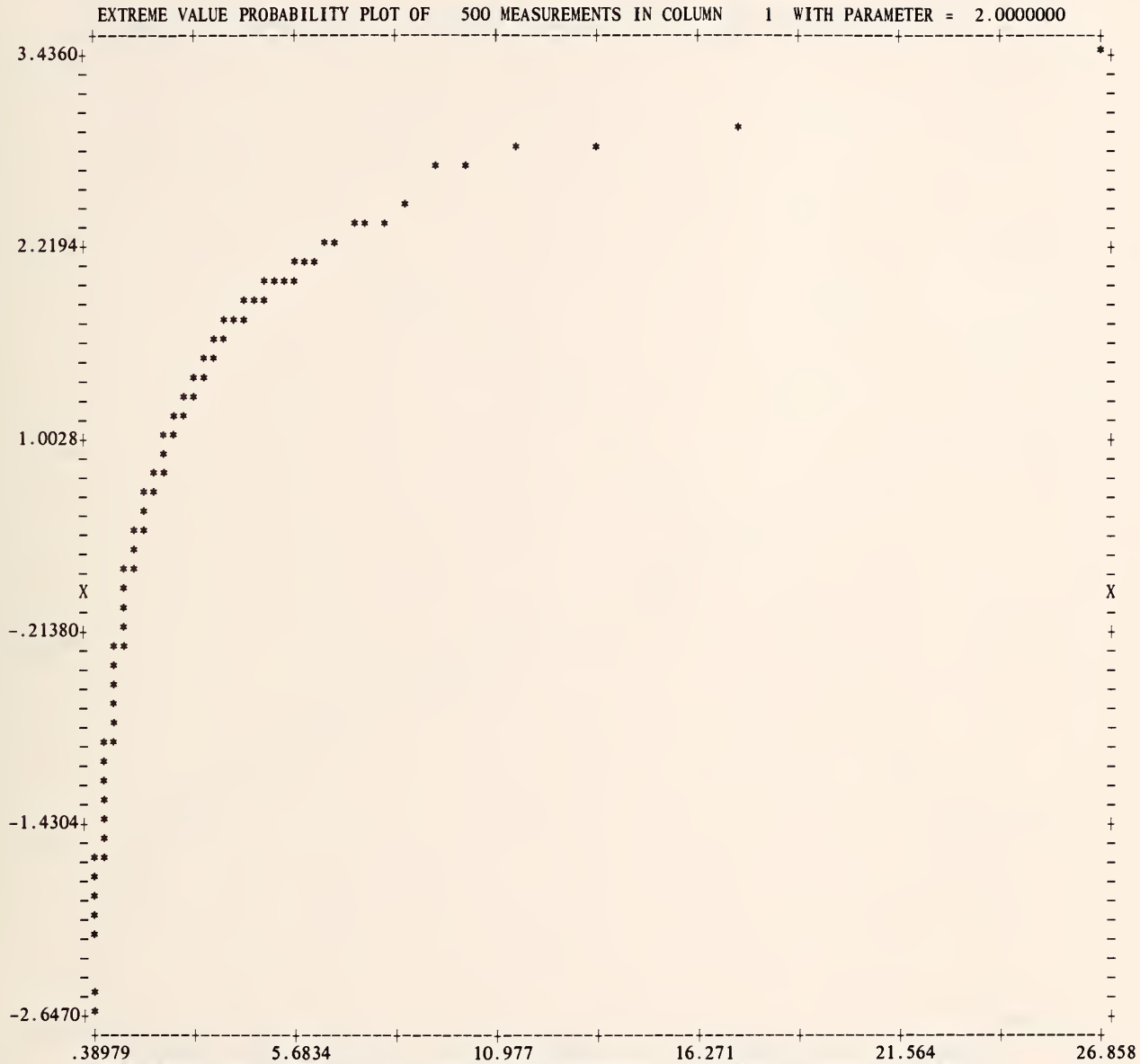

LOG-NORMAL PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1
3.4360
2.2194
1.0028
-.21380
-1.4304
-2.6470
.050182
4.0256
8.0011
11.977
15.952
19.927
PROB. PLOT CORR. COEFF. = .8334, ESTIMATES * INTERCEPT = -.69753332, SLOPE = .42526577


HALF-NORMAL PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1
3.4360
2.2194
1.0028
X
-.21380
-1.4304
-2.6470
.0017363
.64093
1.2801
1.9193
2.5585
3.1977
PROB. PLOT CORR. COEFF. = .9807, ESTIMATES * INTERCEPT = -1.3323330, SLOPE = 1.6680247

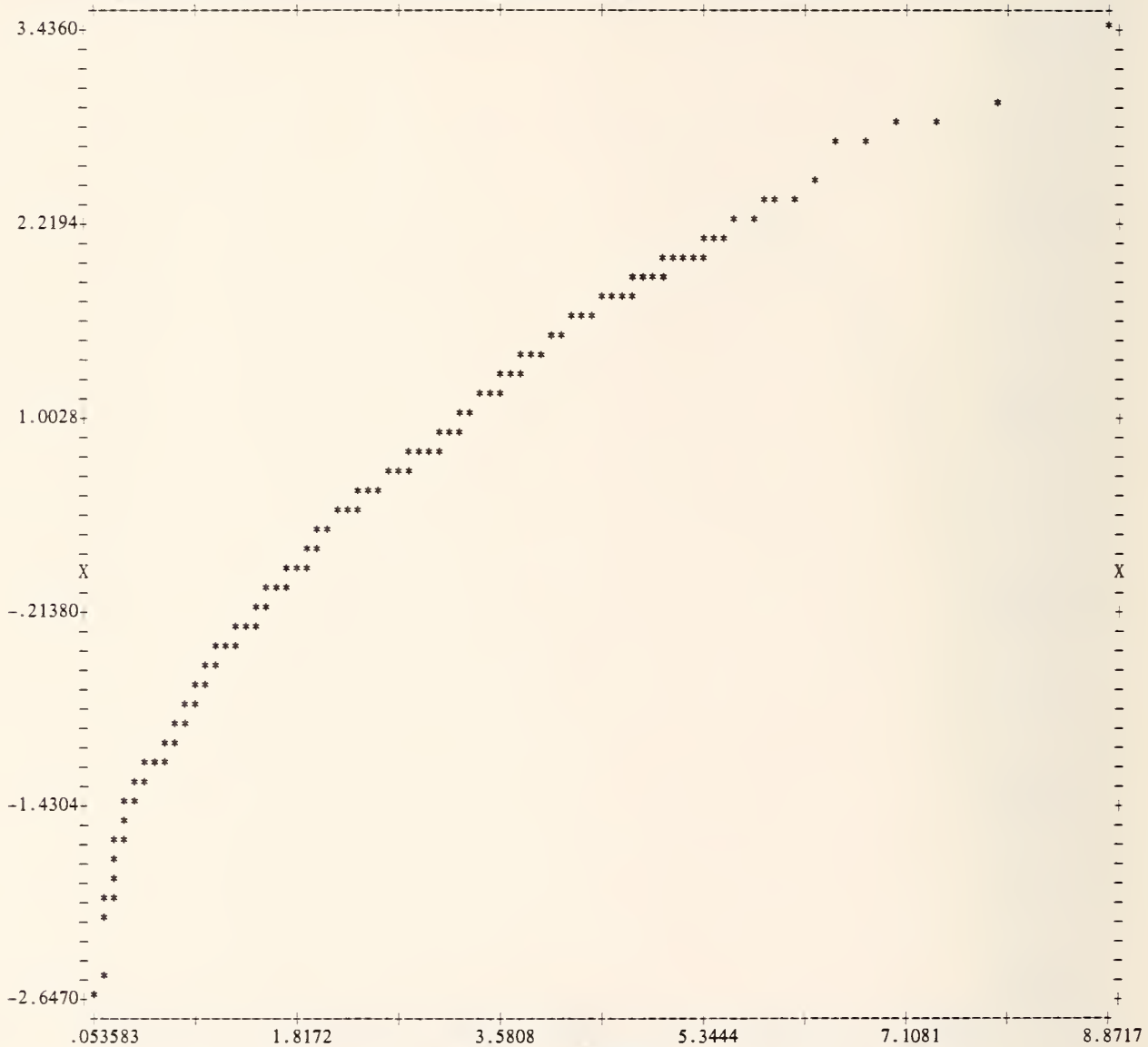
EXTREME VALUE PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1



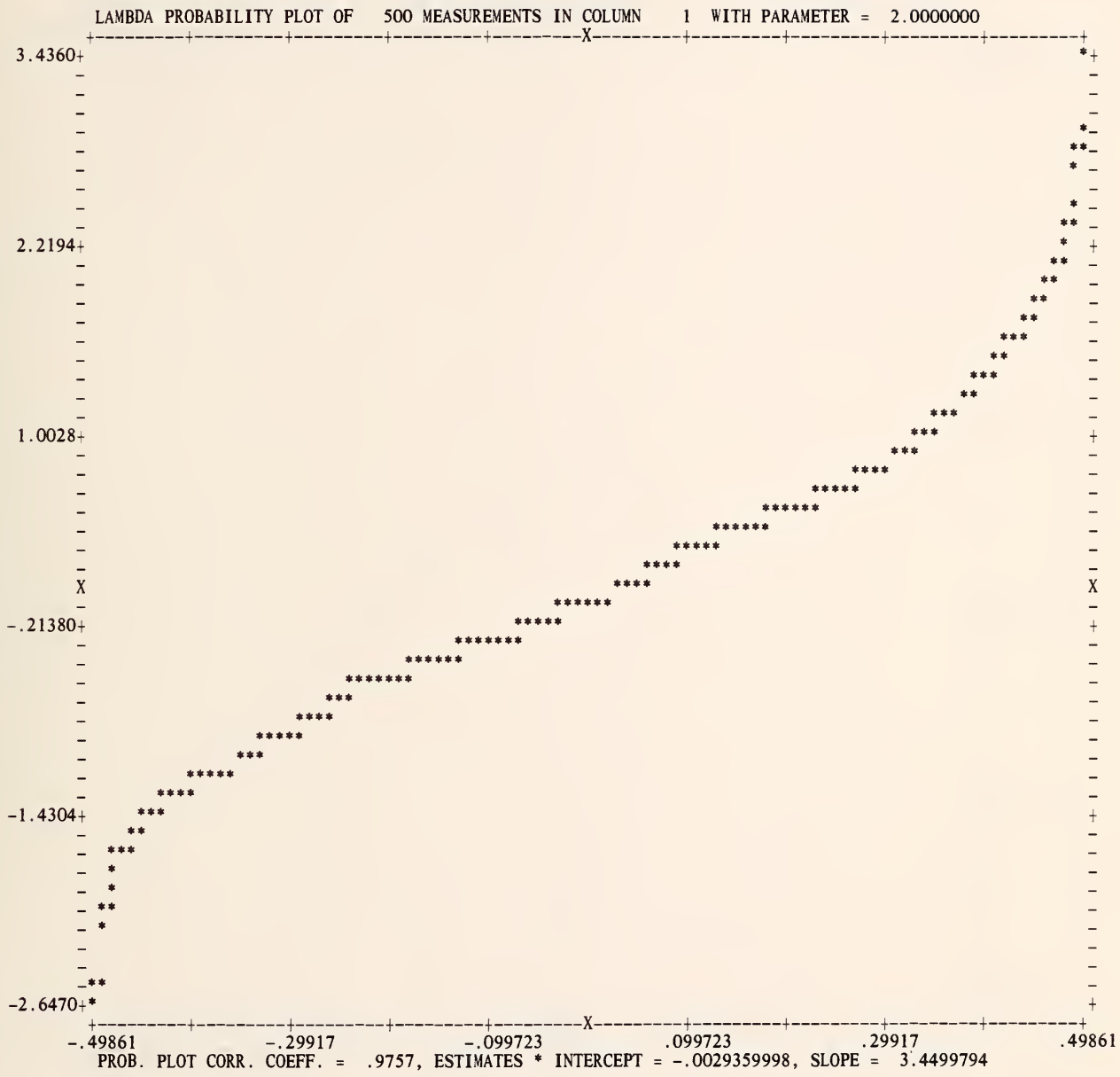
PROB. PLOT CORR. COEFF. = .9851, ESTIMATES * INTERCEPT = -.45777460, SLOPE = .79115441


EXTREME VALUE PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1 WITH PARAMETER = 2.0000000
3.4360
2.2194
1.0028
X
-.21380
-1.4304
-2.6470
.38979
5.6834
10.977
16.271
21.564
26.858
PROB. PLOT CORR. COEFF. = .7262, ESTIMATES * INTERCEPT = -.65159921, SLOPE = .37508196

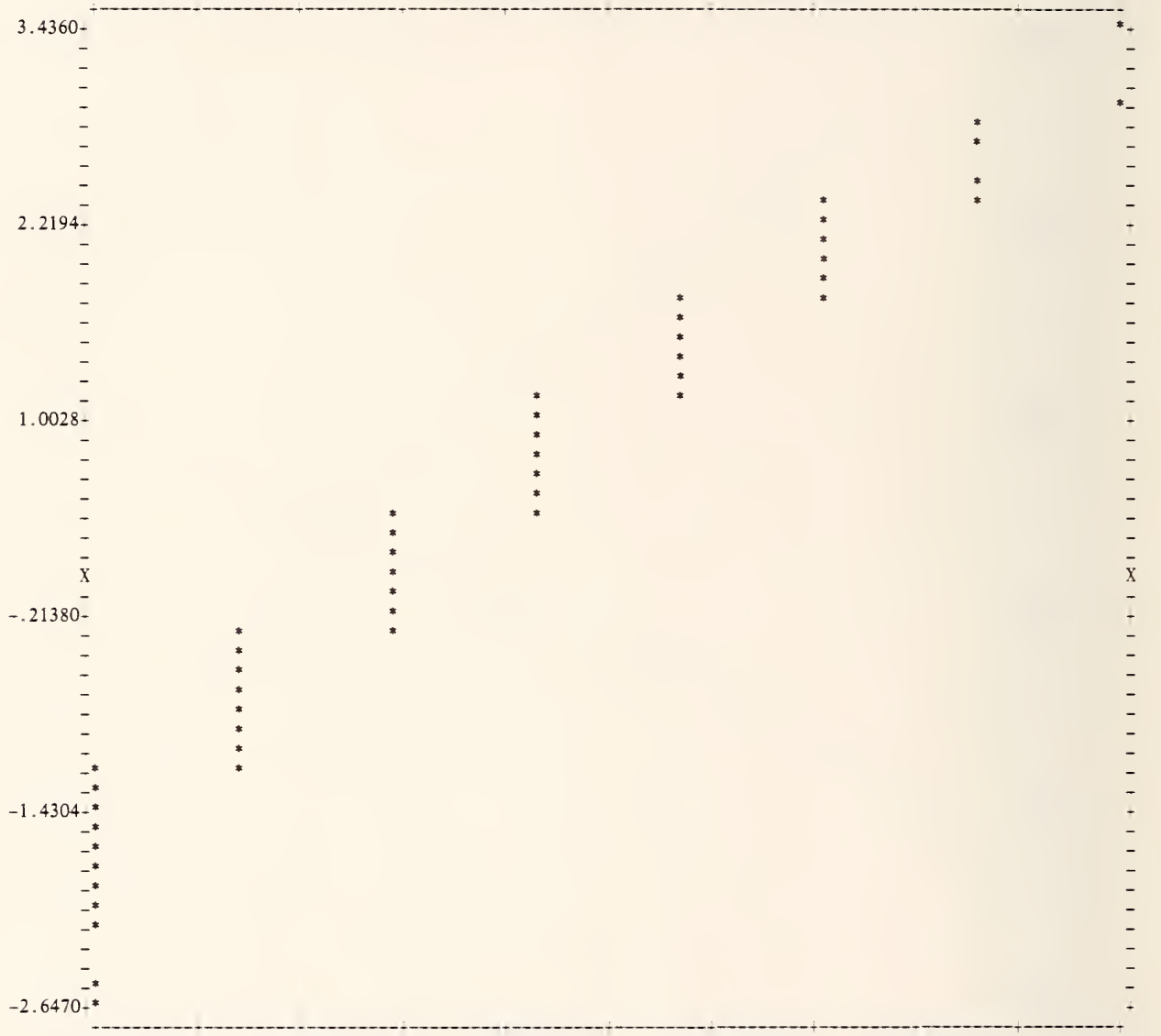
GAMMA PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1 WITH PARAMETER = 2.0000000



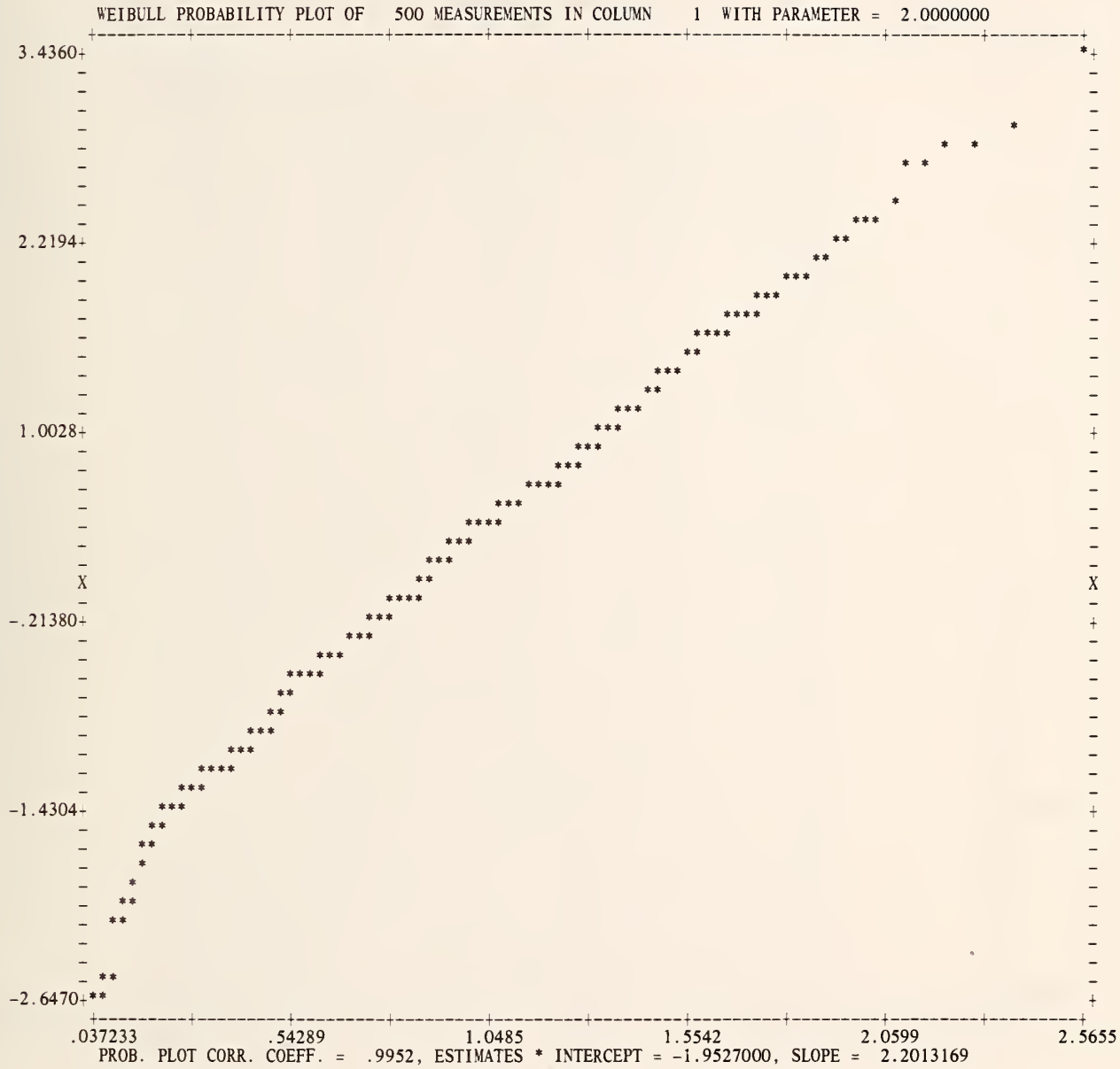
PROB. PLOT CORR. COEFF. = .9702, ESTIMATES * INTERCEPT = -1.4138613, SLOPE = .70654470

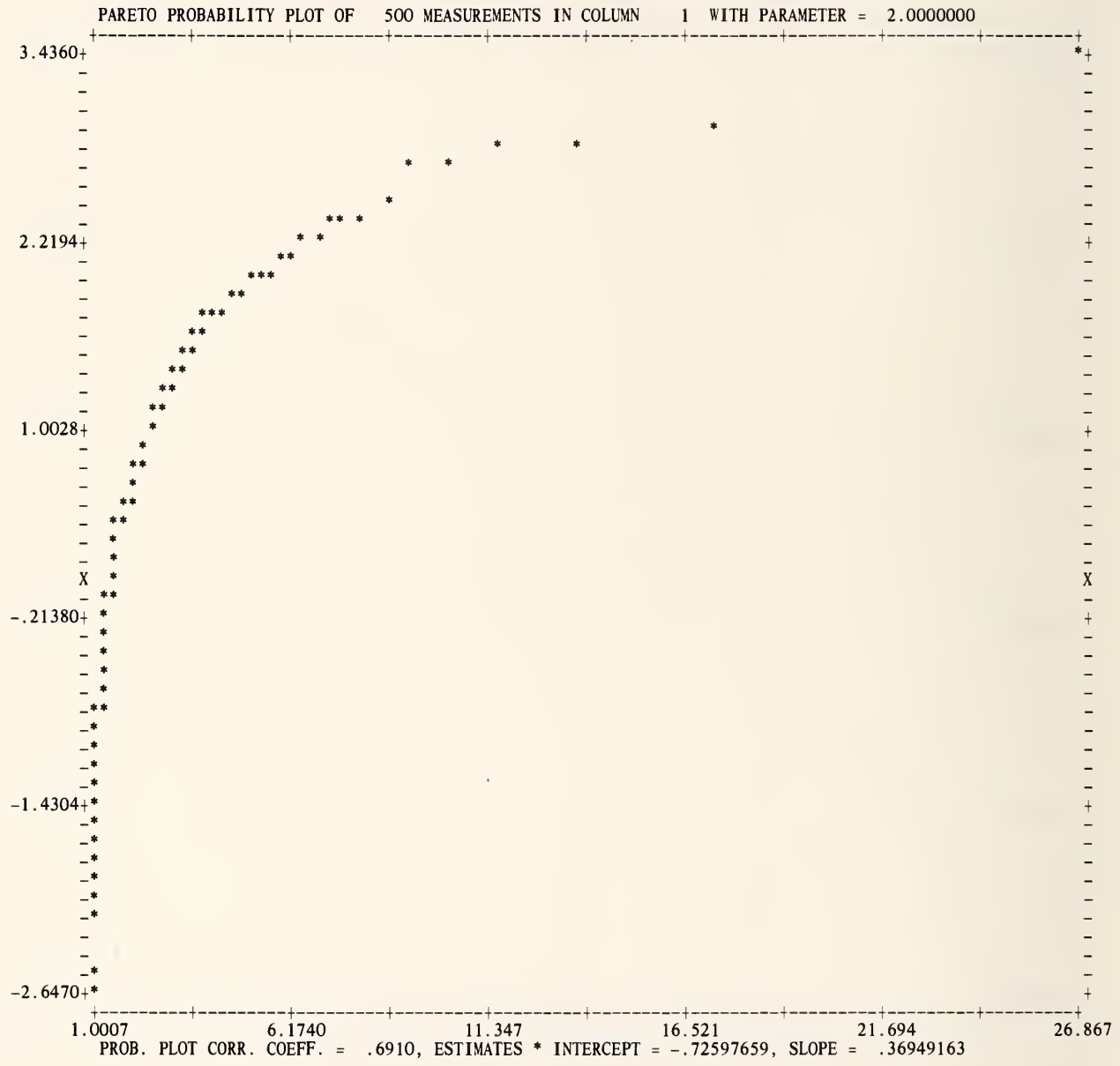

LAMBDA PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1 WITH PARAMETER = 2.0000000
3.4360
2.2194
1.0028
X
-.21380
-1.4304
-2.6470
-.49861
-.29917
-.099723
.099723
.29917
.49861
PROB. PLOT CORR. COEFF. = .9757, ESTIMATES * INTERCEPT = -.0029359998, SLOPE = 3.4499794

POISSON PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1 WITH PARAMETER = 2.0000000



PROB. PLOT CORR. COEFF. = .9683, ESTIMATES * INTERCEPT = -1.4068057, SLOPE = .70334153


WEIBULL PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1 WITH PARAMETER = 2.0000000
3.4360
2.2194
1.0028
X
-.21380
-1.4304
-2.6470
.037233
.54289
1.0485
1.5542
2.0599
2.5655
PROB. PLOT CORR. COEFF. = .9952, ESTIMATES * INTERCEPT = -1.9527000, SLOPE = 2.2013169


PARETO PROBABILITY PLOT OF 500 MEASUREMENTS IN COLUMN 1 WITH PARAMETER = 2.0000000
3.4360
2.2194
1.0028
X
-.21380
-1.4304
-2.6470
1.0007
6.1740
11.347
16.521
21.694
26.867
PROB. PLOT CORR. COEFF. = .6910, ESTIMATES * INTERCEPT = -.72597659, SLOPE = .36949163

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
DIMENSION 501 X 3
SET TEST DATA IN COLUMN 1
-1.276 -1.218 -0.453 -0.350  0.723  0.676 -1.099 -0.314 -0.394 -0.633
-0.318 -0.799 -1.664  1.391  0.382  0.733  0.653  0.219 -0.681  1.129
-1.377 -1.257  0.495 -0.139 -0.854  0.428 -1.322 -0.315 -0.732 -1.348
 2.334 -0.337 -1.955 -0.636 -1.318 -0.433  0.545  0.428 -0.297  0.276
-1.136  0.642  3.436 -1.667  0.847 -1.173 -0.355  0.035  0.359  0.930
 0.414 -0.011  0.666 -1.132 -0.410 -1.077  0.734  1.484 -0.340  0.789
-0.494  0.364 -1.237 -0.044 -0.111 -0.210  0.931  0.616 -0.377 -0.433
 1.048  0.037  0.759  0.609 -2.043 -0.290  0.404 -0.543  0.486  0.869
 0.347  2.816 -0.464 -0.632 -1.614  0.372 -0.074 -0.916  1.314 -0.038
 0.637  0.563 -0.107  0.131 -1.808 -1.126  0.379  0.610 -0.364 -2.626
 2.176  0.393 -0.924  1.911 -1.040 -1.168  0.485  0.076 -0.769  1.607
-1.185 -0.944 -1.604  0.185 -0.258 -0.300 -0.591 -0.545  0.018 -0.485
 0.972  1.710  2.682  2.813 -1.531 -0.490  2.071  1.444 -1.092  0.478
 1.210  0.294 -0.248  0.719  1.103  1.090  0.212 -1.185 -0.338 -1.134
 2.647  0.777  0.450  2.247  1.151 -1.676  0.384  1.133  1.393  0.814
 0.398  0.318 -0.928  2.416 -0.936  1.036  0.024 -0.560  0.203 -0.871
 0.846 -0.699 -0.368  0.344 -0.926 -0.797 -1.404 -1.472 -0.118  1.456
 0.654 -0.955  2.907  1.688  0.752 -0.434  0.746  0.149 -0.170 -0.479
 0.522  0.231 -0.619 -0.265  0.419  0.558 -0.549  0.192 -0.334  1.373
-1.288 -0.539 -0.824  0.244 -1.070  0.010  0.482 -0.469 -0.090  1.171
 1.372  1.769 -1.057  1.646  0.481 -0.600 -0.592  0.610 -0.096 -1.375
 0.854 -0.535  1.607  0.428 -0.615  0.331 -0.336 -1.152  0.533 -0.833
-0.148 -1.144  0.913  0.684  1.043  0.554 -0.051 -0.944 -0.440 -0.212
-1.148 -1.056  0.635 -0.328 -1.221  0.118 -2.045 -1.977 -1.133  0.338
 0.348  0.970 -0.017  1.217 -0.974 -1.291 -0.399 -1.209 -0.248  0.480
 0.284  0.458  1.307 -1.625 -0.629 -0.504 -0.056 -0.131  0.048  1.879
-1.016  0.360 -0.119  2.331  1.672 -1.053  0.840 -0.246  0.237 -1.312
 1.603 -0.952 -0.566  1.600  0.465  1.951  0.110  0.251  0.116 -0.957
-0.190  1.479 -0.986  1.249  1.934  0.070 -1.358 -1.246 -0.959 -1.297
-0.722  0.925  0.783 -0.402  0.619  1.826  1.272 -0.945  0.494  0.050
-1.696  1.879  0.063  0.132  0.682  0.544 -0.417 -0.666 -0.104 -0.253
-2.543 -1.333  1.987  0.668  0.360  1.927  1.183  1.211  1.765  0.35
-0.359  0.193 -1.023 -0.222 -0.616 -0.060 -1.319  0.785 -0.430 -0.298
 0.248 -0.088 -1.379  0.295 -0.115 -0.621 -0.618  0.209  0.979  0.906
-0.099 -1.376  1.047 -0.872 -2.200 -1.384  1.425 -0.812  0.748 -1.093
-0.463 -1.281 -2.514  0.675  1.145  1.083 -0.667 -0.223 -1.592 -1.278
 0.503  1.434  0.290  0.397 -0.837 -0.973 -0.120 -1.594 -0.996 -1.244
-0.857 -0.371 -0.216  0.148 -2.106 -1.453  0.686 -0.075 -0.243 -0.170
-0.122  1.107 -1.039 -0.636 -0.860 -0.895 -1.458 -0.539 -0.159 -0.420
 1.632  0.586 -0.468 -0.386 -0.354  0.203 -1.234  2.381 -0.388 -0.063
 2.072 -1.445 -0.680  0.224 -0.120  1.753 -0.571  1.223 -0.126  0.034
-0.435 -0.375 -0.985 -0.585 -0.203 -0.556  0.024  0.126  1.250 -0.615
 0.876 -1.227 -2.647 -0.745  1.797 -1.231  0.547 -0.634 -0.836 -0.719
 0.833  1.289 -0.022 -0.431  0.582  0.766 -0.574 -1.153  0.520 -1.018
-0.891  0.332 -0.453 -1.127  2.085 -0.722 -1.508  0.489 -0.496 -0.025
 0.644 -0.233 -0.153  1.098  0.757 -0.039 -0.460  0.393  2.012  1.356
 0.105 -0.171 -0.110 -1.145  0.878 -0.909 -0.328  1.021 -1.613  1.560
-1.192  1.770 -0.003  0.369  0.052  0.647  1.029  1.526  0.237 -1.328
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
-0.042  0.553  0.770  0.324 -0.489 -0.367  0.378  0.601 -1.996 -0.738
 0.498  1.072  1.567  0.302  1.157 -0.720  1.403  0.698 -0.370 -0.551
```

* INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
NRMAX HAS BEEN RESET FROM 0 TO 500.

```
UNIFORM       PLOT OF COLUMN 1
NORMAL        PLOT OF COLUMN 1
LOGISTIC      PLOT OF COLUMN 1
DEXPONENTIAL  PLOT OF COLUMN 1
CAUCHY        PLOT OF COLUMN 1
EXPONENTIAL   PLOT OF COLUMN 1
LOGNORMAL     PLOT OF COLUMN 1
HALFNORMAL    PLOT OF COLUMN 1
EXTREME       PLOT OF COLUMN 1
EXTREME PLOT WITH PARAMETER  2.0 OF COLUMN 1
GAMMA   PLOT WITH PARAMETER  2.0 OF COLUMN 1
LAMBDA  PLOT WITH PARAMETER  2.0 OF COLUMN 1
POISSON PLOT WITH PARAMETER  2.0 OF COLUMN 1
WEIBULL PLOT WITH PARAMETER  2.0 OF COLUMN 1
PARETO  PLOT WITH PARAMETER  2.0 OF COLUMN 1
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

OMNITAB 80 TEST 7 ARITHMETIC INSTRUCTIONS. (4.1) PAGE 1

COLUMNS 1 THROUGH 5 CONTAIN AN 11 BY 5 ARRAY DEFINED BY THE COMMANDS GENERATE, ADD AND MULTIPLY.
COL 6 AND 7 CONTAIN ROW SUMS OF THE ARRAY PRODUCED BY THE ROWSUM COMMAND. COL 8 CONTAINS ROW SUMS BY USING ADD COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
2.0000000	4.0000000	8.0000000	6.0000000	10.000000	30.000000	30.000000	30.000000
3.9876540	5.9876540	23.876692	9.9753079	27.864346	71.691654	71.691654	71.691654
5.9753080	7.9753080	47.654922	13.950616	53.630229	129.18638	129.18638	129.18638
7.9629620	9.9629619	79.334686	17.925924	87.297647	202.48418	202.48418	202.48418
9.9506160	11.950616	118.91599	21.901232	128.86661	291.58506	291.58506	291.58506
11.938270	13.938270	166.39883	25.876540	178.33710	396.48901	396.48900	396.48900
13.925924	15.925924	221.78321	29.851848	235.70913	517.19603	517.19602	517.19602
15.913578	17.913578	285.06911	33.827156	300.98269	653.70612	653.70611	653.70611
17.901232	19.901232	356.25657	37.802464	374.15780	806.01929	806.01929	806.01929
19.888886	21.888886	435.34555	41.777772	455.23444	974.13554	974.13553	974.13553
20.000000	22.000000	440.00000	42.000000	460.00000	984.00000	984.00000	984.00000

****

COLUMNS 6 7 AND 8 SHOULD CONTAIN THE SAME VALUES.
THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0. 0.

****

COLUMNS 1 THROUGH 5 CONTAIN AN 11 BY 5 ARRAY DEFINED BY THE COMMANDS GENERATE, ADD AND MULTIPLY.
COL 10 CONTAINS ROW BY ROW PRODUCT OF COLS 1 2 AND 3 USING PRODUCT COMMAND. COL 9 CONTAINS PRODUCT USING MULT COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 10	COLUMN 9
2.0000000	4.0000000	8.0000000	64.000000	64.000000
3.9876540	5.9876540	23.876692	* 5.7009643-02	* 5.7009643-02
5.9753080	7.9753080	47.654922	* 2.2709915-03	* 2.2709915-03
7.9629620	9.9629619	79.334686	* 6.2939924-03	* 6.2939924-03
9.9506160	11.950616	118.91599	* 1.4141013-04	* 1.4141013-04
11.938270	13.938270	166.39883	* 2.7688570-04	* 2.7688570-04
13.925924	15.925924	221.78321	* 4.9187790-04	* 4.9187790-04
15.913578	17.913578	285.06911	* 8.1264399-04	* 8.1264399-04
17.901232	19.901232	356.25657	* 1.2691874-05	* 1.2691874-05
19.888886	21.888886	435.34555	* 1.8952575-05	* 1.8952575-05
20.000000	22.000000	440.00000	* 1.9360000-05	* 1.9360000-05

****

COLUMNS 9 AND 10 SHOULD CONTAIN THE SAME VALUES.
THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE NOS. STARTING WITH 2. IN STEPS OF 1.987654 THRU 20.0 STORE IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   11.

ADD COLUMN 1 TO THE VALUE 2.0 AND STORE RESULTS IN COLUMN 2
MULTIPLY COLUMN 1 BY COLUMN 2 AND STORE PRODUCT IN COLUMN 3
ADD COLUMN 1 TO VALUES IN COLUMN 2 AND STORE SUM IN COL 4
ADD COL 1 TO COL 3 STORE IN COL 5
ROWSUM THE ENTIRE ARRAY ROW BY ROW STORE SUM IN COL 6
ROWSUM COLUMNS 1 THROUGH 5 AND STORE RESULTS IN COLUMN 7
ADD COLUMN 1 TO COL 2 STORE IN COL 8
ADD COLUMN 8 TO COL 3 STORE IN COL 8
ADD COLUMN 8 TO COL 4 STORE IN COL 8
ADD COLUMN 8 TO COL 5 STORE IN COL 8
TITLE1COLUMNS 1 THROUGH 5 CONTAIN AN 11 BY 5 ARRAY DEFINED BY THE
TITLE2COMMANDS GENERATE, ADD AND MULTIPLY.
TITLE3COL 6 AND 7 CONTAIN ROW SUMS OF THE ARRAY PRODUCED BY THE RO
TITLE4WSUM COMMAND. COL 8 CONTAINS ROW SUMS BY USING ADD COMMAND.
PRINT 1***8
SUBTRACT COL 6 FROM COL 7 STORE IN COLUMN 9
SUBTRACT COL 8 FROM COL 7 STORE IN COLUMN 10
SPACE
NOTE ********************************************************************************
SPACE
NOTE COLUMNS 6 7 AND 8 SHOULD CONTAIN THE SAME VALUES.
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 9 AND 10
SPACE
NOTE ********************************************************************************
PRODUCT OF COLUMNS 1 2 AND 3 ROW BY ROW AND STORE IN COL 10
MULT COL 1 BY COL 2 STORE IN COL 9
MULT COL 9 BY COL 3 STORE IN COL 9
TITLE3COL 10 CONTAINS ROW BY ROW PRODUCT OF COLS 1 2 AND 3 USING
TITLE4PRODUCT COMMAND. COL 9 CONTAINS PRODUCT USING MULT COMMAND.
SUBTRACT COL 9 FROM COLUMN 10 AND STORE COLUMN 11
SUM COL 11 STORE IN COLUMN 12
PRINT COLUMNS 1***3 10 9
SPACE
NOTE ********************************************************************************
SPACE
NOTE COLUMNS 9 AND 10 SHOULD CONTAIN THE SAME VALUES.
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 12
SPACE
NOTE ********************************************************************************

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```

OMNITAB 80 TEST 8 CHANGE INSTRUCTION. (4.2) PAGE 1
COLUMNS 1 THROUGH 8 WERE DEFINED BY THE READ COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1.0000000	2.0000000	3.0000000	4.0000000	5.0000000	6.0000000	7.0000000	8.0000000
9.0000000	10.000000	11.000000	12.000000	13.000000	14.000000	15.000000	.16000000
20.000000	30.000000	40.000000	0.	0.	0.	0.	0.

THE FOLLOWING VALUES WERE PRINTED BY THE COMMAND NPRINT.
THE SIGNS OF THE VALUES IN COLUMNS 2, 3 AND 8 HAVE BEEN CHANGED.

1.0000000	-2.0000000	-3.0000000	4.0000000	5.0000000	6.0000000	7.0000000	-8.0000000
9.0000000	-10.000000	-11.000000	12.000000	13.000000	14.000000	15.000000	-.16000000
20.000000	-30.000000	-40.000000	0.	0.	0.	0.	0.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING VALUES INTO COLUMNS 1***8
1. 2. 3. 4. 5. 6. 7. 8.
9. 10. 11. 12. 13. 14. 15. .16
20.  30   40

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    0 TO    3.

TITLE1COLUMNS 1 THROUGH 8 WERE DEFINED BY THE READ COMMAND.
PRINT COLUMNS 1***8
ROWSUM COLUMNS 2 3 AND 8 AND STORE IN COLUMN 9
CHANGE THE SIGNS OF THE VALUES IN COLUMNS 2 3 AND 8
ROWSUM COLUMNS 2 3 AND 8 AND STORE IN COLUMN 10
SPACE
NOTE THE FOLLOWING VALUES WERE PRINTED BY THE COMMAND NPRINT.
NOTE THE SIGNS OF THE VALUES IN COLUMNS 2, 3 AND 8 HAVE BEEN CHANGED.
SPACE
NPRINT COLUMNS 1***8 WITH NO HEADINGS
ADD  COLUMN  9 TO COLUMN 10 STORE IN COLUMN 11
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 11
SPACE
NOTE ********************************************************************************
```

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COL 1 X	COL 2 EXP(X)	COL 3 EXP(-X)	COL 4 NATURAL LOG(X)	COL 5 LOG BASE 10
.25000000	1.2840254	.77880079	-1.3862944	-.60205999
.50000000	1.6487213	.60653066	-.69314718	-.30103000
.75000000	2.1170000	.47236655	-.28768207	-.12493874
1.0000000	2.7182818	.36787944	0.	0.
1.2500000	3.4903429	.28650480	.22314355	.096910013
1.5000000	4.4816891	.22313016	.40546511	.17609126
1.7500000	5.7546027	.17377394	.55961579	.24303805
2.0000000	7.3890561	.13533528	.69314718	.30103000
2.2500000	9.4877359	.10539922	.81093021	.35218252
2.5000000	12.182494	.082084998	.91629073	.39794001
2.7500000	15.642632	.063927861	1.0116009	.43933269
3.0000000	20.085537	.049787068	1.0986123	.47712126
3.2500000	25.790340	.038774208	1.1786550	.51188336
3.5000000	33.115452	.030197383	1.2527630	.54406805
3.7500000	42.521082	.023517746	1.3217558	.57403127
4.0000000	54.598150	.018315639	1.3862944	.60205999

COL 2 EXP(X)	COL 6 INTEGRAL PART OF EXP(X)	COL 7 FRACTIONAL PART OF EXP(X)
1.2840254	1.0000000	.28402542
1.6487213	1.0000000	.64872128
2.1170000	2.0000000	.11700001
2.7182818	2.0000000	.71828184
3.4903429	3.0000000	.49034294
4.4816891	4.0000000	.48168910
5.7546027	5.0000000	.75460267
7.3890561	7.0000000	.38905609
9.4877359	9.0000000	.48773587
12.182494	12.000000	.18249393
15.642632	15.000000	.64263189
20.085537	20.000000	.085536957
25.790340	25.000000	.79033995
33.115452	33.000000	.11545181
42.521082	42.000000	.52108192
54.598150	54.000000	.59815025

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE X FROM .25 IN INTERVALS OF .25 THRU 4. IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   16.

EXP  OF COL 1 STORE IN COL 2
NEGEXPONENT OF COL 1 STORE IN COL 3
DIVIDE COL 2 BY COL 3 STORE IN COL 21
LOGE COL 1 STORE IN COL 4
LOGTEN COL 1 STORE IN COL 5
ANTILOG OF COL 5 STORE IN COL 22
INTEGER PART OF COL 2 STORE IN COL 6
FRACTIONAL PART OF COL 2 STORE IN COL 7
SUBTRACT COL 6 FROM COL 2 MULT BY -1.0 ADD TO COL 7 STORE IN COL 23
NEW PAGE
NOTE        COL 1          COL 2          COL 3          COL 4          COL 5
NOTE          X           EXP(X)         EXP(-X)    NATURAL LOG(X)   LOG BASE 10
SPACE
NPRINT COLS 1 *** 5
SPACE  2
NOTE        COL 2          COL 6          COL 7
NOTE       EXP(X)     INTEGRAL PART  FRACTIONAL PART
NOTE                    OF EXP(X)       OF EXP(X)
SPACE
NPRINT COLS 2  6  7
DEFINE 0.0 IN COL 17
SQUARE COL 2 STORE IN 18
DEFINE COL 1 INTO COL 19
ADD  1.0 TO 0.0 STORE IN COL 15
1/ SUBTRACT COL 21 FROM COL 18 STORE IN COL 21
3/ ABS COL 21 STORE IN 21
4/IFNE 0. IS NOT=TO ANY VAL IN 21 OF TOL =1.E-5 DO NOT EXEC. REST OF STORED COM.
5/ INCREMENT INSTRUCTION 1 BY 1 1 AND 1
6/ INCREMENT  INSTRUCTION 3 BY  1 AND 1
7/ INCREMENT INSTRUCTION 4 BY 0.0 1 AND 0.0
7.5/ IFEQ ANY VALUE IN COL 15 IS = TO 2. TERMINATE FOLLOWING REPEAT INST.
8/ REPEAT  INSTRUCTIONS 1 THRU 7.5, 2 TIMES
10/RESTORE INSTRUCTION 1 TO 23 17 23
11/ ADD 1.0 TO COL 15 STORE IN 15
REPEAT  INSTRUCTIONS 8 THRU 11, 2 TIMES
SPACE  2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE  ROW 1 COL 21 22 23
SPACE
NOTE ********************************************************************************

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COL 1 X	COL 2 SIN X	COL 3 COS X	COL 4 TAN X	COL 5 COT X
-1.0000000	-.84147099	.54030231	-1.5574077	-.64209261
-.80000000	-.71735609	.69670671	-1.0296385	-.97121461
-.59999999	-.56464247	.82533562	-.68413679	-1.4616960
-.40000000	-.38941834	.92106099	-.42279322	-2.3652224
-.20000000	-.19866933	.98006658	-.20271003	-4.9331549
.20000000	.19866933	.98006658	.20271003	4.9331549
.40000000	.38941834	.92106099	.42279322	2.3652224
.59999999	.56464247	.82533562	.68413679	1.4616960
.80000000	.71735609	.69670671	1.0296385	.97121461
1.0000000	.84147099	.54030231	1.5574077	.64209261

****

(SIN(X))**2-(COS(X))**2=1.0.
TAN(X)-(SIN(X)/COS(X))=0.
COT(X)-(COS(X)/SIN(X))=0.
THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 1.0, 0.0 AND 0.0.

1.0000000 0. 0.

****

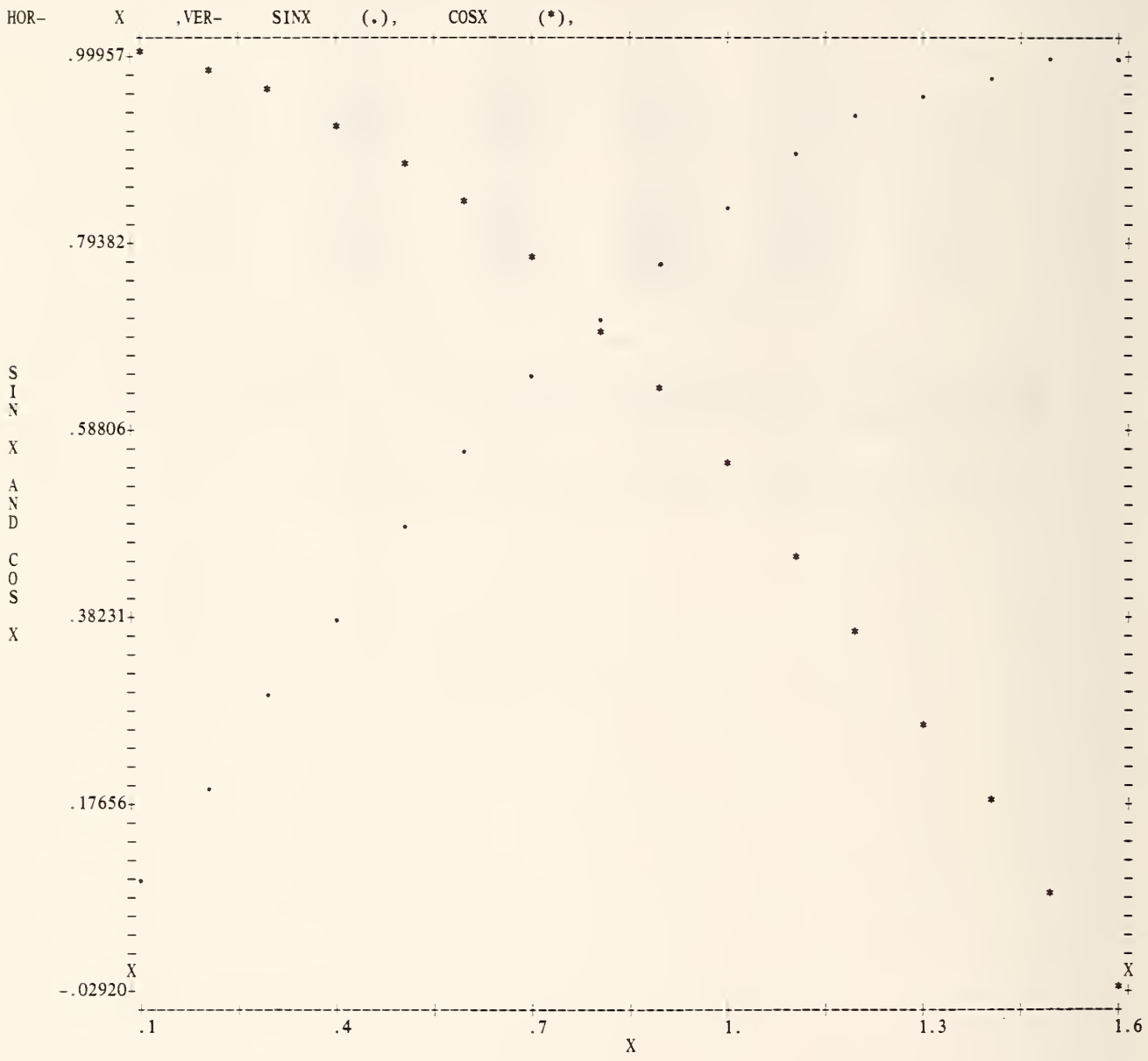
COL 1 X	COL 6 ARCSIN X	COL 7 ARCCOS X	COL 8 ARCTAN X	COL 9 ARCCOT X
-1.0000000	1.0000001	1.0000000	1.0000000	1.0000000
-.80000000	.80000004	.80000000	.80000000	.80000000
-.59999999	.59999999	.59999999	.59999999	.59999999
-.40000000	.40000000	.40000001	.40000000	.40000000
-.20000000	.20000000	.20000002	.20000000	.20000000
.20000000	.20000000	.20000002	.20000000	.20000000
.40000000	.40000000	.40000001	.40000000	.40000000
.59999999	.59999999	.59999999	.59999999	.59999999
.80000000	.79999995	.80000000	.80000000	.80000000
1.0000000	.99999997	1.0000000	1.0000000	1.0000000

****

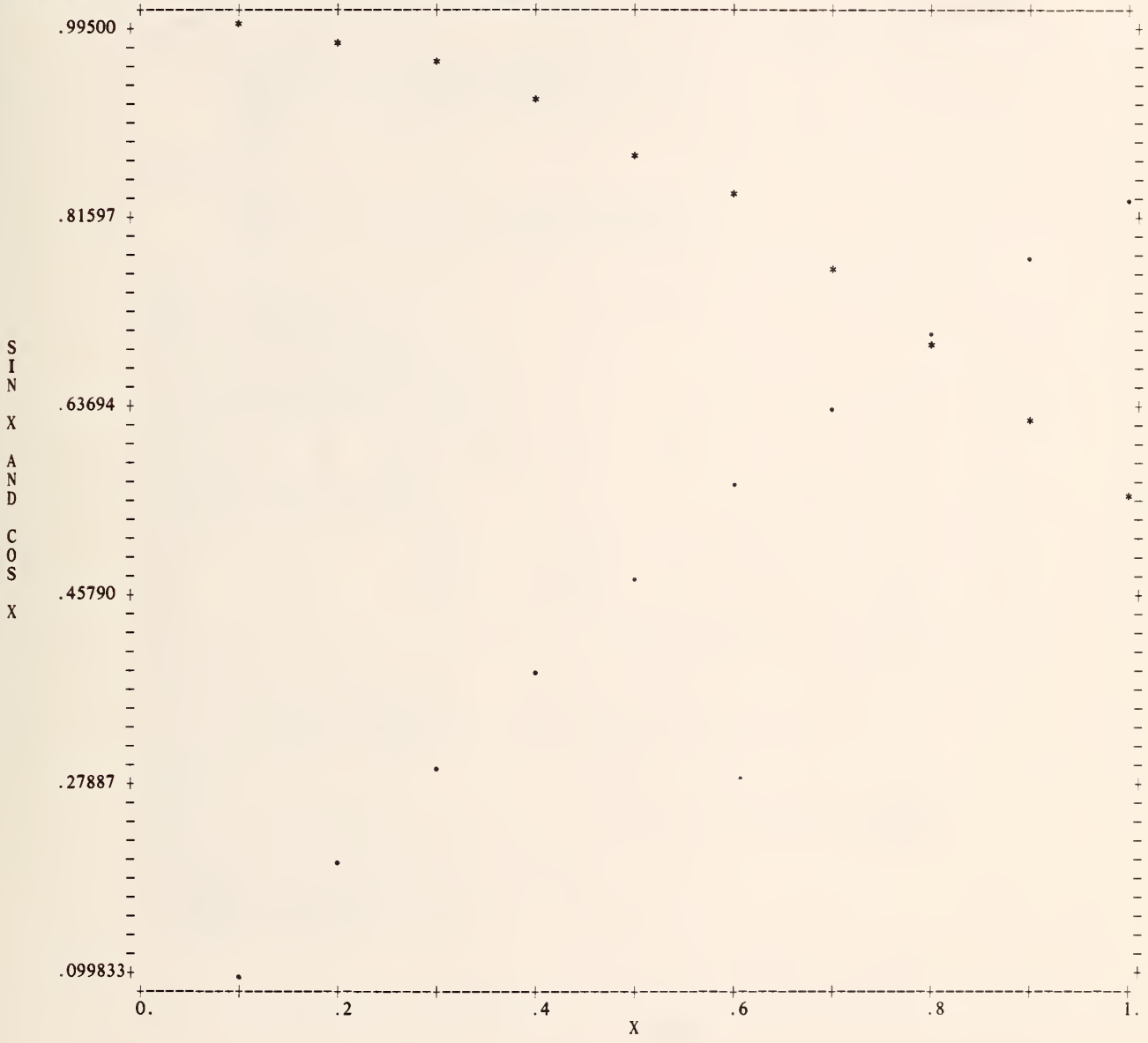
THE FOLLOWING VALUES ARE NUMBER OF SIGNIFICANT DIGITS FOR THE
ABSOLUTE VALUES OF X, ARCSIN, ARCCOS, ARCTAN, AND ARCCOT.
(THE VALUE FOR NUMBER OF SIGNIFICANT DIGITS IS 8.0 FOR NBS COMPUTER.)

8.0000000	7.7129689	7.7500554	7.9811922	7.9811922

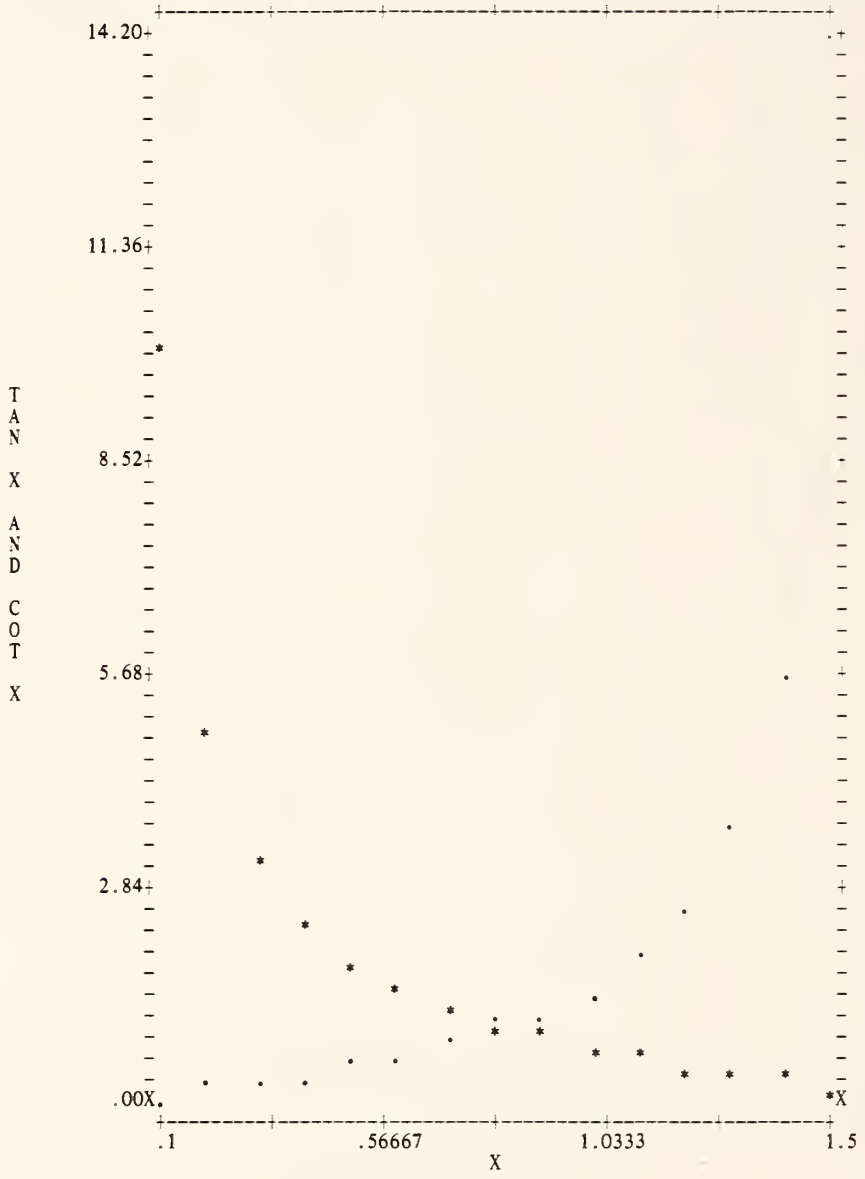
****


HOR- X ,VER- SINX (.), COSX (*),
.99957
.79382
.58806
.38231
.17656
-.02920
SIN X AND COS X
.1
.4
.7
1.
1.3
1.6
X

HOR- X ,VER- SINX (.), COSX (*),
POINTS PLOTTED 20, POINTS NOT PLOTTED - OUT OF BOUND 12



HOR- X
VER- TANX (.), COTX (*),
POINTS PLOTTED 30, POINTS NOT PLOTTED - OUT OF BOUND 2



LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
LABEL X,SINX,COSX,TANX,COTX

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (X) IS IN COL (1), (SINX) IS IN COL (2)
       (COSX) IS IN COL (3), (TANX) IS IN COL (4)
       (COTX) IS IN COL (5)

SET FOLLOWING DATA IN X
-1.,-.8,-.6,-.4,-.2,.2,.4,.6,.8,1.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

SIN OF X STORE RESULTS IN COL 2
COS OF X STORE RESULTS IN COL 3
TAN OF X STORE RESULTS IN COL 4
COT OF X STORE RESULTS IN COL 5
ASIN OF SINX STORE RESULTS IN COL 6
ACOS OF COSX STORE RESULTS IN COL 7
ATAN OF TANX STORE RESULTS IN COL 8
ACOT OF COTX STORE RESULTS IN COL 9
EVALUATE 12 = SINX **2. + COSX **2.
EVALUATE 13 = TANX - ( SINX / COSX )
EVALUATE 14 = COTX - ( COSX / SINX )
AVERAGE COL 12 STORE IN COL 12
AVERAGE COL 13 STORE IN COL 13
AVERAGE COL 14 STORE IN COL 14
NEW PAGE
NOTE        COL 1          COL 2          COL 3          COL 4          COL 5
NOTE          X            SIN X          COS X          TAN X          COT X
SPACE
NPRINT COLS 1 *** 5
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE (SIN(X))**2+(COS(X))**2=1.0.
NOTE TAN(X)-(SIN(X)/COS(X))=0.
NOTE COT(X)-(COS(X)/SIN(X))=0.
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 1.0, 0.0 AND 0.0.
SPACE
ABRIDGE ROW 1 COLS 12 13 14
SPACE
NOTE ***************************************************************************
ADD COL 1 TO 0.0 STORE IN COL 5
1/ABSOLUTE COL 5 STORE IN 5
2/ACCURACY OF COL 5 VS COL 5 STORE IN COL 10
3/AVERAGE COL 10 STORE IN COL 10
4/INCREMENT INSTRUCTION 1 BY 1 1
5/INCREMENT INSTRUCTION 2 BY 0 1 1
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
6/INCREMENT INSTRUCTION 3 BY 1 1
REPEAT INSTRUCTIONS 1 THRU 6, 5 TIMES
NEW PAGE
NOTE        COL 1          COL 6          COL 7          COL 8          COL 9
NOTE          X           ARCSIN X       ARCCOS X       ARCTAN X       ARCCOT X
SPACE
NPRINT COLS 1 6***9
SPACE  2
NOTE ***************************************************************************
NOTE
NOTE THE FOLLOWING VALUES ARE NUMBER OF SIGNIFICANT DIGITS FOR THE
NOTE ABSOLUTE VALUES OF X, ARCSIN, ARCCOS, ARCTAN, AND ARCCOT.
NOTE (THE VALUE FOR NUMBER OF SIGNIFICANT DIGITS IS 8.0 FOR NBS COMPUTER.)
SPACE
ABRIDGE ROW 1 COLS 10***14
SPACE
NOTE ***************************************************************************
GENERATE FROM 0.1 IN STEPS OF .1 THRU 1.6 IN X

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   10 TO   16.

SIN OF COL 1 STORE IN COL 2
COS OF COL 1 STORE IN COL 3
TAN OF COL 1 STORE IN COL 4
COT OF COL 1 STORE IN COL 5
TITLEY                  SIN X AND COS X
TITLEX                                X
PLOT SINX AND COSX VS. X
NEW PAGE
NPLOT SINX AND COSX VS. X HORIZONTAL LIMITS 0.0 THRU 1.0
TITLEX                             X
TITLEY                  TAN X AND COT X
PAGE PLOT COLS 4 AND 5 (TAN AND COT) Y FROM 0.0 TO 14.2 VS. COL 1 FROM .1 TO 1.5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OMNITAB 80 TEST 11 TRIGONOMETRIC FUNCTIONS. (4.4)
EVALUATE SINE, COSINE, TANGENT, AND COTANGENT OF X, X IN DEGREES.

COL 1 X DEGREES	COL 2 SIN X	COL 3 COS X	COL 4 TAN X	COL 5 COT X
5.0000000	.087155742	.99619470	.087488662	11.430052
15.000000	.25881904	.96592583	.26794919	3.7320509
45.000000	.70710678	.70710678	.99999999	1.0000000
75.000000	.96592582	.25881907	3.7320505	.26794921
125.00000	.81915206	-.57357642	-1.4281481	-.70020750
175.00000	.087155786	-.99619470	-.087488707	-11.430047
200.00000	-.34202011	-.93969264	.36397019	2.7474778
200.00000	-.34202011	-.93969264	.36397019	2.7474778
300.00000	-.86602545	.49999992	-1.7320512	-.57735014
350.00000	-.17364826	.98480774	-.17632707	-5.6712789

FOLLOWING COLUMNS SHOULD CONTAIN VALUES EQUAL OR CLOSE TO 1.0,
ACCORDING TO RELATIONAL EXPRESSIONS OF TRIGNOMETRIC FUNCTIONS.

COL 14 SIN**2+COS**2	COL 15 SEC**2-TAN**2	COL 16 COSEC**2-COT**2
.99999999	1.0000000	1.0000019
.99999999	1.0000000	1.0000004
.99999999	1.0000000	1.0000000
.99999999	1.0000001	1.0000000
1.0000000	1.0000000	1.0000000
1.0000000	1.0000000	1.0000000
1.0000000	1.0000000	1.0000000
1.0000000	1.0000000	1.0000000
.99999999	1.0000001	1.0000000
.99999999	1.0000000	1.0000005

****

FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.

1.0000000	1.0000000	1.0000003

****

EVALUATE IN DEGREES THE ARCSIN, ARCCOS, ARCTAN, AND ARCCOT OF X.

COL 1 X	COL 2 ARCSIN X	COL 3 ARCCOS X	COL 4 ARCTAN X	COL 5 ARCCOT X
.1000	5.7392	84.2608	5.7106	84.2894
.2000	11.5370	78.4630	11.3099	78.6901
.3000	17.4576	72.5424	16.6992	73.3008
.4000	23.5782	66.4218	21.8014	68.1986
.5000	30.0000	60.0000	26.5651	63.4349
.6000	36.8699	53.1301	30.9638	59.0362
.7000	44.4270	45.5730	34.9920	55.0080
.8000	53.1301	36.8699	38.6598	51.3402
.9000	64.1581	25.8419	41.9872	48.0128
1.0000	90.0000	.0000	45.0000	45.0000

THE VALUES IN THE FOLLOWING COLS SHOULD BE EQUAL TO OR NEAR 90.

COL 6 ARCSIN+ARCCOS	COL 7 ARCTAN+ARCCOT
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000
90.0000	90.0000

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 90.

90.0000	90.0000

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET FOLLOWING DATA IN COL 1
5,15,45,75,125,175,200,200,300,350

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   10.

SIND OF COL 1 STORE RESULTS IN COL 2
COSD OF COL 1 STORE RESULTS IN COL 3
TAND OF COL 1 STORE RESULTS IN COL 4
COTD OF COL 1 STORE RESULTS IN COL 5
TITLE1  EVALUATE SINE, COSINE, TANGENT, AND COTANGENT OF X, X IN D
TITLE2EGREES.
NEW PAGE
NOTE         COL 1          COL 2          COL 3          COL 4          COL 5
NOTE       X DEGREES        SIN X          COS X          TAN X          COT X
SPACE
NPRINT  COLS 1***5
1/SQUARE COL 2 STORE RESULT IN COL 10
2/INCREMENT INSTRUCTION 1 BY 1 AND 1
REPEAT INSTRUCTIONS 1 THRU 2  4 TIMES
ADD SIND(X) SQUARED IN COL 10 TO COSD(X) SQUARED IN COL 11 AND STORE IN 14
RECIPROCAL OF COL 11   STORE IN COL 15
RECIPROCAL OF COL 10  STORE IN  COL 16
SUBTRACT COL 12 FROM COL 15 STORE IN COL 15
SUBTRACT COL 13 FROM COL 16 STORE IN COL 16
SPACE 2
NOTE FOLLOWING COLUMNS SHOULD CONTAIN VALUES EQUAL OR CLOSE TO 1.0,
NOTE ACCORDING TO RELATIONAL EXPRESSIONS OF TRIGNOMETRIC FUNCTIONS.
SPACE
NOTE        COL  14          COL  15          COL  16
NOTE    SIN**2+COS**2   SEC**2-TAN**2  COSEC**2-COT**2
SPACE
NPRINT COLS 14 15 16
AVERAGE COL 14 STORE IN COL 14
AVERAGE COL 15 STORE IN COL 15
AVERAGE COL 16 STORE IN COL 16
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.
SPACE
ABRIDGE ROW 1 COLS 14 15 16
SPACE
NOTE ***************************************************************************
RESET NRMAX 0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   10 TO    0.

GENERATE NOS FROM .1  IN STEPS OF .1 THRU 1.0 IN COL 1
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

ASIND OF X IN COL 1 STORE IN COL 2
ACOSD OF X IN COL 1 STORE IN COL 3
ATAND OF X IN COL 1 STORE IN COL 4
ACOTD OF X IN COL 1 STORE IN COL 5
TITLE1 EVALUATE IN DEGREES THE ARCSIN, ARCCOS, ARCTAN, AND ARCCOT
TITLE2 OF X.
NEW PAGE
FIXED 4
NOTE        COL 1          COL 2          COL 3          COL 4          COL 5
NOTE          X          ARCSIN X       ARCCOS X       ARCTAN X       ARCCOT X
SPACE
NPRINT COLS 1***5
ADD COL 2  TO COL 3  STORE RESULTS IN COL 6
ADD COL 4  TO COL 5  STORE RESULTS IN COL 7
SPACE 2
NOTE THE VALUES IN THE FOLLOWING COLS SHOULD BE EQUAL TO OR NEAR 90.
SPACE
NOTE        COL 6          COL 7
NOTE    ARCSIN+ARCCOS  ARCTAN+ARCCOT
SPACE
NPRINT COL 6 AND 7
AVERAGE  COL  6 STORE IN COL 6
AVERAGE  COL 7 STORE IN COL 7
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 90.
SPACE
ABRIDGE ROW 1 COLS 6  7
SPACE
NOTE ***************************************************************************

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```

COL 1 X	COL 2 SINH X	COL 3 COSH X	COL 4 TANH X	COL 5 COTH X
.25000000	.25261232	1.0314131	.24491866	4.0829881
.50000000	.52109530	1.1276260	.46211716	2.1639534
.75000000	.82231672	1.2946833	.63514895	1.5744338
1.0000000	1.1752012	1.5430806	.76159415	1.3130353
1.2500000	1.6019191	1.8884239	.84828364	1.1788510
1.5000000	2.1292794	2.3524096	.90514825	1.1047914
1.7500000	2.7904143	2.9641883	.94137554	1.0622753
2.0000000	3.6268604	3.7621957	.96402758	1.0373147
2.2500000	4.6911682	4.7965675	.97802611	1.0224676
2.5000000	6.0502044	6.1322894	.98661430	1.0135673
2.7500000	7.7893519	7.8532798	.99185973	1.0082071
3.0000000	10.017875	10.067662	.99505475	1.0049698
3.2500000	12.875783	12.914557	.99699763	1.0030114
3.5000000	16.542627	16.572824	.99817790	1.0018254
3.7500000	21.248782	21.272300	.99889445	1.0011068
4.0000000	27.289917	27.308233	.99932930	1.0006711
4.2500000	35.045574	35.059838	.99959315	1.0004070
4.5000000	45.003011	45.014120	.99975321	1.0002468
4.7500000	57.787816	57.796468	.99985031	1.0001497
5.0000000	74.203209	74.209948	.99990921	1.0000908

****

(COSH(X))**2 - (SINH(X))**2=1
(TANH(X))**2 + (1/(COSH(X))**2)=1
(COTH(X))**2 - (1/(SINH(X))**2)=1
THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.

1.0000054	1.0000000	.99999995

****

COL 1 X	COL 8 ARCSINH X	COL 9 ARCCOSH X	COL 10 ARCTANH X	COL 11 ARCCOTH X
.25000000	.24999999	.24999995	.24999999	.25000000
.50000000	.49999999	.49999999	.49999999	.50000000
.75000000	.74999999	.74999999	.74999999	.74999999
1.0000000	.99999998	.99999999	.99999998	1.0000000
1.2500000	1.2500000	1.2500000	1.2500000	1.2500000
1.5000000	1.5000000	1.5000000	1.5000000	1.5000000
1.7500000	1.7500000	1.7500000	1.7500000	1.7500001
2.0000000	2.0000000	2.0000000	2.0000001	2.0000001
2.2500000	2.2500000	2.2500000	2.2499998	2.2500000
2.5000000	2.5000000	2.5000000	2.5000001	2.5000004
2.7500000	2.7500000	2.7500000	2.7499997	2.7500009
3.0000000	3.0000000	3.0000000	2.9999998	3.0000003
3.2500000	3.2500000	3.2500000	3.2499982	3.2500001
3.5000000	3.5000000	3.5000000	3.5000009	3.5000018
3.7500000	3.7500000	3.7500000	3.7499979	3.7500054
4.0000000	4.0000000	4.0000000	3.9999993	4.0000015
4.2500000	4.2500000	4.2500000	4.2499909	4.2500113
4.5000000	4.5000000	4.5000000	4.4999921	4.5000250
4.7500000	4.7500000	4.7500000	4.7499846	4.7500097
5.0000000	4.9999999	5.0000000	5.0000163	5.0000617

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-1.7881393-08 *-9.8720192-09 *-1.0196119-06 * 5.9159472-06

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE X STARTING WITH .25 IN STEPS OF .25 UP TO AND INCL 5. INTO COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   20.

SINH OF X IN COL 1 STORE RESULTS IN COL 2
COSH OF X IN COL 1 STORE RESULTS IN COL 3
TANH OF X IN COL 1 STORE RESULTS IN COL 4
COTH OF X IN COL 1 STORE RESULTS IN COL 5
1/ SQUARE COL 2 STORE IN COL 6
2/ INCREMENT 1 BY 1 1
REPEAT STATEMENTS 1 AND 2 4 TIMES
SUBTRACT COL 6 FROM COL 7 STORE IN 10
RECIPROCAL OF COL 7 MULT BY 1.0 ADD TO 8 AND STORE IN 11
RECIPROCAL OF COL 6 MULT BY -1.0 ADD TO 9 AND STORE IN 12
AVERAGE COL 10 STORE IN 10
AVERAGE COL 11 STORE IN 11
AVERAGE COL 12 STORE IN 12
NEW PAGE
NOTE        COL 1          COL 2          COL 3          COL 4          COL 5
NOTE          X            SINH X         COSH X         TANH X         COTH X
SPACE
NPRINT COLS 1***5
SPACE  2
NOTE ********************************************************************************
SPACE
NOTE (COSH(X))**2 - (SINH(X))**2=1
NOTE (TANH(X))**2 + (1/(COSH(X))**2)=1
NOTE (COTH(X))**2 - (1/(SINH(X))**2)=1
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.
SPACE
ABRIDGE ROW 1 COLS 10 11 12
SPACE
NOTE ********************************************************************************
ASINH OF COL 2 STORE RESULTS IN COL 8
ACOSH OF COL 3 STORE RESULTS IN COL 9
ATANH OF COL 4 STORE RESULTS IN COL 10
ACOTH OF COL 5 STORE RESULTS IN COL 11
NEW PAGE
NOTE        COL 1          COL 8          COL 9          COL 10         COL 11
NOTE          X          ARCSINH X      ARCCOSH X      ARCTANH X      ARCCOTH X
SPACE
NPRINT COLS 1 8***11
SPACE  2
1/ SUBTRACT COL 1 FROM COL 8 STORE RESULTS IN 8
2/ AVERAGE COL 8 STORE IN 8
3/INCREMENT INSTRUCTION 1 BY 0 1 1
4/INCREMENT INSTRUCTION 2 BY 1 1
PERFORM INSTRUCTIONS 1 THRU 4, 4 TIMES
NOTE ********************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 8***11
SPACE
NOTE ********************************************************************************
```

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NUMBER OF SIGNIFICANT DIGITS PER COLUMN.

8	7	6	5	4	3	2	1
COLUMN 21	COLUMN 22	COLUMN 23	COLUMN 24	COLUMN 25	COLUMN 26	COLUMN 27	COLUMN 28
72.444443	72.444440	72.444400	72.444000	72.440000	72.400000	72.000000	70.000000
6.4748596	6.4748600	6.4748600	6.4749000	6.4750000	6.4800000	6.5000000	6.0000000
1.6718015	1.6718020	1.6718000	1.6718000	1.6720000	1.6700000	1.7000000	2.0000000
20.000000	20.000000	20.000000	20.000000	20.000000	20.000000	20.000000	20.000000
5.2533334	5.2533330	5.2533300	5.2533000	5.2530000	5.2500000	5.2000000	5.0000000
41.923807	41.923810	41.923800	41.924000	41.920000	41.900000	42.000000	40.000000
9.0262909	9.0262910	9.0262901	9.0263000	9.0260000	9.0300000	9.0000000	9.0000000
68.147674	68.147670	68.147700	68.148000	68.150000	68.200000	68.000000	70.000000
-.82094830	-.82094830	-.82094800	-.82095000	-.82100000	-.82100000	-.82000000	-.80000000
.42543463	.42543460	.42543500	.42544000	.42540000	.42500000	.42000000	.40000000
10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000
.13563949	.13563950	.13564000	.13564000	.13560000	.13600000	.14000000	.10000000
1.9525860	1.9525860	1.9525900	1.9526000	1.9530000	1.9500000	2.0000000	2.0000000
* 1.0760000+03	* 1.0760000+03	* 1.0760000+03	* 1.0760000+03	* 1.0760000+03	* 1.0800000+03	* 1.1000000+03	* 1.0000000+03
* 7.7772000+04	* 7.7772000+04	* 7.7772000+04	* 7.7772000+04	* 7.7770000+04	* 7.7800000+04	* 7.8000000+04	* 8.0000000+04

NUMBER OF SIGNIFICANT DIGITS PER COLUMN.

8	7	6	5	4	3	2	1
72.444443	72.444440	72.444400	72.444000	72.440000	72.400000	72.000000	70.000000
6.4748596	6.4748600	6.4748600	6.4749000	6.4750000	6.4700000	6.5000000	6.0000000
1.6718015	1.6718020	1.6718000	1.6718000	1.6720000	1.6700000	1.7000000	2.0000000
20.000000	20.000000	20.000000	20.000000	20.000000	20.000000	20.000000	20.000000
5.2533334	5.2533330	5.2533300	5.2533000	5.2530000	5.2500000	5.3000000	5.0000000
41.923807	41.923810	41.923800	41.924000	41.920000	41.900000	42.000000	40.000000
9.0262909	9.0262910	9.0262901	9.0263000	9.0260000	9.0300000	9.0000000	9.0000000
68.147674	68.147670	68.147700	68.148000	68.150000	68.100000	68.000000	70.000000
-.82094830	-.82094830	-.82094800	-.82095000	-.82090000	-.82100000	-.82000000	-.80000000
.42543463	.42543460	.42543500	.42543000	.42540000	.42500000	.43000000	.40000000
10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000
.13563949	.13563950	.13563900	.13564000	.13560000	.13600000	.14000000	.10000000
1.9525860	1.9525860	1.9525900	1.9526000	1.9530000	1.9500000	2.0000000	2.0000000
* 1.0760000+03	* 1.0760000+03	* 1.0760000+03	* 1.0760000+03	* 1.0760000+03	* 1.0800000+03	* 1.1000000+03	* 1.0000000+03
* 7.7772000+04	* 7.7772000+04	* 7.7772000+04	* 7.7772000+04	* 7.7770000+04	* 7.7800000+04	* 7.8000000+04	* 8.0000000+04

THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.
THEY ARE NOT EXACTLY ZERO DUE TO USING TWO DIFFERENT METHODS OF ROUNDING.

0.	0. * 6.6682696-08	* 6.6657861-07	*-6.6667795-06	.0073332945	-.0073333348	0.

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET IN COLUMN 21 DATA
 7.2444443-01   6.4748596-00   1.6718015+00
2.0000000-01   5.2533334-00   4.1923807-01   9.0262909-00   6.8147674-01
-8.2094830-01   4.2543463-01   1.0000000-01
1.3563949-01   1.9525860-00   1.0760000-03   7.7772000-04

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   15.

DEFINE COLUMN 21 INTO COLUMN 1
SUBTRACT COLUMN 21 FROM 1 PUT IN COL 41
5/ ROUND 21 TO 7 SIGNIFICANT DIGITS AND STORE IN COL 22
6/ INCREMENT INSTRUCTION 5 BY 1,-1 AND 1
7/ROUND COL 1 TO 7 SIG. DIGITS STORE IN COL 2
8/INCREMENT INSTRUCTION 7 BY 0, -1 AND 1
9/SUBTRACT COL 2 FROM COL 22 STORE IN COL 32
10/INCREMENT INSTRUCTION 9 BY 1, 1 AND 1
11/AVERAGE COL 32 STORE IN COL 42
12/INCREMENT INSTRUCTION 11 BY 1 AND 1
PERFORM INSTRUCTIONS 5 THRU 12, 7 TIMES
TITLE1 NUMBER OF SIGNIFICANT DIGITS PER COLUMN.
TITLE3       8              7              6              5
TITLE4       4              3              2              1
PRINT 21 *** 28
SPACE  2
NOTE NUMBER OF SIGNIFICANT DIGITS PER COLUMN.
 NOTE1       8              7              6              5
 NOTE2       4              3              2              1
SPACE  2
PRINT NOTE
SPACE 2
NPRINT 1 *** 8
NOTE1 ********************************************************************************
NOTE2 ********************************************************************************
PRINT NOTE
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.
 NOTE THEY ARE NOT EXACTLY ZERO DUE TO USING TWO DIFFERENT METHODS OF ROUNDING.
SPACE
ABRIDGE  ROW 1 COL 41***48
SPACE
PRINT NOTE
```

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OMNITAB 80 TEST 14 SUM, PARPRODUCT, PARSUM AND RMS (ROOT MEAN SQUARE). (4.7) PAGE 1
RESULTS OF AVERAGE,SUM,PARPRODUCT,PARSUM AND RMS COMMANDS.
COLUMN 1 WAS DEFINED BY READ COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
1.0000000	3.0000000	18.000000	17.000000	1.0000000	1.0000000	3.8297084
2.0000000	3.0000000	18.000000	17.000000	2.0000000	3.0000000	3.8297084
3.0000000	3.0000000	18.000000	17.000000	6.0000000	6.0000000	3.8297084
5.0000000	3.0000000	18.000000	17.000000	30.000000	11.000000	3.8297084
7.0000000	3.0000000	18.000000	17.000000	210.00000	18.000000	3.8297084
0.	3.0000000	18.000000	17.000000	0.	18.000000	3.8297084

COLUMN 2 CONTAINS AVERAGE OF COLUMN 1.
COLUMN 3 CONTAINS SUM OF COLUMN 1.
COLUMN 4 CONTAINS SUM OF ROWS 2 THRU 5 OF COLUMN 1.
COLUMN 5 CONTAINS PARTIAL PRODUCTS OF COLUMN 1.
COLUMN 6 CONTAINS PARTIAL SUMS OF COLUMN 1.
COL 7 CONTAINS THE ROOT MEAN SQUARE OF THE VALUES IN COL 1.

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0. 0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING NUMBERS INTO COLUMN 1
1.0
2.0
3.0
5.0
7.0
0.0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM     0 TO     6.

AVERAGE COLUMN 1 AND STORE RESULT IN COLUMN 2
SUM COLUMN 1 AND STORE RESULT IN COLUMN 3
SUM COLUMN 1 ROWS 2, 3, 4 AND 5 STORE RESULT IN COLUMN 4
PARPRODUCT OF COLUMN 1 AND STORE RESULT IN COLUMN 5
PARSUM OF COLUMN 1 AND STORE RESULT IN COLUMN 6
RMS OF COLUMN 1 AND STORE RESULT IN COLUMN 7
SQUARE COLUMN 1 AND STORE RESULTS IN COLUMN 11
SUM COLUMN 11 AND STORE RESULT IN COLUMN 12
DIVIDE COLUMN 12 BY 6.0 STORE IN COLUMN 12
SQRT OF COLUMN 12 STORE IN COLUMN 13
SUB COLUMN 7 FROM COLUMN 13 STORE IN COLUMN 8
TITLE1RESULTS OF AVERAGE,SUM,PARPRODUCT,PARSUM AND RMS COMMANDS.
TITLE3COLUMN 1 WAS DEFINED BY READ COMMAND.
PRINT COLUMNS 1 2 3 4 5 6 AND 7
SPACE 2
NOTE COLUMN 2 CONTAINS AVERAGE OF COLUMN 1.
NOTE COLUMN 3 CONTAINS SUM OF COLUMN 1.
NOTE COLUMN 4 CONTAINS SUM OF ROWS 2 THRU 5 OF COLUMN 1.
NOTE COLUMN 5 CONTAINS PARTIAL PRODUCTS OF COLUMN 1.
NOTE COLUMN 6 CONTAINS PARTIAL SUMS OF COLUMN 1.
NOTE COL 7 CONTAINS THE ROOT MEAN SQUARE OF THE VALUES IN COL 1.
SUB  *6,3* FROM *6,6* STORE IN COLUMN 9
SUB  3.0 FROM COLUMN 2 AND STORE IN COLUMN 10
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 6 OF COLUMNS 8 9 10 AND 5
SPACE
NOTE ********************************************************************************


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```

COLUMN 8	COLUMN 2	COLUMN 3
8.0000000	20.512820	.20512820
11.000000	28.205128	.28205128
14.000000	35.897435	.35897436
5.0000000	12.820513	.12820513
1.0000000	2.5641025	.025641026

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

****

THE TOTAL NUMBER OF DAYS BETWEEN 7/4/1776 AND 7/4/1976 IS

73049

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET IN COL 8 THE FOLLOWING NUMBERS
 8, 11, 14, 5, AND 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    5.

PERCENTAGES OF COL 8 PUT IN COL 2
PROPORTIONS OF COL 8 PUT IN COL 3
PRINT COLS 8, 2 AND 3
MULTIPLY COL 3 BY 100. AND -1. ADD COL 2 PUT IN COL 3
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 3
SPACE
NOTE ***************************************************************************
READ INTO COL 11, 12 AND 13 DATE OF INDEPENDENCE
 7/4/1776

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    5 TO    1.

DAYS OF COLS 11, 12 AND 13 PUT IN COL 14
READ INTO COLS 21, 22 AND 23 BICENTENNIAL DATE
 7/4/1976
DAYS OF COLS 21, 22 AND 23 PUT IN COL 24
SUBTRACT COL 14 FROM COL 24 MULT BY 1. ADD 1. PUT IN COL 25
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE TOTAL NUMBER OF DAYS BETWEEN 7/4/1776 AND 7/4/1976 IS
SPACE
FIXED 0
ABRIDGE ROW 1 OF COL 25
SPACE
NOTE ***************************************************************************
```

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THE FOLLOWING IS AN EXAMPLE OF SHORTEN AND EXPAND COMMANDS. COLUMN 1 WAS DEFINED BY THE EXPAND COMMAND. COLUMNS 5 AND 6 WERE DEFINED BY THE SHORTEN COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 6	COLUMN 7
1.0000000	1.0000000	1.0000000	1.0000000	1.0000000	1.0000000
2.0000000	4.0000000	16.000000	64.000000	2.0000000	4.0000000
3.0000000	9.0000000	81.000000	* 7.2900000+02	3.0000000	9.0000000
4.0000000	16.000000	* 2.5600000+02	* 4.0960000+03	4.0000000	16.000000
5.0000000	25.000000	* 6.2500000+02	* 1.5625000+04	5.0000000	25.000000
6.0000000	36.000000	* 1.2960000+03	* 4.6656000+04	6.0000000	36.000000
7.0000000	49.000000	* 2.4010000+03	* 1.1764900+05	7.0000000	49.000000
8.0000000	64.000000	* 4.0960000+03	* 2.6214400+05		
9.0000000	81.000000	* 6.5610000+03	* 5.3144100+05		
10.000000	100.00000	* 1.0000000+04	* 1.0000000+06		

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE BEGIN WITH 1. IN STEPS OF 1. THRU 10. STORE IN COLUMN 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

EXPAND VALUES IN COL 1 TO 6TH POWER IN INTERVALS OF 2 START STORING IN COLUMN 2
SHORTEN COLUMN 1 FOR COLUMN 2 EQUAL TO 49. PUT SHORTENED COLUMNS IN 6 AND 7

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   10 TO    7.

RESET NRMAX TO 10

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    7 TO   10.

TITLE1THE FOLLOWING IS AN EXAMPLE OF SHORTEN AND EXPAND COMMANDS.
TITLE2 COLUMN 1 WAS DEFINED BY THE EXPAND COMMAND. COLUMNS 5 AND 6
TITLE3 WERE DEFINED BY THE SHORTEN COMMAND.
PRINT COLUMNS 1 2 3 4 5 6 7
SQRT OF COLUMN 2 AND STORE IN COLUMN 5
SUBTRACT COLUMN 5 FROM COLUMN 1 AND STORE IN COLUMN 11
MULTIPLY COL 2 BY COL 2 MULT BY -1.0 ADD TO COL 3 STORE IN COL 12
MULTIPLY COL 2 BY COL 3 MULT BY -1.0 ADD TO COL 4 STORE IN COL 13
SUM COLUMN 1 AND STORE IN COLUMN 1
SUM COLUMN 6 AND STORE IN COLUMN 6
SUBTRACT COLUMN 6 FROM COLUMN 1 AND STORE IN COLUMN 14
SUB THE VALUE 27.0 FROM COLUMN 14 AND STORE IN COLUMN 14
SUM COLUMN 2 AND STORE IN COLUMN 2
SUM COLUMN 7 AND STORE IN COLUMN 7
SUBTRACT COLUMN 7 FROM COLUMN 2 AND STORE IN COLUMN 15
SUB THE VALUE 245.0 FROM COLUMN 15 AND STORE IN COLUMN 15
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 11, 12, 13, 14 AND 15,
SPACE
NOTE ***************************************************************************
```

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X		Y		X+Y		Y-X	
REAL	IMAGINARY	REAL	IMAGINARY	REAL	IMAGINARY	REAL	IMAGINARY
COLUMN 51	COLUMN 52	COLUMN 61	COLUMN 62	COLUMN 1	COLUMN 2	COLUMN 11	COLUMN 12
0.	0.	0.	0.	0.	0.	0.	0.
0.	1.0000000	0.	1.0000000	0.	2.0000000	0.	0.
0.	1.0000000	1.0000000	0.	1.0000000	1.0000000	1.0000000	-1.0000000
1.0000000	0.	1.0000000	1.0000000	2.0000000	1.0000000	0.	1.0000000
1.0000000	0.	1.0000000	0.	2.0000000	0.	0.	0.
1.0000000	1.0000000	1.0000000	1.0000000	2.0000000	2.0000000	0.	0.
1.0000000	1.0000000	0.	0.	1.0000000	1.0000000	-1.0000000	-1.0000000
0.	0.	3.0000000	0.	3.0000000	0.	3.0000000	0.
0.	0.	1.0000000	1.0000000	1.0000000	1.0000000	1.0000000	1.0000000
3.0000000	1.0000000	1.0000000	-1.0000000	4.0000000	0.	-2.0000000	-2.0000000
1.0000000	1.0000000	-2.0000000	-1.0000000	-1.0000000	0.	-3.0000000	-2.0000000
1.0000000	-1.0000000	1.0000000	-1.0000000	2.0000000	-2.0000000	0.	0.
10.000000	2.0000000	10.000000	1.0000000	20.000000	3.0000000	0.	-1.0000000
10.000000	1.0000000	-1.2345678	10.000000	8.7654322	11.000000	-11.234568	9.0000000
1.2345678	10.000000	0.	10.000000	1.2345678	20.000000	-1.2345678	0.
0.	-1.2345678	0.	-1.2345678	0.	-2.4691356	0.	0.

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-1.8626451-09 0. 0. 0.

****

X		X*(3.5+1.0I)		X*(3.5-1.0I)/(3.5-1.0I)	
REAL	IMAGINARY	REAL	IMAGINARY	REAL	IMAGINARY
COLUMN 51	COLUMN 52	COLUMN 21	COLUMN 22	COLUMN 31	COLUMN 32
0.	0.	0.	0.	0.	0.
0.	1.0000000	-1.0000000	3.5000000	0.	1.0000000
0.	1.0000000	-1.0000000	3.5000000	0.	1.0000000
1.0000000	0.	3.5000000	1.0000000	1.0000000	0.
1.0000000	0.	3.5000000	1.0000000	1.0000000	0.
1.0000000	1.0000000	2.5000000	4.5000000	1.0000000	1.0000000
1.0000000	1.0000000	2.5000000	4.5000000	1.0000000	1.0000000
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
3.0000000	1.0000000	9.5000000	6.5000000	3.0000000	1.0000000
1.0000000	1.0000000	2.5000000	4.5000000	1.0000000	1.0000000
1.0000000	-1.0000000	4.5000000	-2.5000000	1.0000000	-1.0000000
10.000000	2.0000000	33.000000	17.000000	10.000000	2.0000000
10.000000	1.0000000	34.000000	13.500000	10.000000	1.0000000
1.2345678	10.000000	-5.6790127	36.234568	1.2345678	10.000000
0.	-1.2345678	1.2345678	-4.3209873	*-1.1246159-09	-1.2345678

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 7.0288496-11 0.

****

X		POLAR COORDINATES (X)		CHANGE BACK TO RECTANGULAR COORDINATES	
REAL	IMAGINARY	THETA(ANGLE)	RHO(RADIUS)	REAL	IMAGINARY
COLUMN 51	COLUMN 52	COLUMN 53	COLUMN 54	COLUMN 55	COLUMN 56
0.	0.	0.	0.	0.	0.
0.	1.0000000	1.0000000	1.5707963	* 3.0794416-08	1.0000000
0.	1.0000000	1.0000000	1.5707963	* 3.0794416-08	1.0000000
1.0000000	0.	1.0000000	0.	1.0000000	0.
1.0000000	0.	1.0000000	0.	1.0000000	0.
1.0000000	1.0000000	1.4142136	.78539816	1.0000000	1.0000000
1.0000000	1.0000000	1.4142136	.78539816	1.0000000	1.0000000
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
3.0000000	1.0000000	3.1622777	.32175056	3.0000000	1.0000000
1.0000000	1.0000000	1.4142136	.78539816	1.0000000	1.0000000
1.0000000	-1.0000000	1.4142136	-.78539816	1.0000000	-1.0000000
10.000000	2.0000000	10.198039	.19739556	10.000000	2.0000000
10.000000	1.0000000	10.049876	.099668653	10.000000	1.0000000
1.2345678	10.000000	10.075920	1.4479611	1.2345679	10.000000
0.	-1.2345678	1.2345678	-1.5707963	* 3.8017794-08	-1.2345678

****

THE FOLLOWING VALUES MÙST BE EQUAL TO OR NEAR ZERO.

*-1.0882027-08 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET REAL PART OF X IN COLUMN 51
0. 0. 0. 1. 1. 1. 1. 0. 0. 3. 1. 1. 10. 10. 1.2345678

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   15.

SET IMAGINARY PART OF X IN COLUMN 52
0. 1. 1. 0. 0. 1. 1. 0. 0.  1. 1. -1.  2.  1.  10. -1.2345678

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   15 TO   16.

SET REAL PART OF Y IN COLUMN 61
0. 0. 1. 1. 1. 1. 0. 3.  1.  1.  -2.  1.  10.  -1.2345678

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   16 TO   14.

SET IMAGINARY PART OF Y IN COLUMN 62
0. 1. 0. 1. 0. 1. 0. 0. 1. -1. -1. -1.  1. 10.  10.  -1.2345678

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   14 TO   16.

CADD X IN COLS 51, 52 TO Y IN COLS 61, 62 PUT IN COLUMNS 1, 2
CSUBTRACT X IN COLS 51, 52 FROM Y IN COLS 61, 62 PUT IN  COLS 11, 12
TITLE1               X                                Y
TITLE2            X+Y                              Y-X
TITLE3      REAL          IMAGINARY        REAL          IMAGINARY
TITLE4      REAL          IMAGINARY        REAL          IMAGINARY
PRINT COLS 51, 52   61, 62   1, 2   11, 12
CADD COLS 1, 2 TO COLS 11, 12 PUT IN COLS 41, 42
CSUBTRACT COLS 11, 12 FROM COLS 1, 2 PUT IN COLS 43, 44
CDIVIDE COLS 41, 42 BY (2.0, 0.0) PUT IN COLS 45, 46
CDIVIDE COLS 43, 44 BY (2.0, 0.0) PUT IN COLS 47, 48
SUBTRACT COL 45 FROM COL 61 STORE IN COL 31
SUBTRACT COL 46 FROM 62 STORE IN COL 32
SUBTRACT COL 47 FROM COL 51 AND PUT IN COL 33
SUBTRACT COL 48 FROM COL 52 AND PUT IN COL 34
AVERAGE COL 31 PUT RESULT IN COL 35
AVERAGE COL 32 PUT RESULT IN COL 36
AVERAGE COL 33 PUT RESULT IN COL 37
AVERAGE COL 34 PUT RESULT IN COL 38
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 35 *** 38
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE ************************************************************************
CMULTIPLY COLS 51, 52 BY (3.5, 1.0) PUT IN COLUMNS 21, 22
CDIVIDE COLS 21, 22 BY (3.5, 1.0) PUT IN COLUMNS 31, 32
TITLE1               X                        X*(3.5+1.0I)
TITLE2     X*(3.5+1.0I)/(3.5+1.0I)
TITLE4      REAL          IMAGINARY
PRINT COLS 51, 52  21, 22  31, 32
SUBTRACT COL 31 FROM COL 51 AND PUT IN COL 33
SUBTRACT COL 32 FROM COL 52 AND PUT IN COL 34
AVERAGE COL 33 PUT RESULT IN COL 35
AVERAGE COL 34 PUT RESULT IN COL 36
SPACE  2
NOTE ************************************************************************
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 35 AND 36
SPACE
NOTE ************************************************************************
CPOLAR CHANGE CPLEX NOS. IN COLS 51, 52 FROM RECT. COORD. TO POLAR PUT IN 53, 54
CRECTANGULAR CHANGE POLAR COORD. OF CPLEX NOS. IN 53, 54 TO RECT. PUT IN 55, 56
SUBTRACT COL 55 FROM COL 51 AND PUT IN COL 57
SUBTRACT COL 56 FROM COL 52 AND PUT IN COL 58
AVERAGE COL 57 STORE IN COL 57
AVERAGE COL 58 STORE IN COL 58
TITLE1               X                   POLAR COORDINATES (X)
TITLE2 CHANGE BACK TO RECTANGULAR COORDINATES
TITLE3      REAL          IMAGINARY    THETA(ANGLE)   RHO(RADIUS)
TITLE4      REAL          IMAGINARY
PRINT COLS 51***56
SPACE  2
NOTE ************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLUMNS 57, 58
SPACE
NOTE ************************************************************************
```

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THE FOLLOWING IS AN EXAMPLE OF PROMOTE AND DEMOTE.
COLUMN 1 WAS DEFINED BY THE GENERATE COMMAND. COLUMNS 2, 3, 4 AND 5 WERE DEFINED BY THE PROMOTE AND DEMOTE COMMANDS.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
1.0000000	0.	0.	1.0000000	0.
2.0000000	0.	0.	2.0000000	0.
3.0000000	1.0000000	0.	3.0000000	1.0000000
4.0000000	2.0000000	0.	4.0000000	2.0000000
5.0000000	3.0000000	1.0000000	5.0000000	3.0000000
6.0000000	4.0000000	2.0000000	6.0000000	4.0000000
7.0000000	5.0000000	3.0000000	7.0000000	5.0000000
8.0000000	6.0000000	4.0000000	8.0000000	6.0000000
9.0000000	7.0000000	5.0000000	9.0000000	7.0000000
10.000000	8.0000000	6.0000000	10.000000	8.0000000
0.	9.0000000	7.0000000	0.	0.
0.	10.000000	8.0000000	0.	0.

COLUMN 1 WAS MOVED DOWN BY 2 ROWS AND STORED IN COLUMN 2.
COLUMN 2 WAS MOVED DOWN BY 2 ROWS AND STORED IN COLUMN 3.
COLUMN 2 WAS MOVED UP BY 2 ROWS AND STORED IN COLUMN 4.
COLUMN 3 WAS MOVED UP BY 2 ROWS AND STORED IN COLUMN 5.
ROW 11 OF COL 9 CONTAINS SUM OF TERMS OF THE 8X2 ARRAY IN ROW 1 COL 6

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE STARTING WITH 1 IN STEPS OF 1 UP THRU 10 AND STORE VALUES IN COLUMN 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

DEMOTE BY 2 ROWS COLUMN 1 INTO COLUMN 2, COLUMN 2 INTO COLUMN 3

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   10 TO   12.

PROMOTE BY 2 ROWS COLUMN 2 INTO COLUMN 4, COLUMN 3 INTO COLUMN 5
TITLE1 THE FOLLOWING IS AN EXAMPLE OF PROMOTE AND DEMOTE.
TITLE3 COLUMN 1 WAS DEFINED BY THE GENERATE COMMAND. COLUMNS 2, 3,
TITLE4 4 AND 5 WERE DEFINED BY THE PROMOTE AND DEMOTE COMMANDS.
PRINT COLUMNS  1***5
SPACE
NOTE COLUMN 1 WAS MOVED DOWN BY 2 ROWS AND STORED IN COLUMN 2.
NOTE COLUMN 2 WAS MOVED DOWN BY 2 ROWS AND STORED IN COLUMN 3.
NOTE COLUMN 2 WAS MOVED UP BY 2 ROWS AND STORED IN COLUMN 4.
NOTE COLUMN 3 WAS MOVED UP BY 2 ROWS AND STORED IN COLUMN 5.
ASUB ARRAY IN ROW 3 COL 2 SIZE 8X2 MINUS ROW 1 COL 4 SIZE 8X2 PUT IN R=1, C=6
SAPROP OF ARRAY IN ROW 1 OF COL 6 SIZE 8X2 STORE PROPERTIES IN COLUMN 9
NOTE ROW 11 OF COL 9 CONTAINS SUM OF TERMS OF THE 8X2 ARRAY IN ROW 1 COL 6
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 11 OF COLUMN 9
SPACE
NOTE ********************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
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```
OMNITAB 80 TEST 19 EXCHANGE INSTRUCTION. (5.2)                          PAGE   1
 COLUMNS 1 THROUGH 8 WERE DEFINED BY THE READ COMMAND.

  COLUMN    1     COLUMN    2     COLUMN    3     COLUMN    4     COLUMN    5     COLUMN    6     COLUMN    7     COLUMN    8

     1.0000000       2.0000000       3.0000000       4.0000000       5.0000000       6.0000000       7.0000000       8.0000000
     9.0000000      10.000000       11.000000       12.000000       13.000000       14.000000       15.000000        .16000000
    20.000000       30.000000       40.000000       50.000000       60.000000       70.000000       80.000000       90.000000

THE FOLLOWING VALUES WERE PRINTED BY THE COMMAND NPRINT.
COLUMN 1 WAS EXCHANGED WITH COLUMN 2, COLUMN 3 WITH COLUMN 4 AND
COLUMN 5 WITH COLUMN 6.

     2.0000000       1.0000000       4.0000000       3.0000000       6.0000000       5.0000000       7.0000000       8.0000000
    10.000000        9.0000000      12.000000       11.000000       14.000000       13.000000       15.000000        .16000000
    30.000000       20.000000       50.000000       40.000000       70.000000       60.000000       80.000000       90.000000

*******************************************************************************

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.

            0.              0.              0.

*******************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING VALUES INTO COLUMNS 1***8
1. 2. 3. 4. 5. 6. 7. 8.
9. 10. 11. 12. 13. 14. 15. .16
20.  30   40   50   60   70   80   90

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    3.

TITLE1 COLUMNS 1 THROUGH 8 WERE DEFINED BY THE READ COMMAND.
PRINT COLUMNS 1***8
MOVE THE ARRAY STARTING IN ROW 1 OF COL 1 SIZE 3X1 PUT IN ROW 1 OF COL 9
MOVE THE ARRAY STARTING IN ROW 1 OF COL 3 SIZE 3X1 PUT IN ROW 1 OF COL 10
MOVE THE ARRAY STARTING IN ROW 1 OF COL 5 SIZE 3X1 PUT IN ROW 1 OF COL 11
EXCHANGE COLUMN 1 WITH COLUMN 2, COLUMN 3 WITH COLUMN 4, COLUMN 5 WITH COLUMN 6
SPACE
NOTE THE FOLLOWING VALUES WERE PRINTED BY THE COMMAND NPRINT.
NOTE COLUMN 1 WAS EXCHANGED WITH COLUMN 2, COLUMN 3 WITH COLUMN 4 AND
NOTE COLUMN 5 WITH COLUMN 6.
SPACE
NPRINT COLUMNS 1***8 WITH NO HEADINGS
SUBTRACT COL 2 FROM COL 9 STORE IN COL 12
SUBTRACT COL 4 FROM COL 10 STORE IN COL 13
SUBTRACT COL 6 FROM COL 11 STORE IN COL 14
SPACE
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 12***14
SPACE
NOTE ********************************************************************************

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                 OMNITAB 80  VERSION 6.00      MARCH  2, 1981
```

OMNITAB 80 TEST 20 MOVE, AMOVE AND MMOVE INSTRUCTIONS. (5.2), (10.2) AND (11.2) PAGE 1

COLUMNS 1 THROUGH 4 HAVE BEEN DEFINED BY READ COMMAND. THE VALUES OF ROWS 2 THROUGH 6 OF COLUMNS 2 THROUGH 4 HAVE BEEN MOVED TO A NEW LOCATION BEGINNING IN ROW 3 OF COL 5. FIVE ROWS AND 3 COLUMNS WERE MOVED.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
1.0000000	6.0000000	11.000000	16.000000	0.	0.	0.
2.0000000	7.0000000	12.000000	17.000000	0.	0.	0.
3.0000000	8.0000000	13.000000	18.000000	7.0000000	12.000000	17.000000
4.0000000	9.0000000	14.000000	19.000000	8.0000000	13.000000	18.000000
5.0000000	10.000000	15.000000	20.000000	9.0000000	14.000000	19.000000
0.	0.	0.	0.	10.000000	15.000000	20.000000
0.	0.	0.	0.	0.	0.	0.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

ARRAYS A AND B HAVE BEEN FORMED BY AMOVE AND MMOVE COMMANDS.
THEIR ELEMENTS SHOULD ALL BE EQUAL.

ARRAY A		ARRAY B	
0.	0.	0.	0.
12.000000	17.000000	12.000000	17.000000
13.000000	18.000000	13.000000	18.000000
14.000000	19.000000	14.000000	19.000000
15.000000	20.000000	15.000000	20.000000
0.	0.	0.	0.
0.	0.	0.	0.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING VALUES INTO COLUMNS 1 2 3 AND 4
1.    6.   11.   16.
2.    7.   12.   17.
3.    8.   13.   18.
4.    9.   14.   19.
5.   10.   15.   20.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    5.

MOVE THE ARRAY BEGINNING IN ROW 2 OF COL 2 SIZE 5X3 PUT IN ROW 3 OF COL 5
TITLE1 COLUMNS 1 THROUGH 4 HAVE BEEN DEFINED BY READ COMMAND. THE
TITLE2VALUES OF ROWS 2 THROUGH 6 OF COLUMNS 2 THROUGH 4 HAVE BEEN
TITLE3 MOVED TO A NEW LOCATION BEGINNING IN ROW 3 OF COL 5. FIVE R
TITLE4OWS AND 3 COLUMNS WERE MOVED.
RESET NRMAX TO 7

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    5 TO    7.

PRINT COLUMNS 1***7
ASUB ARRAY IN ROW 2 COL 2 5X3 MINUS ARRAY IN ROW 3 COL 5 5X3 PUT IN ROW 2 COL 20
SMPROPERTIES OF MATRIX IN ROW 2 OF COL 20 SIZE 5X3 STORE PROPERTIES IN COL 30
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE  ROW 11 OF COLUMN 30
SPACE
NOTE ***************************************************************************
AMOVE ARRAY IN ROW 3 OF COL 6 SIZE 4X2 STORE IN ROW 2 OF COLUMN 10
MMOVE MATRIX IN ROW 2 OF COL 3 SIZE 4X2 PUT IN ROW 2 OF COL 12
SPACE 2
NOTE ARRAYS A AND B HAVE BEEN FORMED BY AMOVE AND MMOVE COMMANDS.
NOTE THEIR ELEMENTS SHOULD ALL BE EQUAL.
SPACE
NOTE    ARRAY A                         ARRAY B
SPACE
NPRINT COLUMNS 10***13
SUB COL 11 FROM COL 13 STORE IN COL 15
AVERAGE  COL 15 STORE IN COL 15
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE  SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 15
SPACE
NOTE ***************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

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OMNITAB 80 TEST 21 CENSOR, SELECT AND SEARCH INSTRUCTIONS. (5.3) AND (5.5) PAGE 1

THE FOLLOWING IS AN EXAMPLE OF THE CENSOR AND MATCH COMMANDS. COLUMN 1 WAS SET UP BY THE GENERATE COMMAND.
COLUMNS 2 AND 3 WERE DEFINED BY THE CENSOR COMMAND. COLUMN 4 WAS DEFINED BY THE MATCH COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
10.000000	1.0000000	10.000000	1.0000000
20.000000	1.0000000	20.000000	1.0000000
30.000000	1.0000000	30.000000	1.0000000
40.000000	1.0000000	40.000000	1.0000000
50.000000	1.0000000	50.000000	1.0000000
60.000000	60.000000	60.000000	1.0000000
70.000000	70.000000	70.000000	1.0000000
80.000000	80.000000	80.000000	1.0000000
90.000000	90.000000	90.000000	1.0000000
100.00000	100.00000	100.00000	1.0000000

****

COLUMNS 1 AND 3 SHOULD CONTAIN THE SAME VALUES.
THE VALUES IN COLUMN 4 SHOULD BE EQUAL TO ONE.
THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0.

****

THE FOLLOWING IS AN EXAMPLE OF THE SELECT COMMAND.
COLUMNS 9 10 11 AND 12 WERE DEFINED BY SELECT COMMAND.

COLUMN 1	COLUMN 2	COLUMN 4	COLUMN 5	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12
10.000000	1.0000000	5.0000000	0.	1.0000000	1.0000000	1.0000000	5.0000000
20.000000	1.0000000	10.000000	0.	1.0000000	1.0000000	1.0000000	5.0000000
30.000000	1.0000000	10.000000	0.	1.0000000	1.0000000	1.0000000	5.0000000
40.000000	1.0000000	12.000000	0.	0.	0.	0.	0.
50.000000	1.0000000	15.000000	0.	0.	0.	0.	0.
60.000000	60.000000	1.0000000	60.000000	1.0000000	1.0000000	1.0000000	5.0000000
70.000000	70.000000	2.0000000	70.000000	1.0000000	1.0000000	1.0000000	5.0000000
80.000000	80.000000	10.000000	80.000000	1.0000000	1.0000000	1.0000000	5.0000000
90.000000	90.000000	10.000000	90.000000	1.0000000	1.0000000	1.0000000	5.0000000
100.00000	100.00000	84.000000	100.00000	80.000000	90.000000	0.	2.0000000

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

THE FOLLOWING IS AN EXAMPLE OF THE SEARCH COMMAND.
COLUMN 13 WAS DEFINED BY THE SEARCH COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 13
10.000000	1.0000000	10.000000	1.0000000
20.000000	1.0000000	20.000000	1.0000000
30.000000	1.0000000	30.000000	1.0000000
40.000000	1.0000000	40.000000	1.0000000
50.000000	1.0000000	50.000000	1.0000000
60.000000	60.000000	60.000000	60.000000
70.000000	70.000000	70.000000	70.000000
80.000000	80.000000	80.000000	80.000000
90.000000	90.000000	90.000000	90.000000
100.00000	100.00000	100.00000	100.00000

****

COLUMNS 2 AND 13 SHOULD CONTAIN THE SAME VALUES.
THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

THE FOLLOWING IS AN EXAMPLE OF THE TWO WORD CENSOR COMMANDS. COLUMN 1 IS DEFINED BY THE GENERATE COMMAND.
COLUMN 8 WAS DEFINED BY THE FLIP COMMAND.

COLUMN 1	CENSOR LE	CENSOR EQ	CENSOR GE	CENSOR LT	CENSOR GT	CENSOR NE	COLUMN 8
10.000000	2.0000000	10.000000	10.000000	100.00000	10.000000	100.00000	100.00000
20.000000	2.0000000	20.000000	20.000000	90.000000	20.000000	90.000000	90.000000
30.000000	2.0000000	30.000000	30.000000	80.000000	30.000000	30.000000	80.000000
40.000000	2.0000000	40.000000	40.000000	70.000000	40.000000	70.000000	70.000000
50.000000	2.0000000	50.000000	50.000000	60.000000	50.000000	60.000000	60.000000
60.000000	60.000000	50.000000	60.000000	50.000000	2.0000000	50.000000	50.000000
70.000000	70.000000	70.000000	2.0000000	40.000000	2.0000000	40.000000	40.000000
80.000000	80.000000	80.000000	2.0000000	80.000000	2.0000000	30.000000	30.000000
90.000000	90.000000	90.000000	2.0000000	90.000000	2.0000000	20.000000	20.000000
100.00000	100.00000	100.00000	2.0000000	100.00000	2.0000000	10.000000	10.000000

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 2.0 AND 6.2.

2.0000000 6.2000000

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE STARTING WITH 10 IN STEPS OF 10 THRU 100 AND STORE VALUES IN COLUMN 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   10.

CENSOR COLUMN 1 FOR VALUES LESS OR EQUAL TO 50. REPLACE BY 1.0 STORE IN COL 2
CENSOR COL 2 FOR VALUES LESS OR EQUAL TO VALUES IN 1 REPLACE BY COL 1 PUT IN 3
MATCH COL 1 FOR VALUES EQUAL TO VALUES IN COL 3 REPLACE BY 1.0 PUT IN COLUMN 4
SUBTRACT COLUMN 1 FROM COLUMN 3 AND STORE IN COLUMN 20
AVERAGE COLUMN 20 AND STORE IN COLUMN 20
AVERAGE COLUMN 4 AND STORE IN COLUMN 21
SUBTRACT 1.0 FROM COLUMN 21 AND STORE IN COL 21
TITLE1 THE FOLLOWING 1S AN EXAMPLE OF THE CENSOR AND MATCH COMMAND
TITLE2S. COLUMN 1 WAS SET UP BY THE GENERATE COMMAND.
TITLE3 COLUMNS 2 AND 3 WERE DEFINED BY THE CENSOR COMMAND. COLUMN
TITLE44 WAS DEFINED BY THE MATCH COMMAND.
PRINT COLUMNS 1 2 3 AND 4
SPACE  2
NOTE ********************************************************************************
SPACE
NOTE COLUMNS 1 AND 3 SHOULD CONTAIN THE SAME VALUES.
NOTE THE VALUES IN COLUMN 4 SHOULD BE EQUAL TO ONE.
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 20  AND 21
SPACE
NOTE ********************************************************************************
SET THE FOLLOWING VALUES IN COLUMN 4
5.0  10.0  10.0  12.0  15.0  1.0  2.0  10.0  10.0  84.0
SELECT IN COL 1 VALUES APPROXIMATING COL 2 TO TOLERANCE .5  STORE IN COL 5
SELECT COL 2 VALUES APPROXIMATING COL 4 TO 10.0 STORE IN 9 TO 11 FREQ CT IN 12
TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE SELECT COMMAND.
TITLE2
TITLE3 COLUMNS 9 10 11 AND 12 WERE DEFINED BY SELECT COMMAND.
TITLE4
PRINT  COLUMNS  1  2  4  5  9  10  11 AND 12
ROWSUM COLUMNS 5 9 10 11 12 STORE IN COL 40
SET IN COLUMN 41
8. 8. 8. 0. 0. 68. 78. 88. 98. 272.
SUBTRACT COLUMN 40 FROM COLUMN 41 STORE IN COL 40
AVERAGE COLUMN 40 STORE IN COLUMN 40
SPACE  2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 40
SPACE
NOTE ********************************************************************************
SEARCH COL 3 FOR NUMBERS IN COL 1 MOVE CORRESPONDING VALUES IN COL 2 TO COL 13
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE SEARCH COMMAND.
TITLE2
TITLE3 COLUMN 13 WAS DEFINED BY THE SEARCH COMMAND.
TITLE4
PRINT COLUMNS 1 2 3 AND 13
SUBTRACT COL 2 FROM COLUMN 13 STORE IN COL 30
AVERAGE COL 30 AND STORE RESULT IN COL 30
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE COLUMNS 2 AND 13 SHOULD CONTAIN THE SAME VALUES.
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 30
SPACE
NOTE ***************************************************************************
TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE TWO WORD CENSOR COMMANDS
TITLE2. COLUMN 1 IS DEFINED BY THE GENERATE COMMAND.
TITLE3 COLUMN 8 WAS DEFINED BY THE FLIP COMMAND.
LABEL CENSOR LE, 2, CENSOR EQ, 3, CENSOR GE, 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (CENSOR LE) IS IN COL (2), (CENSOR EQ) IS IN COL (3)
       (CENSOR GE) IS IN COL (4)

LABEL CENSOR LT, 5, CENSOR GT, 6, CENSOR NE, 7

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (CENSOR LT) IS IN COL (5), (CENSOR GT) IS IN COL (6)
       (CENSOR NE) IS IN COL (7)

FLIP  COLUMN 1 INTO COLUMN 8
CENSOR LE COL 1 FOR NOS 50. OR LESS, REPLACE BY 2.0 PUT IN COL 2
CENSOR EQ COL 1 FOR VALUES EQUAL TO 60., REPLACE BY COL 8 PUT IN COLUMN 3
CENSOR GE COL 1 FOR NOS 70.0 AND GREATER, REPLACE BY 2.0 PUT IN COL 4
CENSOR LT COL 1 FOR VALUES LESS THAN 80.0, REPLACE BY COL 8 PUT IN COLUMN 5
CENSOR GT COLUMN 1 FOR VALUES GREATER THAN 50., REPLACE BY 2.0 PUT IN COL 6
CENSOR NE COL 1 FOR VALUES OTHER THAN 30., REPLACE WITH COL 8 PUT IN COLUMN 7
PRINT COLUMNS  1, 2, 3, 4, 5, 6, 7 AND 8
ADD COL 6 TO COL 2 PUT IN COL 9
SUBTRACT COL 1 FROM COL 9 PUT IN COL 9
ADD COL 3 TO COL 7 PUT IN COL 10
SUBTRACT COL 5 FROM COL 10 PUT IN COL 10
SUBTRACT COL 4 FROM COL 10 PUT IN COL 10
AVERAGE COLUMN 9 PUT RESULT IN COLUMN 9
AVERAGE COLUMN 10 PUT RESULT IN COLUMN 10
SPACE 2
NOTE ***************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 2.0 AND 6.2.
SPACE
ABRIDGE ROW 1 OF COLUMNS 9 10
NOTE ********************************************************************************
```

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 THE FOLLOWING IS AN EXAMPLE OF THE INSERT AND SEPARATE COMMANDS.
 COLUMN 1 WAS DEFINED BY THE GENERATE COMMAND. COLUMNS 2 AND 3 WERE DEFINED BY SEPARATE AND COLUMN 4 BY INSERT.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
1.0000000	2.0000000	1.0000000	1.0000000
2.0000000	4.0000000	3.0000000	2.0000000
3.0000000	6.0000000	5.0000000	3.0000000
4.0000000	8.0000000	7.0000000	4.0000000
5.0000000	10.000000	9.0000000	5.0000000
6.0000000	12.000000	11.000000	6.0000000
7.0000000	14.000000	13.000000	7.0000000
8.0000000	16.000000	15.000000	8.0000000
9.0000000	18.000000	17.000000	9.0000000
10.000000	20.000000	19.000000	10.000000
11.000000			11.000000
12.000000			12.000000
13.000000			13.000000
14.000000			14.000000
15.000000			15.000000
16.000000			16.000000
17.000000			17.000000
18.000000			18.000000
19.000000			19.000000
20.000000			20.000000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
          0.

****

THE FOLLOWING IS AN EXAMPLE OF THE MAXMIN COMMAND. X WAS DEFINED BY THE GENERATE COMMAND. Y=COSD(X).

X	Y	COLUMNS 6 AND 7 CONTAIN MAXIMA VALUES OF FUNCTION Y. COLUMN 6	COLUMN 7	COLUMNS 8 AND 9 CONTAIN MINIMA VALUES OF FUNCTION Y. COLUMN 8	COLUMN 9
-10.000000	.98480775	* 3.8314035-08	1.0000000	180.00000	-1.0000000
0.	1.0000000	* 3.6000000+02	1.0000002		
10.000000	.98480775				
20.000000	.93969262				
30.000000	.86602541				
40.000000	.76604445				
50.000000	.64278762				
60.000000	.50000001				
70.000000	.34202016				
80.000000	.17364819				
90.000000	* 1.5893255-08				
100.00000	-.17364816				
110.00000	-.34202012				
120.00000	-.49999997				
130.00000	-.64278758				
140.00000	-.76604442				
150.00000	-.86602538				
160.00000	-.93969262				
170.00000	-.98480775				
180.00000	-1.0000000				
190.00000	-.98480776				
200.00000	-.93969264				
210.00000	-.86602543				
220.00000	-.76604448				
230.00000	-.64278768				
240.00000	-.50000005				
250.00000	-.34202018				
260.00000	-.17364825				
270.00000	*-4.7679764-08				
280.00000	.17364810				
290.00000	.34202009				
300.00000	.49999992				
310.00000	.64278756				
320.00000	.76604442				
330.00000	.86602537				
340.00000	.93969260				
350.00000	.98480774				
360.00000	1.0000000				
370.00000	.98480777				

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.

* 1.9073486-06
0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 1 IN STEPS OF 1 THRU 20 AND STORE VALUES IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   20.

SEPARATE FROM COLUMN 1 EVERY 2ND ROW STARTING WITH ROW 2 STORE IN COLUMN 2
SEPARATE FROM COL 1 EVERY 2ND ROW STARTING WITH ROW 1 AND STORE IN COL 3
INSERT IN COL 3 FROM COL 2 AT EVERY 2ND ROW STARTING AT 2ND ROW STORE IN COL 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   20 TO   40.

TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE INSERT AND SEPARATE COMM
TITLE2ANDS.
TITLE3 COLUMN 1 WAS DEFINED BY THE GENERATE COMMAND. COLUMNS 2 AND
TITLE4 3 WERE DEFINED BY SEPARATE AND COLUMN 4 BY INSERT.
RESET NRMAX 20

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   40 TO   20.

PRINT COLUMNS 1 2 3 AND 4
SPACE 2
SUB  COL 1 FROM COL 4 STORE IN COLUMN 5
NOTE **********************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
ABRIDGE ROW 1 OF COLUMN 5
SPACE
NOTE **********************************************************************
RESET NRMAX 0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   20 TO    0.

GENERATE STARTING WITH -10 IN STEPS OF 10 THRU 370 AND STORE VALUES IN COLUMN 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   39.

COSD OF COLUMN 4 AND STORE IN COLUMN 5
MAXMIN X IN COL 4 Y IN COL 5 STORE MAXIMA IN COLS 6 AND 7 MINIMA IN COLS 8 AND 9
TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE MAXMIN COMMAND.  X WAS D
TITLE2EFINED BY THE GENERATE COMMAND. Y=COSD(X).
TITLE3 COLUMNS 6 AND 7 CONTAIN MAXIMA VALUES OF FUNCTION Y.
TITLE4 COLUMNS 8 AND 9 CONTAIN MINIMA VALUES OF FUNCTION Y.
HEAD COL 4/     X
HEAD COL 5/     Y
PRINT COLUMNS 4***9
RESET NRMAX 2
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   39 TO    2.

ROWSUM COLS 6***9 STORE IN COLUMN 10
SET IN COL 11
180.0  361.0
SUBTRACT COL 10 FROM COL 11 STORE IN COL 12
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
NPRINT COLUMN 12
SPACE
NOTE ***************************************************************************

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```

```
OMNITAB 80 TEST 23 HIERARCHY, ORDER AND SORT INSTRUCTIONS. (5.4)                    PAGE    1
 COLUMNS 1 AND 2 WERE DEFINED BY THE SET COMMAND.
 COLUMN 3 CONTAINS THE LOCATIONS OF THE SMALLEST TO LARGEST VALUES OF COLUMN 1.
  COLUMN    1     COLUMN    2     COLUMN    3

   30.000000        1.2450000        5.0000000
    3.5600000         .44000000      10.000000
    2.1400000        7.5800000        4.0000000
    1.0000000       23.000000         3.0000000
    0.              56.000000         2.0000000

    5.7800000       45.000000         6.0000000
    8.9000000       78.000000         7.0000000
    9.0000000       96.000000         8.0000000
  123.00000          2.0000000        1.0000000
     .12000000       0.               9.0000000

THE VALUES BELOW RESULTED FROM SORTING COLUMN 2 AND CARRYING ALONG THE
CORRESPONDING VALUES OF COLUMNS 1 AND 3.

     .12000000       0.               9.0000000
    3.5600000         .44000000      10.000000
   30.000000         1.2450000        5.0000000
  123.00000          2.0000000        1.0000000
    2.1400000        7.5800000        4.0000000

    1.0000000       23.000000         3.0000000
    5.7800000       45.000000         6.0000000
    0.              56.000000         2.0000000
    8.9000000       78.000000         7.0000000
    9.0000000       96.000000         8.0000000

THE VALUES BELOW ARE THE SORTED VALUES OF THE ABOVE COLUMNS.

    0.               0.               1.0000000
     .12000000        .44000000       2.0000000
    1.0000000        1.2450000        3.0000000
    2.1400000        2.0000000        4.0000000
    3.5600000        7.5800000        5.0000000

    5.7800000       23.000000         6.0000000
    8.9000000       45.000000         7.0000000
    9.0000000       56.000000         8.0000000
   30.000000        78.000000         9.0000000
  123.00000         96.000000        10.000000

**************************************************************************

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.

            0.               0.               0.

**************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET THE FOLLOWING VALUES INTO COLUMN 1
30.0  3.56  2.14  1.  0.0  5.78  8.9  9  123.  .12

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

SET THE FOLLOWING VALUES INTO COLUMN 2
1.245 .44 7.58  23  56 45 78 96 2

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   10 TO    9.

RESET NRMAX TO 10

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    9 TO   10.

HIERARCHY OF COLUMN 1 STORE LOCATIONS OF SMALLEST TO LARGEST INTO COL 3
AVERAGE OF COLUMN 1 AND STORE IN COLUMN 4
AVERAGE OF COLUMN 2 AND STORE IN COLUMN 5
AVERAGE OF COLUMN 3 AND STORE IN COLUMN 6
TITLE1 COLUMNS 1 AND 2 WERE DEFINED BY THE SET COMMAND.
TITLE3 COLUMN 3 CONTAINS THE LOCATIONS OF THE SMALLEST TO LARGEST
TITLE4VALUES OF COLUMN 1.
PRINT THE VALUES IN COLUMNS 1***3
SORT COLUMN 2 AND CARRY ALONG THE CORRESPONDING VALUES OF COLUMNS 1 AND 3
AVERAGE OF COLUMN 1 STORE IN COL 7
AVERAGE OF COLUMN 2 STORE IN COL 8
SPACE
AVERAGE OF COLUMN 3 STORE IN COL 9
NOTE THE VALUES BELOW RESULTED FROM SORTING COLUMN 2 AND CARRYING ALONG THE
NOTE CORRESPONDING VALUES OF COLUMNS 1 AND 3.
SPACE
NPRINT COLUMNS 1***3 WITHOUT HEADINGS
ORDER COLUMNS 1***3
AVERAGE OF COLUMN 1 STORE IN COLUMN 10
AVERAGE OF COLUMN 2 STORE IN COLUMN 11
AVERAGE OF COLUMN 3 STORE IN COLUMN 12
SPACE
NOTE THE VALUES BELOW ARE THE SORTED VALUES OF THE ABOVE COLUMNS.
SPACE
NPRINT COLUMNS 1***3 WITHOUT HEADINGS
SUBTRACT COL 4 FROM COL 7 AND STORE IN COL 13
SUBTRACT COL 8 FROM COL 11 STORE IN COL 14
SUBTRACT COL 6 FROM COL 12 STORE IN COL 15
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
ABRIDGE ROW 1 OF COLUMN 13 14 15
SPACE
NOTE **************************************************************************
```

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OMNITAB 80 TEST 24 CHOOSE, RETAIN, OMIT AND DELETE INSTRUCTIONS. (5.6) PAGE 1
COLUMNS 5 AND 6 WERE DEFINED BY THE CHOOSE COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
6.0000000	25.000000	40.000000	101.00000	6.0000000	6.0000000
7.0000000	23.000000	48.000000	-1.0000000	6.0000000	7.0000000
7.0000000	25.000000	40.000000	104.00000	6.0000000	7.0000000
6.0000000	25.000000	49.000000	109.00000	6.0000000	6.0000000
-2.0000000	26.000000	40.000000	106.00000	6.0000000	7.0000000
7.0000000	24.000000	48.000000	102.00000	6.0000000	6.0000000
6.0000000	-3.0000000	40.000000	103.00000		6.0000000
6.0000000	25.000000	49.000000	108.00000		6.0000000
6.0000000	23.000000	-2.0000000	105.00000		7.0000000
7.0000000	24.000000	48.000000	108.00000		6.0000000
-1.0000000	24.000000	48.000000	102.00000		7.0000000
6.0000000	25.000000	49.000000	101.00000		7.0000000
7.0000000	26.000000	-1.0000000	-1.0000000		7.0000000
7.0000000	25.000000	48.000000	103.00000		0.
7.0000000	26.000000	49.000000	107.00000		0.

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL 15.0, 6.0 AND 13.0.

15.000000	6.0000000	13.000000

****

COLUMNS 5 AND 6 WERE DEFINED BY THE CHOOSE COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14
6.0000000	25.000000	40.000000	101.00000	6.0000000	25.000000	40.000000	101.00000
7.0000000	23.000000	48.000000	-1.0000000	7.0000000	25.000000	40.000000	104.00000
7.0000000	25.000000	40.000000	104.00000	6.0000000	25.000000	49.000000	109.00000
6.0000000	25.000000	49.000000	109.00000	7.0000000	24.000000	48.000000	102.00000
-2.0000000	26.000000	40.000000	106.00000	6.0000000	25.000000	49.000000	108.00000
7.0000000	24.000000	48.000000	102.00000	7.0000000	24.000000	48.000000	108.00000
6.0000000	-3.0000000	40.000000	103.00000	6.0000000	25.000000	49.000000	101.00000
6.0000000	25.000000	49.000000	108.00000	7.0000000	25.000000	48.000000	103.00000
6.0000000	23.000000	-2.0000000	105.00000	7.0000000	26.000000	49.000000	107.00000
7.0000000	24.000000	48.000000	108.00000				
-1.0000000	24.000000	48.000000	102.00000				
6.0000000	25.000000	49.000000	101.00000				
7.0000000	26.000000	-1.0000000	-1.0000000				
7.0000000	25.000000	48.000000	103.00000				
7.0000000	26.000000	49.000000	107.00000				

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL 9.0

9.0000000

****

COLUMNS 5 THRU 8 WERE DEFINED BY THE OMIT COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
6.0000000	25.000000	40.000000	101.00000	6.0000000	6.0000000	6.0000000	25.000000
7.0000000	23.000000	48.000000	-1.0000000	7.0000000	7.0000000	7.0000000	23.000000
7.0000000	25.000000	40.000000	104.00000	7.0000000	7.0000000	7.0000000	25.000000
6.0000000	25.000000	49.000000	109.00000	6.0000000	6.0000000	6.0000000	25.000000
-2.0000000	26.000000	40.000000	106.00000	7.0000000	7.0000000	7.0000000	24.000000
7.0000000	24.000000	48.000000	102.00000	6.0000000	6.0000000	6.0000000	-3.0000000
6.0000000	-3.0000000	40.000000	103.00000	6.0000000	6.0000000	6.0000000	25.000000
6.0000000	25.000000	49.000000	108.00000	6.0000000	6.0000000	6.0000000	23.000000
6.0000000	23.000000	-2.0000000	105.00000	7.0000000	7.0000000	7.0000000	24.000000
7.0000000	24.000000	48.000000	108.00000	-1.0000000	6.0000000	-1.0000000	24.000000
-1.0000000	24.000000	48.000000	102.00000	6.0000000	7.0000000	6.0000000	25.000000
6.0000000	25.000000	49.000000	101.00000	7.0000000	7.0000000	7.0000000	26.000000
7.0000000	26.000000	-1.0000000	-1.0000000	7.0000000	7.0000000	7.0000000	25.000000
7.0000000	25.000000	48.000000	103.00000	7.0000000	0.	7.0000000	26.000000
7.0000000	26.000000	49.000000	107.00000	0.	0.	0.	0.

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO ARE EQUAL TO 15.0, 14.0 AND 13.0.

15.000000 14.000000 13.000000

****

COLUMNS 11 THRU 18 WERE DEFINED BY THE DELETE COMMAND.

COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15	COLUMN 16	COLUMN 17	COLUMN 18
6.0000000	25.000000	40.000000	101.00000	6.0000000	25.000000	40.000000	101.00000
7.0000000	25.000000	40.000000	104.00000	7.0000000	25.000000	40.000000	104.00000
6.0000000	25.000000	49.000000	109.00000	6.0000000	25.000000	49.000000	109.00000
-2.0000000	26.000000	40.000000	106.00000	7.0000000	24.000000	48.000000	102.00000
7.0000000	24.000000	48.000000	102.00000	6.0000000	25.000000	49.000000	108.00000
6.0000000	-3.0000000	40.000000	103.00000	7.0000000	24.000000	48.000000	108.00000
6.0000000	25.000000	49.000000	108.00000	6.0000000	25.000000	49.000000	101.00000
6.0000000	23.000000	-2.0000000	105.00000	7.0000000	25.000000	48.000000	103.00000
7.0000000	24.000000	48.000000	108.00000	7.0000000	26.000000	49.000000	107.00000
6.0000000	25.000000	49.000000	101.00000				
7.0000000	25.000000	48.000000	103.00000				
7.0000000	26.000000	49.000000	107.00000				

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO 12.0 AND 9.0.

12.000000 9.0000000

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ DATA INTO COLUMNS 1 2 3 AND 4
  6   25   40   101
  7   23   48    -1
  7   25   40   104
  6   25   49   109
 -2   26   40   106
  7   24   48   102
  6   -3   40   103
  6   25   49   108
  6   23   -2   105
  7   24   48   108
 -1   24   48   102
  6   25   49   101
  7   26   -1    -1
  7   25   48   103
  7   26   49   107

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   15.

RESET X TO *NRMAX*
TITLE1 COLUMNS 5 AND 6 WERE DEFINED BY THE CHOOSE COMMAND.
CHOOSE ROWS WITH  6. IN COLUMN 1 AND PUT IN COLUMN 5

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO    6.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    6 TO   15.

CHOOSE ROWS WITH VALUES BETWEEN 5. AND 8. IN COLUMN 1 AND PUT IN COL 6

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO   13.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   13 TO   15.

PRINT COLUMNS 1 *** 6
COUNT LENGTH OF COLUMN 1 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 51
COUNT LENGTH OF COLUMN 5 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 52
COUNT LENGTH OF COLUMN 6 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 53
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL 15.0, 6.0 AND 13.0.
SPACE
ABRIDGE ROW 1 OF COLUMNS 51, 52 AND 53
SPACE
NOTE ***************************************************************************
RETAIN ALL VALUES BETWEEN 0. AND 200. IN COLS 1***4 PUT IN COLS 11***14

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO    9.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    9 TO   15.

PRINT COLUMNS 1 *** 4 AND 11 *** 14
TITLE1 COLUMNS 11 THRU 14 WERE DEFINED BY THE RETAIN COMMAND.
COUNT COLUMN 11 PUT IN COL 51
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL 9.0
SPACE
ABRIDGE ROW 1 OF COLUMN 51
SPACE
NOTE ***************************************************************************
TITLE1 COLUMNS 5 THRU 8 WERE DEFINED BY THE OMIT COMMAND.
ERASE COLS 5, 6, 7 AND 8
OMIT ROWS WITH THE VALUE OF -2. IN COLUMN 1 AND PUT IN COLUMN 5

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO   14.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   14 TO   15.

OMIT ROWS WITH VALUES BETWEEN -10. AND 0. IN COLUMN 1 AND PUT IN COL 6

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO   13.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   13 TO   15.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
OMIT ROWS WITH -2. IN COL 1 CORR ROW OF COL 2 PUT IN COLS 7 AND 8

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO   14.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   14 TO   15.

PRINT COLUMNS 1 *** 8
COUNT LENGTH OF COLUMN 1 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 51
COUNT LENGTH OF COLUMN 5 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 52
COUNT LENGTH OF COLUMN 6 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 53
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO ARE EQUAL TO 15.0, 14.0 AND 13.0.
SPACE
ABRIDGE ROW 1 OF COLUMNS 51, 52 AND 53
SPACE
NOTE ***************************************************************************
TITLE1 COLUMNS 11 THRU 18 WERE DEFINED BY THE DELETE COMMAND.
ERASE 11***18
DELETE ALL ROWS HAVING THE VALUE -1.0 IN COLS 1***4 PUT IN COLS 11***14

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO   12.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   12 TO   15.

DELETE ALL VALUES BETWEEN -10. AND 0. IN COLS 1***4 PUT IN COLS 15***18

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   15 TO    9.

RESET NRMAX TO **X**

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    9 TO   15.

PRINT COLUMNS 11 *** 18
COUNT COLUMN 11 PUT IN COL 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 52
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
COUNT LENGTH OF COLUMN 15 PUT IN COLUMN 60
DEFINE VALUE IN ROW 1 OF COL 60 INTO ROW 1 OF COL 53
NOTE ************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO 12.0 AND 9.0.
SPACE
ABRIDGE ROW 1 OF COLUMNS 52 AND 53
SPACE
NOTE ************************************************************************
```

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COLUMNS 2, 3 AND 4 WERE DEFINED BY THE CODE COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
12.600000	3.0000000	1.0000000	2.0000000
36.400000	8.0000000	6.0000000	7.0000000
27.100000	6.0000000	4.0000000	5.0000000
6.2000000	2.0000000	0.	1.0000000
3.7000000	1.0000000	0.	1.0000000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ONE.

1.0000000

****

COLUMN 2 WAS DEFINED BY THE RECODE COMMAND.

COLUMN 1	COLUMN 2
40.000000	1.0000000
48.000000	2.0000000
40.000000	1.0000000
49.000000	3.0000000
40.000000	1.0000000
48.000000	2.0000000
40.000000	1.0000000
49.000000	3.0000000
49.000000	3.0000000
48.000000	2.0000000
48.000000	2.0000000
49.000000	3.0000000
48.000000	2.0000000
48.000000	2.0000000
49.000000	3.0000000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ONE.

1.0000000

****

COLUMNS 3 AND 5 WERE DEFINED BY THE REPLACE COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
-1.0000000	1.0000000	8.0000000	1.0000000	7.0000000
-9.0000000	2.0000000	-9.0000000	1.0000000	-9.0000000
2.0000000	1.0000000	2.0000000	1.0000000	7.0000000
5.0000000	3.0000000	5.0000000	1.0000000	5.0000000
-9.0000000	1.0000000	-9.0000000	1.0000000	-9.0000000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
TITLE1 COLUMNS 2, 3 AND 4 WERE DEFINED BY THE CODE COMMAND.
SET DATA IN COLUMN 1
 12.6   36.4   27.1    6.2    3.7

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    0 TO    5.

CODE COLUMN 1 STARTING AT 0.0 USING LENGTH 5.0 AND PUT CODE IN COLUMN 2
CODE COLUMN 1 STARTING AT 10.0 USING LENGTH 5.0 AND PUT CODE IN COLUMN 3
CODE COLUMN 1 USING LENGTH 5.0 AND PUT CODE IN COLUMN 4
PRINT COLUMNS 1, 2, 3 AND 4
SUBTRACT COLUMN 4 FROM COLUMN 2 PUT RESULTS IN COLUMN 5
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ONE.
SPACE
ABRIDGE ROW 1 OF COLUMN 5
SPACE
NOTE ***************************************************************************
TITLE1 COLUMN 2 WAS DEFINED BY THE RECODE COMMAND.
SET DATA IN COLUMN 1
40 48 40 49 40 48 40 49 49 48 48 49 48 48 49

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    5 TO   15.

RECODE COLUMN 1 INTO COLUMN 2
PRINT COLUMNS 1 AND 2
SUM COLUMN 2 PUT RESULT IN COLUMN 3
SUBTRACT 1.0 FROM COLUMN 3 PUT RESULTS IN COLUMN 3
DIVIDE COLUMN 3 BY 30.0 PUT RESULT IN COLUMN 4
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ONE.
SPACE
ABRIDGE ROW 1 OF COLUMN 4
SPACE
NOTE ***************************************************************************
TITLE1 COLUMNS 3 AND 5 WERE DEFINED BY THE REPLACE COMMAND.
SET DATA IN COLUMN 1
 -1   -9   2   5  -9

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM   15 TO    5.

REPLACE -1.0 IN COLUMN 1 BY 8.0 AND PUT IN COLUMN 3
REPLACE VALUES FROM -3.0 TO -3.0 IN COLUMN 1 BY 7.0 AND PUT IN COLUMN 5
PRINT COLUMNS 1,2 3, 4 AND 5
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SUBTRACT COLUMN 5 FROM COLUMN 3 PUT RESULTS IN COLUMN 6
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 2 OF COLUMN 6
SPACE
NOTE ***************************************************************************
```

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COLUMNS 1 AND 2 WERE DEFINED BY READ COMMAND.
COLUMNS 3 THROUGH 8 WERE DEFINED BY THE MAXIMUM AND MINIMUM COMMANDS.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 8
1.2345000	5.4600000	213.45000	7.8900000	4.5599999	1.2345000	213.45000
4.5599999	7.8900000	213.45000	7.8900000	4.5599999	1.2345000	213.45000
213.45000	0.	213.45000	7.8900000	4.5599999	1.2345000	213.45000
21.400000	5.6000000	213.45000	7.8900000	4.5599999	1.2345000	213.45000
4.5678000	5.4450000	213.45000	7.8900000	4.5599999	1.2345000	213.45000
2.1110000	3.1121000	213.45000	7.8900000	4.5599999	1.2345000	213.45000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO 440.5845.

440.58450

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING VALUES INTO COLUMNS 1 AND 2
1.2345    5.46
4.56      7.89
213.45    0.0
21.4      5.6
4.5678    5.445
2.111     3.1121

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    6.

MAXIMUM VALUE OF COLUMN 1 IS STORED IN COLUMN 3
MAX     OF COL 2 STORE IN COL 4 STORE CORRESPONDING VALUE OF COL 1 INTO COL 5
MINIMUM VALUE OF COLUMN 1 IS STORED IN COLUMN 6
MIN     OF COL 2 STORE IN COL 7 STORE CORRESPONDING VALUE OF COL 1 INTO COL 8
TITLE1 COLUMNS 1 AND 2 WERE DEFINED BY READ COMMAND.
TITLE3 COLUMNS 3 THROUGH 8 WERE DEFINED BY THE MAXIMUM AND MINIMUM
TITLE4 COMMANDS.
PRINT THE VALUES IN COLUMNS 1***8
RESET  NRMAX 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    6 TO    1.

ROWSUM COLUMNS 3 4 5 6 7 AND 8 STORE IN COL 9
SPACE
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO 440.5845.
SPACE
ABRIDGE ROW 1 OF COLUMN 9
SPACE
NOTE ********************************************************************************

          NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C.  20234
                OMNITAB 80  VERSION 6.00      MARCH  2, 1981
```

STATISTICAL ANALYSIS OF COLUMN 2

NUMBER OF MEASUREMENTS = 33, NO. OF DISTINCT MEASUREMENTS = 22

FREQUENCY DISTRIBUTION WITH 10 CLASSES OF LENGTH .0045999944

1	1	2	2	3	8	10	3	2	1

FREQUENCY DISTRIBUTION OF LEAST SIGNIFICANT DIGIT (0,1,...,9)

2	3	4	2	7	1	4	2	2	6

MEASURES OF LOCATION

ARITHMETIC MEAN	7.8781212
MEDIAN	7.8789999
MID-RANGE	7.8749999
MID-MEAN (25 PERCENT TRIMMED MEAN)	7.8797646

MEASURES OF DISPERSION

STANDARD DEVIATION	.0092761682
AS PERCENT OF MEAN (COEF. OF VAR.)	.11774594
RANGE	.045999944
MEAN DEVIATION	.0069439772
INTER-QUARTILE RANGE	.010999978
VARIANCE	.000086047296

STANDARD DEVIATION OF MEAN.	.0016147736	
TREND STATISTICS		
SLOPE, SIGNIFICANCE LEVEL	.00015708244	.363
QUADRATIC COEFF., SIGNIFICANCE LEVEL	.0000046544881	.820
OTHER TESTS FOR NON-RANDOMNESS		
NUMBER OF RUNS UP AND DOWN, Z VALUE	21	-.283
MEAN SQUARE SUCCESSIVE DIFFERENCE	.00020103107	
MS SUCC DIFF/2(VARIANCE), Z VALUE	1.1681428	1.004
DEVIATIONS FROM ARITHMETIC MEAN		
NUMBER OF - SIGNS, + SIGNS	13	20
NUMBER OF RUNS, Z VALUE	19	.832
AUTOCORRELATION COEFFICIENT	-.17578389	

A TWO-SIDED 95 PERCENT CONFIDENCE INTERVAL FOR THE

MEAN IS	7.8748320	TO	7.8814104	
MEDIAN IS	7.8760000	TO	7.8830000	(DISTRIBUTION-FREE)
S.D. IS	.0073879703	TO	.012138986	

STATISTICAL TOLERANCE INTERVAL WITH 95 PERCENT CONFIDENCE FOR

50 PCT NORMAL COVERAGE IS	7.8701009	TO	7.8861415
95 PCT NORMAL COVERAGE IS	7.8548215	TO	7.9014209
99 PCT NORMAL COVERAGE IS	7.8475063	TO	7.9087361

INTERVAL FROM MIN TO MAX HAS DIST.-FREE COVERAGE 86.41

OTHER STATISTICS

MINIMUM	7.8520000
SECOND MINIMUM	7.8609999
MAXIMUM	7.8979999
SECOND MAXIMUM	7.8900000
(MEAN-MINIMUM)/STANDARD DEVIATION	2.8159471
(MAXIMUM-MEAN)/STANDARD DEVIATION	2.1429910
SQRT(B1), SKEWNESS COEFFICIENT	-.71451176
B2, KURTOSIS COEFFICIENT	3.7605827
LOWER QUARTILE	7.8730000
UPPER QUARTILE	7.8839999

STATISTICAL ANALYSIS OF COLUMN 2

NUMBER OF MEASUREMENTS = 33, NO. OF DISTINCT MEASUREMENTS = 22

FREQUENCY DISTRIBUTION WITH 10 CLASSES OF LENGTH .0045999944

1	1	2	2	3	8	10	3	2	1

FREQUENCY DISTRIBUTION OF LEAST SIGNIFICANT DIGIT (0,1,...,9)

2	3	4	2	7	1	4	2	2	6

MEASURES OF LOCATION

ARITHMETIC MEAN	7.8781212
MEDIAN	7.8789999
MID-RANGE	7.8749999
MID-MEAN (25 PERCENT TRIMMED MEAN)	7.8797646

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MS SUCC DIFF/2(VARIANCE), Z VALUE	1.1681428	1.004
DEVIATIONS FROM ARITHMETIC MEAN		
NUMBER OF - SIGNS, + SIGNS	13	20
NUMBER OF RUNS, Z VALUE	19	.832
AUTOCORRELATION COEFFICIENT	-.17578389	

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(MAXIMUM-MEAN)/STANDARD DEVIATION	2.1429910
SQRT(B1), SKEWNESS COEFFICIENT	-.71451176
B2, KURTOSIS COEFFICIENT	3.7605827
LOWER QUARTILE	7.8730000
UPPER QUARTILE	7.8839999

	OBSERVATIONS			ORDERED OBSERVATIONS		
I	X(I)	RANK	X(I)-MEAN	NO.	X(J)	X(J+1)-X(J)
1	7.8839999	25.5	.00587875	10	7.8520000	.00899994
2	7.8640000	3.5	-.0141212	21	7.8609999	.00300002
3	7.8789999	15.5	.000878751	2	7.8640000	0.
4	7.8720000	8.0	-.00612122	27	7.8640000	.00300002
5	7.8780000	13.0	-.000121236	26	7.8670000	.00199997
6	7.8900000	32.0	.0118788	8	7.8690000	.00200003
7	7.8740000	9.0	-.00412124	23	7.8710000	9.99987-04
8	7.8690000	6.0	-.00912124	4	7.8720000	.00199997
9	7.8830000	22.5	.00487876	7	7.8740000	.00200003
10	7.8520000	1.0	-.0261212	13	7.8760000	0.
11	7.8860000	29.5	.00787878	16	7.8760000	9.99987-04
12	7.8820000	20.5	.00387877	25	7.8770000	9.99987-04
13	7.8760000	10.5	-.00212121	5	7.8780000	9.99987-04
14	7.8839999	25.5	.00587875	3	7.8789999	0.
15	7.8830000	22.5	.00487876	17	7.8789999	0.
16	7.8760000	10.5	-.00212121	20	7.8789999	0.
17	7.8789999	15.5	.000878751	33	7.8789999	.00100005
18	7.8850000	28.0	.00687879	30	7.8800000	9.99987-04
19	7.8839999	25.5	.00587875	22	7.8810000	9.99987-04
20	7.8789999	15.5	.000878751	12	7.8820000	0.
21	7.8609999	2.0	-.0171213	29	7.8820000	9.99987-04
22	7.8810000	19.0	.00287879	9	7.8830000	0.
23	7.8710000	7.0	-.00712121	15	7.8830000	9.99987-04
24	7.8979999	33.0	.0198787	1	7.8839999	0.
25	7.8770000	12.0	-.00112122	14	7.8839999	0.
26	7.8670000	5.0	-.0111212	19	7.8839999	0.
27	7.8640000	3.5	-.0141212	31	7.8839999	.00100005
28	7.8860000	29.5	.00787878	18	7.8850000	9.99987-04
29	7.8820000	20.5	.00387877	11	7.8860000	0.
30	7.8800000	18.0	.00187880	28	7.8860000	.00300002
31	7.8839999	25.5	.00587875	32	7.8890000	9.99987-04
32	7.8890000	31.0	.0108788	6	7.8900000	.00799996
33	7.8789999	15.5	.000878751	24	7.8979999	

****

FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 7.580526, 7.87812, 0.0
AND 0.0 RESPECTIVELY.

7.5805213 7.8781212 *-1.8062013-08 0.

****

RANGE	MEDIAN	STANDARD DEV.
.045999944	7.8789999	.0092761681

****

FOLLOWING VALUES ALL MUST BE EQUAL TO OR NEAR ZERO.

0. 0. * 1.1641532-10

****

COL 21	COL 22	COL 23
LOWER BOUNDARY	UPPER BOUNDARY	FREQUENCY
7.8494444	7.8545555	1.0000000
7.8545555	7.8596666	0.
7.8596666	7.8647777	3.0000000
7.8647777	7.8698888	2.0000000
7.8698888	7.8749999	3.0000000
7.8749999	7.8801110	9.0000000
7.8801110	7.8852221	10.000000
7.8852221	7.8903332	4.0000000
7.8903332	7.8954443	0.
7.8954443	7.9005554	1.0000000

THE RESULTS ABOVE IN COL 23 ARE DIFFERENT FROM THE FREQUENCIES IN THE STATISTICAL ANALYSIS PRINT OUT BECAUSE DIFFERENT METHODS FOR COMPUTING WERE USED.

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. -.00022140890

****

HISTOGRAM WITH MID-POINTS IN COLUMN 26 , FREQUENCIES IN COLUMN 23

MID-POINTS	RCF	CF	RF	FREQUENCY	0--------10--------20
7.8520000	.030	1	.030	1	+
7.8571111	.030	1	.000	0	
7.8622222	.121	4	.091	3	+++
7.8673333	.182	6	.061	2	++
7.8724444	.273	9	.091	3	+++
7.8775555	.545	18	.273	9	+++++++++
7.8826666	.848	28	.303	10	++++++++++
7.8877777	.970	32	.121	4	++++
7.8928888	.970	32	.000	0	
7.8979999	1.000	33	.030	1	+

RCF = RELATIVE CUMULATIVE FREQUENCY
CF = CUMULATIVE FREQUENCY
RF = RELATIVE FREQUENCY

ABOVE PRINT OUT IS FROM HISTOGRAM COMMAND

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET IN COL 2 THE FOLLOWING DATA
7.884, 7.864, 7.879, 7.872, 7.878, 7.890, 7.874, 7.869, 7.883, 7.852
7.886, 7.882, 7.876, 7.884, 7.883, 7.876, 7.879, 7.885, 7.884, 7.879
7.861, 7.881, 7.871, 7.898, 7.877, 7.867, 7.864, 7.886, 7.882, 7.880
7.884, 7.889, 7.879

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   33.

BRIEF
STATISTICAL ANALYSIS OF COL 2
FULL
STATISTICAL ANALYSIS OF COL 2
SSTATISTICAL ANALYSIS OF COL 2 STORE RESULTS IN COLS 3, 4, 5 AND 6
RANKS OF COL 2 STORE RESULTS IN COL 10
SUBTRACT COL 10 FROM COL 4 STORE IN COL 11
AVERAGE COL 11 STORE IN COL 11
AVERAGE COL 3 STORE IN COL 4
AVERAGE COL 5 STORE IN COL 5
AVERAGE COL 6 STORE IN COL 6
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR  7.580526, 7.87812, 0.0
NOTE AND 0.0 RESPECTIVELY.
SPACE
ABRIDGE ROW 1 OF COLS 4 5 6 11
SPACE
NOTE ***************************************************************************
RANGE OF NUMBERS IN COL 2 PUT IN COL 1
MEDIAN OF NUMBERS IN COL 2 PUT RESULT IN COL 41
STDDEVIATION OF NUMBER IN COL 2 PUT RESULT IN COL 42
NEW PAGE
NOTE      RANGE          MEDIAN      STANDARD DEV.
SPACE
ABRIDGE ROW 1 OF COLS 1 41 AND 42
SPACE 5
SUBTRACT COL 1 FROM VALUE IN *11,3* PUT IN COL 1
SUBTRACT COL 41 FROM VALUE IN *5,3* PUT IN COL 41
SUBTRACT COL 42 FROM VALUE IN *9,3* PUT IN COL 42
NOTE ***************************************************************************
SPACE
NOTE FOLLOWING VALUES ALL MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 1 41 42
SPACE
NOTE ***************************************************************************
FREQUENCY OF COL 2, 10 CELLS LOWER BND IN COL 21 UPPER IN COL 22 FREQ IN COL 23

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   33 TO   10.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
MOVE ROW 51 OF COL 3 SIZE 10X1 TO ROW 1 OF COL 24
SUM COL 24 STORE IN COL 24
SUM COL 23 STORE IN COL 25
SUBTRACT COL 25 FROM COL 24 STORE IN COL 25
NEW PAGE
NOTE       COL 21          COL 22          COL 23
SPACE
NOTE     LOWER BOUNDARY UPPER BOUNDARY FREQUENCY
SPACE
NPRINT  21 22 23
ADD COL 21 TO COL 22 MULTIPLY BY .5 ADD 0.0 AND STORE IN COL 26
RESET NRMAX TO 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    10 TO     1.

SUBTRACT 1.0 FROM VALUE IN *2,3* STORE IN COL 30
SQUARE VALUE IN *21,3* STORE IN COL 31
F PROBABILITY OF 1.0 AND COL 30 DEG OF FREEDOM IN COL 31 STORE IN COL 32
SUBTRACT VALUE IN *22,3* FROM COL 32 STORE IN COL 32
SPACE
NOTE1  THE RESULTS ABOVE IN COL 23 ARE DIFFERENT FROM THE FREQUEN
NOTE2CIES IN THE STATISTICAL ANALYSIS PRINT OUT BECAUSE
PRINT NOTE
NOTE DIFFERENT METHODS FOR COMPUTING WERE USED.
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 25  32
SPACE
NOTE ***************************************************************************
RESET NRMAX TO 10

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM     1 TO    10.

HISTOGRAM MID PTS IN COL 26 FREQ. IN COL 23
SPACE   5
NOTE ABOVE PRINT OUT IS FROM HISTOGRAM COMMAND


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EXAMPLE FROM NBS HANDBOOK 91, PAGE 6-27.

LEAST SQUARES FIT OF RESPONSE, COLUMN 2,
AS A POLYNOMIAL OF DEGREE 3. INDEPENDENT VARIABLE IS COLUMN 1
USING 7 NON-ZERO WEIGHTS = 1.0000000

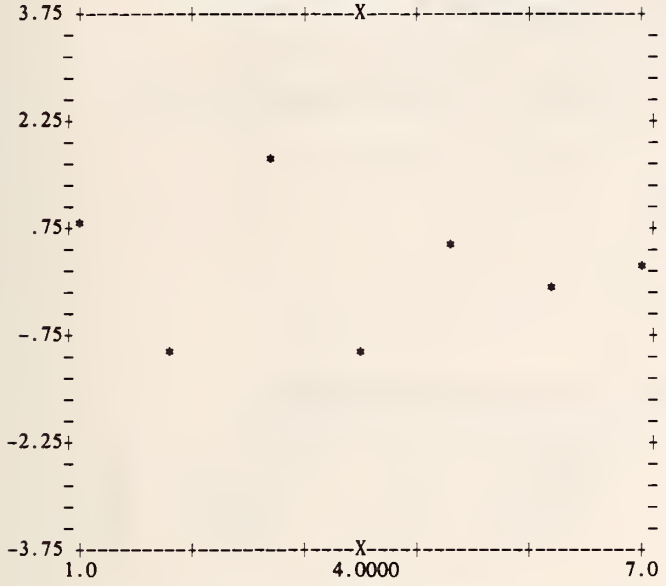
ROW	INDEP VAR. COLUMN 1	RESPONSE COLUMN 2	PREDICTED RESPONSE	STD. DEV. OF PRED. RESPONSE	RESIDUALS	STD. RES.	WEIGHTS
1	10.000000	3.4000000	3.2380953	.72044574	.16190474	.81	1.000
2	20.000000	11.700000	12.326190	.50285847	-.62619044	-1.13	1.000
3	30.000000	37.200000	36.290476	.50285847	.90952384	1.64	1.000
4	40.000000	80.099999	80.714285	.43165123	-.61428591	-1.01	1.000
5	50.000000	151.40000	151.18095	.50285847	.21904787	.40	1.000
6	60.000000	253.20000	253.27381	.50285847	-.073809660	-.13	1.000
7	70.000000	392.60000	392.57619	.72044574	.023809552	.12	1.000

DIAGNOSTIC INFORMATION FOR IDENTIFYING INFLUENTIAL MEASUREMENTS.
I = ROW, FOR 7 LARGEST VALUES, T(I) = STANDARDIZED RESIDUAL,
H(I) = DIAGONAL OF HAT MATRIX, D(I) = COOK STATISTIC,
WSSD(I) = DANIEL-WOOD STATISTIC, V(I) = VAR(YHAT) / VAR(RESIDUAL).

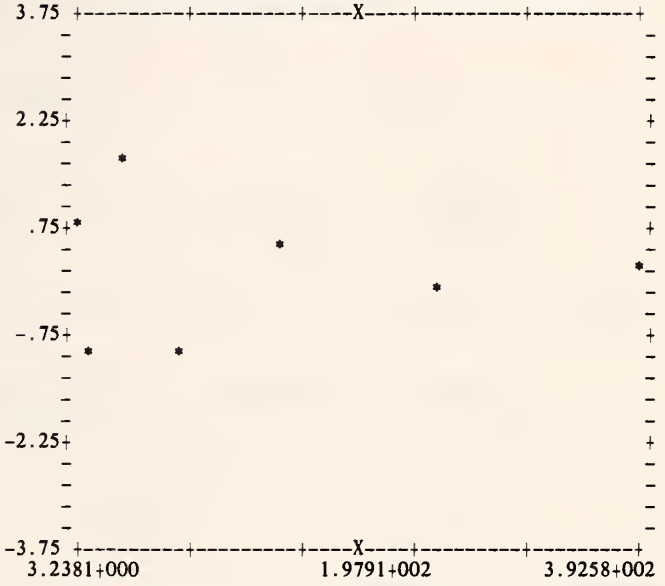
I	T(I)	I	H(I)	I	D(I)	I	WSSD(I)	I	V(I)
3	1.64	1	.929	1	2.13	7	87984.78	1	13.00
2	-1.13	7	.929	3	.56	1	21452.96	7	13.00
4	-1.01	2	.452	2	.26	2	18395.27	2	.83
1	.81	3	.452	4	.13	6	18395.27	3	.83
5	.40	5	.452	7	.05	3	11953.39	5	.83
6	-.13	6	.452	5	.03	4	3667.74	6	.83
7	.12	4	.333	6	.00	5	431.66	4	.50

THE DURBIN-WATSON STATISTIC IS D = 3.6324348

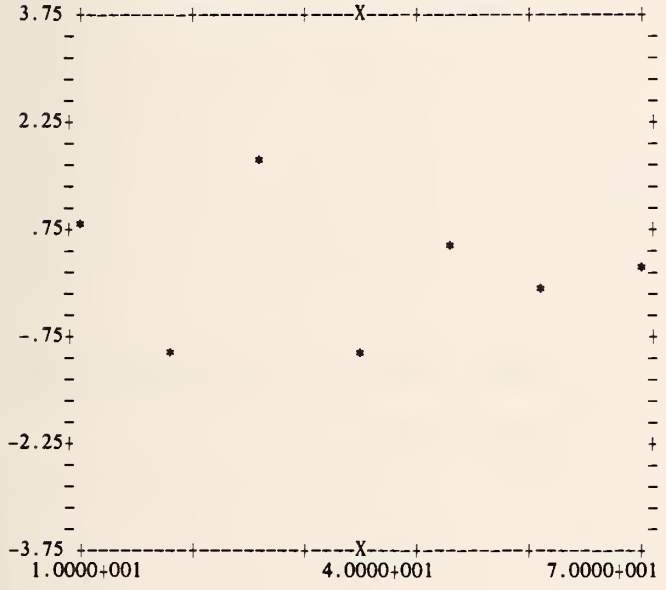
STANDARDIZED RESIDUALS VS ROW NUMBER



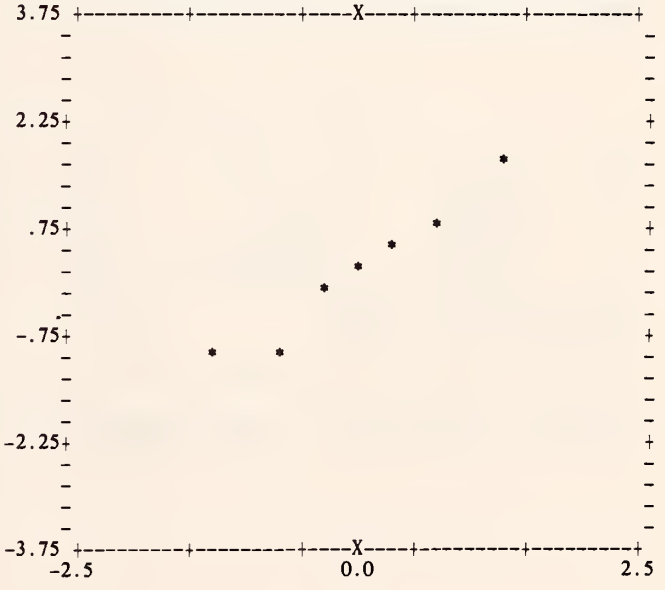
STANDARDIZED RESIDUALS VS PREDICTED RESPONSE



STANDARDIZED RESIDUALS VS COLUMN 1



NORMAL PROBABILITY PLOT OF STANDARDIZED RESIDUALS



LEAST SQUARES FIT OF RESPONSE, COLUMN 2,
AS A POLYNOMIAL OF DEGREE 3. INDEPENDENT VARIABLE IS COLUMN 1
USING 7 NON-ZERO WEIGHTS = 1.0000000

SAMPLE VARIANCE-COVARIANCE MATRIX OF THE ESTIMATED COEFFICIENTS WITH CORRELATIONS ABOVE THE DIAGONAL.

TERM	0	1	2	3
0	4.7113046	-.9547	.8960	-.8437
1	-.45382909	.047959634	-.9835	.9524
2	.011977894	-.0013264408	3.7929996-05	-.9912
3	-9.3161392-05	1.0610048-05	-3.1053798-07	2.5878165-09

THERE ARE NO REPLICATIONS FOR A LACK OF FIT ANALYSIS OF VARIANCE.

ANALYSIS OF VARIANCE
-DEPENDENT ON ORDER INDEPENDENT VARIABLES ARE ENTERED, UNLESS VECTORS ARE ORTHOGONAL-

TERM	SS=RED. DUE TO COEF.	CUM. RESIDUAL MS	D.F.	F(COEF=0)	P(F)	F(COEFS=0)	P(F)
0	123450.88	20944.063	6	220854.850	.000	111416.669	.000
1	111232.82	2886.3113	5	198996.625	.000	74937.274	.000
2	14242.838	47.179633	4	25480.580	.000	12907.599	.000
3	187.04163	.55896837	3	334.619	.000	334.619	.000
RESIDUAL	1.6769051		3				
TOTAL	249115.26		7				

ESTIMATES FROM LEAST SQUARES FIT

TERM	COEFFICIENT	S.D. OF COEFF.	RATIO	ACCURACY*
0	3.4428573	2.1705540	1.59	6.24
1	-.29900796	.21899688	-1.37	6.05
2	.018547619	.0061587333	3.01	6.32
3	.00093055554	.000050870586	18.29	7.03

RESIDUAL STANDARD DEVIATION = .74764188
BASED ON DEGREES OF FREEDOM 7 - 4 = 3

*THE NUMBER OF CORRECTLY COMPUTED DIGITS IN EACH COEFFICIENT USUALLY DIFFERS BY LESS THAN 1 FROM THE NUMBER GIVEN HERE.

THE NUMBER OF ITERATIONS WAS 2. SCALING WAS NOT USED.
THE AVERAGE NUMBER OF DIGITS IN AGREEMENT BETWEEN INITIAL SOLUTION AND 1ST ITERATION IS 6.02.

****

THE CORRECT COEFFICIENTS (TO 8 SIGNIFICANT DIGITS) FOR A THIRD
DEGREE POLYNOMIAL FIT TO THE GIVEN DATA ARE

3.4428571, -.29900794, .018547619 AND .00093055556.

THE CORRECT RESIDUAL STANDARD DEVIATION IS .74764180.

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. *-3.7252903-08 * 4.6566129-10 0. 0.

****

THE DATA USED ABOVE ARE FROM N. B. S. HANDBOOK 91, 'EXPERIMENTAL
STATISTICS,' PAGES 6-27.

THE RELATIONSHIP OF THE FOURIER COEFFICIENTS TO LEAST SQUARES PROBLEMS IS
GIVEN IN DAVIS AND RABINOWITZ'S 'ADVANCES IN ORTHONORMALIZING
COMPUTATION,' A CHAPTER IN 'ADVANCES IN COMPUTERS,' EDITED BY
FRANZ ALT, PUBLISHED BY ACADEMIC PRESS, 1961.

EXAMPLE FROM NBS HANDBOOK 91, PAGE 6-27.

N	COEFFS. $	RESIDUALS $$	SD OF PRED.Y	FOURIER $$$
1.0	3.4428573	.16190474	.72044574 *	1.2345088+05
2.0	-.29900796	-.62619044	.50285847 *	1.1123282+05
3.0	.018547619	.90952384	.50285847 *	1.4242838+04
4.0 *	9.3055554-04	-.61428591	.43165123 *	1.8704163+02
5.0	2.1705540	.21904787	.50285847	1.6769051
6.0	.21899688	-.073809660	.50285847 *	2.4911526+05
7.0	.0061587333	.023809552	.72044574	
8.0 *	5.0870586-05			
9.0	7.0000000			
10.	4.0000000			
11.	3.0000000			
12.	.74764188			
13.	.55896837			
14.	.99998666			

VARIANCE - COVARIANCE MATRIX.

1.	4.7113046	-.45382909	.011977894	*-9.3161392-05
2.	-.45382909	.047959634	-.0013264408 *	1.0610048-05
3.	.011977894	-.0013264408 *	3.7929996-05	*-3.1053798-07
4.	*-9.3161392-05 *	1.0610048-05	*-3.1053798-07 *	2.5878165-09

ABOVE OUTPUT IS A PRINT OUT OF THE INFORMATION STORED IN COLS 3-6, 11-14.

$ N=1,...,4 COEFFICIENTS.
N=5,...,8 STANDARD DEVIATIONS OF THE COEFFICIENTS.
N=9 NUMBER OF NON-ZERO WEIGHTS.
N=10 DEGREE PLUS 1.
N=11 DEGREES OF FREEDOM FOR RESIDUAL STANDARD DEV.
N=12 RESIDUAL STANDARD DEV.
N=13 RESIDUAL VARIANCE.
N=14 MULTIPLE CORRELATION COEFF. SQUARED.

$$ N=1,...,7 RESIDUALS: DEVS. OF PRED. VALUES FROM MEASUREMENTS.

$$$ N=1,...,4 SQUARED FOURIER COEFFICIENTS.
N=5 RESIDUAL SUM OF SQUARES.
N=6 TOTAL SUM OF SQUARES.

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
TITLE1EXAMPLE FROM NBS HANDBOOK 91, PAGE 6-27.
SET X IN COLUMN 1
10 20 30 40 50 60 70

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    7.

SET Y IN COLUMN 2
3.4  11.7  37.2  80.1  151.4  253.2  392.6
POLYFIT Y IN COL 2 WTS 1. DEG 3, X IN 1 PUT COEF 3 RES 4 SD PV 5 FC 6 VC (1,11)
 $      SD PV DENOTES STANDARD DEVIATIONS OF PREDICTED VALUES
 $      FC DENOTES FOURIER COEFFICIENTS
 $      VC DENOTES VARIANCE COVARIANCE MATRIX
HEAD  4/RESIDUALS $$
HEAD  3/COEFFS. $
HEAD  5/SD OF PRED.Y
HEAD  6/FOURIER $$$
NEW PAGE
NOTE ***************************************************************************
SPACE
NOTE  THE CORRECT COEFFICIENTS (TO 8 SIGNIFICANT DIGITS) FOR A THIRD
NOTE  DEGREE POLYNOMIAL FIT TO THE GIVEN DATA ARE
SPACE
NOTE  3.4428571, -.29900794, .018547619 AND .00093055556.
NOTE
NOTE  THE CORRECT RESIDUAL STANDARD DEVIATION IS .74764180.
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
RESET  NRMAX 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    7 TO    1.

SUBTRACT 3.4428573 FROM VALUE IN *1,3* STORE IN COL 20
SUBTRACT -.29900792 FROM VALUE IN *2,3* STORE IN COL 21
SUBTRACT .018547619 FROM VALUE IN *3,3* STORE IN COL 22
SUBTRACT .93055555-3 FROM VALUE IN *4,3* STORE IN COL 23
SUBTRACT .74764188 FROM VALUE IN *12,3* STORE IN COL 24
ABRIDGE ROW 1 COL 20 *** 24
SPACE
NOTE ***************************************************************************
NOTE
NOTE  THE DATA USED ABOVE ARE FROM N. B. S. HANDBOOK 91, 'EXPERIMENTAL
NOTE  STATISTICS,' PAGES 6-27.
NOTE
NOTE  THE RELATIONSHIP OF THE FOURIER COEFFICIENTS TO LEAST SQUARES PROBLEMS IS
NOTE  GIVEN IN DAVIS AND RABINOWITZ'S 'ADVANCES IN ORTHONORMALIZING
NOTE  COMPUTATION,' A CHAPTER IN 'ADVANCES IN COMPUTERS,' EDITED BY
NOTE  FRANZ ALT, PUBLISHED BY ACADEMIC PRESS, 1961.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 1 IN STEPS OF 1 THRU 14 IN COL 20

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    1 TO   14.

HEAD 20/          N
PRINT COL 20 WITH 2. SIG DIGITS, COLS 3***6 WITH 8.0 SIG DIGITS
SPACE
NOTE VARIANCE - COVARIANCE MATRIX.
SPACE
RESET  NRMAX 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   14 TO    4.

NPRINT COL 20 WITH 1. SIG DIGIT, COLS 11***14 WITH 8.0 SIG DIGITS
SPACE   2
NOTE ABOVE OUTPUT IS A PRINT OUT OF THE INFORMATION STORED IN COLS 3-6, 11-14.
SPACE
NOTE $     N=1,...,4  COEFFICIENTS.
NOTE       N=5,...,8  STANDARD DEVIATIONS OF THE COEFFICIENTS.
NOTE       N=9 NUMBER OF NON-ZERO WEIGHTS.
NOTE       N=10 DEGREE PLUS 1.
NOTE       N=11 DEGREES OF FREEDOM FOR RESIDUAL STANDARD DEV.
NOTE       N=12 RESIDUAL STANDARD DEV.
NOTE       N=13 RESIDUAL VARIANCE.
NOTE       N=14 MULTIPLE CORRELATION COEFF. SQUARED.
SPACE
NOTE $$    N=1,...,7 RESIDUALS: DEVS. OF PRED. VALUES FROM MEASUREMENTS.
SPACE
NOTE $$$   N=1,...,4 SQUARED FOURIER COEFFICIENTS.
NOTE       N=5  RESIDUAL SUM OF SQUARES.
NOTE       N=6  TOTAL SUM OF SQUARES.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OMNITAB 80 TEST 29 ONEWAY AND SONEWAY INSTRUCTIONS. (6.6)
AUTOMATIC OUTPUT FROM THE COMMAND ONEWAY.

ONEWAY ANALYSIS OF 30 MEASUREMENTS IN COLUMN 1
CLASSIFIED INTO 6 GROUPS WITH NUMBERS IN COLUMN 2

I ANALYSIS OF VARIANCE I

SOURCE	D.F.	SUMS OF SQUARES	MEAN SQUARES	F RATIO	PROB.
BETWEEN GROUPS	5	1320.0000	264.00000	7.135	.000
SLOPE	1	1282.5714	1282.5714	38.806	.000
ABOUT LINE	4	37.428574	9.3571434	.253	.905
WITHIN GROUPS	24	888.00000	37.000000		
TOTAL	29	2208.0000			

KRUSKAL-WALLIS RANK TEST FOR DIFFERENCE BETWEEN MEANS
SIGNIFICANCE LEVEL IS APPROXIMATELY .001

I ESTIMATES I

GROUP	NO.	MEAN		MINIMUM		MAXIMUM		SUM RANKS
1	5	45.000000	L	40.000000	L	51.000000	L	23.5L
2	5	51.000000		45.000000		58.000000		52.0
3	5	55.000000		45.000000		63.000000		74.0
4	5	58.000000		52.000000		65.000000		86.5
5	5	63.000000		56.000000		71.000000	H	111.5
6	5	64.000000	H	57.000000	H	70.000000		117.5H
TOTAL	30	56.000000		40.000000		71.000000		

GROUP	WITHIN S.D.		S.D. OF MEAN		95 PCT CONF INT FOR MEAN
1	4.3011627	L	1.9235384	L	39.659488 TO 50.340512
2	6.0415230		2.7018512		43.498580 TO 58.501420
3	7.6485293	H	3.4205263	H	45.503251 TO 64.496749
4	6.0415230		2.7018512		50.498580 TO 65.501419
5	6.6708320		2.9832868		54.717203 TO 71.282797
6	5.2440442		2.3452079		57.488766 TO 70.511234
MODEL					
FIXED	6.0827625		1.1105554		53.707927 TO 58.292073
RANDOM	7.2663608		2.9664794		48.374538 TO 63.625462
UNGROUPED	8.7257051		1.5930885		52.741768 TO 59.258232

AUTOMATIC OUTPUT FROM THE COMMAND ONEWAY.

I PAIRWISE MULTIPLE COMPARISION OF MEANS I

THE MEANS ARE PUT IN INCREASING ORDER IN GROUPS SEPARATED BY ***. A MEAN IS ADJUDGED NON-SIGNIFICANTLY DIFFERENT FROM ANY MEAN IN THE SAME GROUP AND SIGNIFICANTLY DIFFERENT AT THE .05 LEVEL FROM ANY MEAN IN ANOTHER GROUP. ***** INDICATES ADJACENT GROUPS HAVE NO COMMON MEAN.

- NEWMAN-KEULS TECHNIQUE, HARTLEY MODIFICATION -
(APPROXIMATE, IF THE NUMBERS OF MEASUREMENTS IN THE GROUPS DIFFER)

45.000000, 51.000000
***
51.000000, 55.000000, 58.000000
***
55.000000, 58.000000, 63.000000, 64.000000

- SCHEFFE TECHNIQUE -

45.000000, 51.000000, 55.000000, 58.000000
***
51.000000, 55.000000, 58.000000, 63.000000, 64.000000

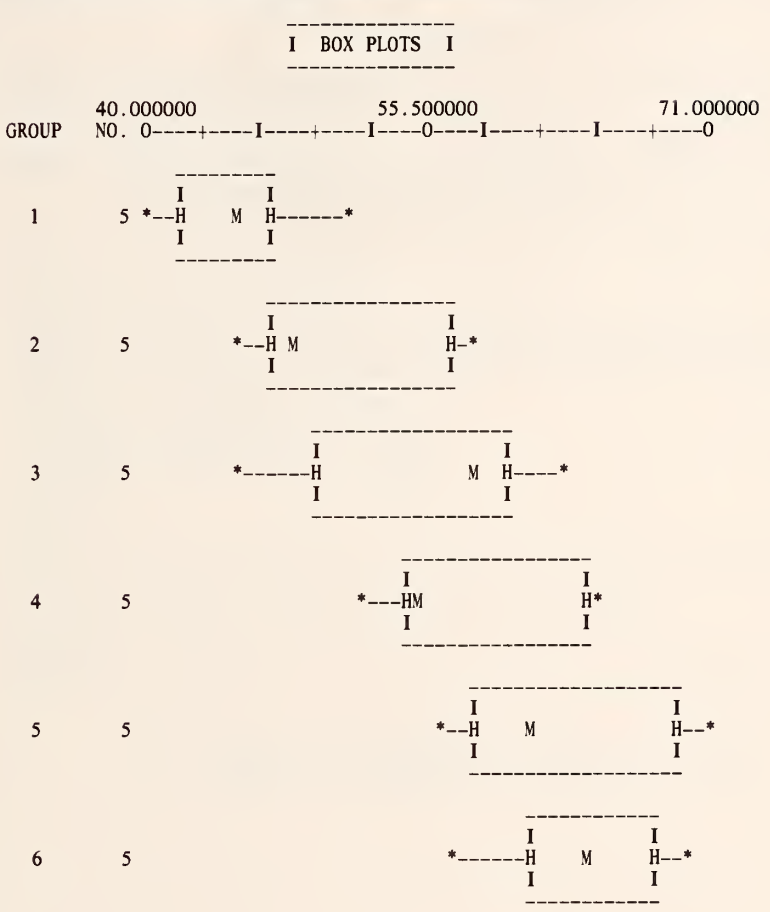
I TESTS FOR HOMOGENEITY OF VARIANCES I

COCHRAN'S C = MAX VARIANCE/SUM(VARIANCES) = .2635, APPROX SL = .853
BARTLETT-BOX F = .272, SIGNIFICANCE LEVEL = .929
MAXIMUM VARIANCE / MINIMUM VARIANCE = 3.1621621

I MODEL II - COMPONENTS OF VARIANCE I

ESTIMATE OF BETWEEN COMPONENT OF VARIATION IS 45.400000

AUTOMATIC OUTPUT FROM THE COMMAND ONEWAY.



****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET THE FOLLOWING DATA IN COL 1
40,51,42,47,45,57,47,58,48,45
49,60,58,45,63,55,64,65,54,52
56,71,58,61,69,61,68,70,64,57

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   30.

SET THE FOLLOWING DATA IN COL 2
1,1,1,1,1,2,2,2,2,3,3,3,3,3
4,4,4,4,4,5,5,5,5,6,6,6,6,6
TITLE1    AUTOMATIC OUTPUT FROM THE COMMAND ONEWAY.
ONEWAY ANALYSIS OF DATA IN COL 1 PUT TAG IN COL 2 AND STATISTICS IN COLS 11***14
SONEWAY ANALYSIS OF COL 1, PUT TAG IN COL 2 AND STATISTICS IN COLS 21***24
1/SUB COL 11 FROM COL 21 STORE IN COL 21
2/AVERAGE COL 21 STORE IN COL 21
3/INCREMENT INSTRUCTION 1 BY 1, 1 AND 1
4/INCREMENT INSTRUCTION 2 BY 1 AND 1
REPEAT INSTRUCTIONS 1 THRU 4, 4 TIMES
TITLE1
NEW PAGE
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE 1  21***24
SPACE 1
NOTE ***************************************************************************

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ANALYSIS OF VARIANCE FOR TWOWAY 3 X 4 TABLE OF COLUMN 11

SOURCE	D.F.	SUMS OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN ROWS	2	7.1666666	3.5833333	.942	.528
BETWEEN COLS	3	24.916667	8.3055556	2.182	.191
RESIDUALS	6	22.833333	3.8055555		
TOTAL	11	54.916667			

TUKEY'S TEST FOR NON-ADDITIVITY

NON-ADDITIVITY	1	7.9069895	7.9069895	2.649	.165
BALANCE	5	14.926344	2.9852688		
RESIDUALS	6	22.833333	3.8055555		

COEFFICIENT		ESTIMATE	RANK SUM
GRAND MEAN		2.4166667	
ROW	1	1.0833333 H	10.0H
ROW	2	-.66666666L	7.0L
ROW	3	-.41666666	7.0L
COLUMN	1	2.2500000 H	11.0H
COLUMN	2	-1.4166667 L	5.0L
COLUMN	3	-1.0833333	5.0L
COLUMN	4	.25000001	9.0

SAMPLE STANDARD DEVIATIONS ...
- GRAND MEAN = .56314263
- ROW EFFECT = .79640394
- COL EFFECT = .97539166
- RESIDUAL = 1.9507833

RANK SUM TEST STATISTICS ...
- ROWS - KENDALL W = .188
- FRIEDMAN CHISQ = 1.500
- COLS - KENDALL W = .600
- FRIEDMAN CHISQ = 5.400

3 X 4 TABLE OF RESIDUALS, STANDARDIZED BY DIVIDING EACH RESIDUAL BY ITS STANDARD DEVIATION.

COLUMN / ROW	1	2	3	4
1	1.63	-.06	-1.03	-.54
2	-1.45	.48	-.48	1.45
3	-.18	-.42	1.51	-.91

THE ABOVE OUTPUT IS FROM THE COMMAND TWOWAY.

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0.	0.	0.
0.	0.	0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET DATA IN COLUMN 11
8 2 1 3
2 1 0 4
4 0 3 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   12.

TWOWAY ANALYSIS FOR 3 BY 4 TABLE, DATA IN COL 11, STORE IN 31 AND SUCC. COLS
SFIT Y IN COL 11 WTS=1. FOR 6 VAR. IN COLS 31***36 PUT IN COLS 41***44 R=1,C=45
RESET NRMAX 40

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   12 TO   40.

1/SUBTRACT COL 38 FROM COL 42, PUT IN COL 51
2/INCREMENT INSTRUCTION 1 BY 1, 1 AND 1
3/AVERAGE COL 51 STORE IN COL 51
4/INCREMENT INSTRUCTION 3 BY 1 AND 1
PERFORM INSTRUCTIONS 1 THRU 4, 3 TIMES
SPACE 2
NOTE THE ABOVE OUTPUT IS FROM THE COMMAND TWOWAY.
NEW PAGE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 51 52 53
MOVE DATA IN ROW 1 OF COL 37 SIZE 3OX4 TO ROW 1 OF COL 41
RESET NRMAX 12

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   40 TO   12.

STWOWAY ANALYSIS FOR 3 BY 4 TABLE, DATA IN COL 11, STORE IN 31 AND SUCC. COLS
RESET NRMAX 40

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   12 TO   40.

1/SUBTRACT COL 38 FROM COL 42, PUT IN COL 51
3/AVERAGE COL 51 STORE IN COL 51
PERFORM INSTRUCTIONS 1 THRU 4, 3 TIMES
ABRIDGE ROW 1 OF COLS 51 52 53
SPACE
NOTE ***************************************************************************


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CORRELATION ANALYSIS FOR 7 VARIABLES WITH 16 OBSERVATIONS

SIMPLE CORRELATION COEFFICIENTS

COLUMN	1	2	3	4	5	6
1	1.0000					
2	.9916	1.0000				
3	.6206	.6043	1.0000			
4	.4647	.4464	-.1774	1.0000		
5	.9792	.9911	.6866	.3644	1.0000	
6	.9911	.9953	.6683	.4172	.9940	1.0000
8	.9708	.9835	.5024	.4570	.9604	.9713

COLUMN	8
8	1.0000

SIGNIFICANCE LEVELS OF SIMPLE CORRELATION COEFF'S (ASSUMING NORMALITY)

COLUMN	1	2	3	4	5	6
1	.0000					
2	.0000	.0000				
3	.0103	.0132	.0000			
4	.0697	.0830	.5109	.0000		
5	.0000	.0000	.0033	.1652	.0000	
6	.0000	.0000	.0047	.1078	.0000	.0000
8	.0000	.0000	.0473	.0751	.0000	.0000

COLUMN	8
8	.0000

PARTIAL CORRELATION COEFFICIENTS WITH 5 REMAINING VARIABLES FIXED

COLUMN	1	2	3	4	5	6
1	1.0000					
2	.6296	1.0000				
3	.3712	-.7952	1.0000			
4	.2316	-.5177	-.8783	1.0000		
5	-.6525	.7592	.3876	.0391	1.0000	
6	-.1560	.7213	.9376	.8527	-.1753	1.0000
8	.0554	-.3344	-.8080	-.8479	-.0717	.7993

COLUMN	8
8	1.0000

SIGNIFICANCE LEVELS OF PARTIAL CORRELATION COEF'S (ASSUMING NORMALITY)

COLUMN	1	2	3	4	5	6
1	.0000					
2	.0379	.0000				
3	.2610	.0034	.0000			
4	.4931	.1029	.0004	.0000		
5	.0295	.0067	.2389	.9091	.0000	
6	.6468	.0122	.0000	.0009	.6061	.0000
8	.8715	.3148	.0026	.0010	.8340	.0032

COLUMN	8
8	.0000

SPEARMAN RANK CORRELATION COEFFICIENTS (ADJUSTED FOR TIES)

COLUMN	1	2	3	4	5	6
1	1.0000					
2	.9971	1.0000				
3	.6647	.6382	1.0000			
4	.2206	.2235	-.3412	1.0000		
5	.9971	.9941	.6853	.2265	1.0000	
6	.9971	.9941	.6853	.2265	1.0000	1.0000
8	.9824	.9853	.5647	.2265	.9765	.9765

COLUMN	8
8	1.0000

SIGNIFICANCE LEVEL OF QUADRATIC FIT OVER LINEAR FIT
BASED ON F RATIO WITH 1 AND 13 DEGREES OF FREEDOM
(FOR EXAMPLE .1099 IS THE SIGNIFICANCE LEVEL OF THE
QUADRATIC TERM WHEN COLUMN 2 IS FITTED TO COLUMN 1)

COLUMN	1	2	3	4	5	6
1	1.0000	.0465	.4560	.0001	.0009	.1908
2	.1099	1.0000	.5834	.0001	.0068	.6670
3	.0560	.1795	1.0000	.0028	.4280	.1796
4	.0007	.0018	.2827	1.0000	.0108	.0030
5	.0013	.0027	.5545	.0002	1.0000	.0000
6	.0896	.8106	.6234	.0001	.0000	1.0000
8	.8852	.3038	.7556	.0001	.0444	.6047

COLUMN	8
1	.6482
2	.4973
3	.1435
4	.0006
5	.0920
6	.5806
8	1.0000

CONFIDENCE INTERVALS FOR SIMPLE CORRELATION COEFF'S (FISHER APPROX.)
95 PER CENT LIMITS BELOW DIAGONAL, 99 PER CENT LIMITS ABOVE DIAGONAL

COLUMN	1	2	3	4	5	6
1	99.0000	.9980	.8938	.8390	.9950	.9979
	95.0000	.9654	.0116	-.2080	.9158	.9636
2	.9972	99.0000	.8884	.8320	.9979	.9989
	.9753	95.0000	-.0146	-.2300	.9633	.9804
3	.8537	.8464	99.0000	.4893	.9147	.9090
	.1804	.1550	95.0000	-.7132	.1263	.0929
4	.7806	.7714	.3490	99.0000	.7992	.8206
	-.0402	-.0633	-.6187	95.0000	-.3207	-.2637
5	.9929	.9970	.8821	.7285	99.0000	.9985
	.9394	.9738	.2893	-.1602	95.0000	.9750
6	.9970	.9984	.8743	.7565	.9980	99.0000
	.9740	.9860	.2580	-.0989	.9822	95.0000
8	.9900	.9944	.7991	.7767	.9865	.9902
	.9157	.9518	.0090	-.0500	.8869	.9171

COLUMN	8
1	.9929
	.8834
2	.9960
	.9329
3	.8530
	-.1605
4	.8361
	-.2174
5	.9904
	.8444

```
6          .9930
          .8853

8        99.0000
        95.0000
```

****

THE OUTPUT ON THE PREVIOUS PAGE IS THE AUTOMATIC PRINT OUT OF CORRELATION.
THE DATA USED IN THIS PROBLEM WAS TAKEN FROM AN ARTICLE BY
JAMES W. LONGLEY IN 'JOURNAL OF THE AMERICAN STATISTICAL
ASSOCIATION', VOL. 62, (1967), PAGES 819-841.

****

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0. 0. 0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ DATA INTO COLS 1***8
83.0  234289  2356  1590  107608  1947  347873.0  60343
88.5  259426  2325  1456  108632  1948  373875.5  61122
88.2  258054  3682  1616  109773  1949  375162.2  60171
96.2  328975  2099  3099  112075  1951  448295.2  63221
89.5  284599  3351  1650  110929  1950  402568.5  61187
98.1  346999  1932  3594  113270  1952  467845.1  63639
99.0  365385  1870  3547  115094  1953  487948.0  64989
100.0 363112  3578  3350  116219  1954  488313.0  63761
101.2 397469  2904  3048  117388  1955  522865.2  66019
104.6 419180  2822  2857  118734  1956  545653.6  67857
108.4 442769  2936  2798  120445  1957  571013.4  68169
110.8 444546  4681  2637  121950  1958  575882.8  66513
112.6 482704  3813  2552  123366  1959  614506.6  68655
114.2 502601  3931  2514  125368  1960  636488.2  69564
115.7 518173  4806  2572  127852  1961  655479.7  69331
116.9 554894  4007  2827  130081  1962  693887.9  70551

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   16.

CORRELATION 7 VARIABLES IN COLS 1***6, 8 PUT IN ROW 1 OF COL 9, ROW 8 OF COL 9
SCORRELATION 7 VARIABLES IN COLS 1***6,8 PUT IN ROW 1 COL 19 AND ROW 8 COL 19
RESET NRMAX TO 14

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   16 TO   14.

NEW PAGE
NOTE1*****************************************************************************
NOTE2*********************************************************
PRINT NOTE
SPACE
NOTE THE OUTPUT ON THE PREVIOUS PAGE IS THE AUTOMATIC PRINT OUT OF CORRELATION.
NOTE THE DATA USED IN THIS PROBLEM WAS TAKEN FROM AN ARTICLE BY
NOTE JAMES W. LONGLEY IN 'JOURNAL OF THE AMERICAN STATISTICAL
NOTE ASSOCIATION', VOL. 62, (1967), PAGES 819-841.
SPACE
PRINT NOTE
1/SUBTRACT  COL 9 FROM COL 19 STORE IN COL 19
2/AVERAGE COL 19 STORE IN COL 19
3/INCREMENT INSTRUCTION 1 BY  1  1  AND 1
4/ INCREMENT INSTRUCTION 2 BY  1 AND 1
REPEAT INSTRUCTIONS 1 THRU 4, 7 TIMES
SPACE  2
PRINT NOTE
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 19 *** 25
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
PRINT NOTE

        NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C.  20234
              OMNITAB 80  VERSION 6.00      MARCH  2, 1981
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CONTINGENCY TABLE ANALYSIS OF 5 BY 3 TABLE. * OBSERVED COUNT
OBSERVED COUNTS IN COLUMNS 11 TO 13. SHOWING * EXPECTED COUNT
HYPOTHESIS IS P(IJ) = P(I.)P(.J). * ----------
* DIFFERENCE

COL / ROW	11	12	13	TOTALS
1	1	1	11	13
	3.29	2.99	6.72	
	-2.29	-1.99	4.28	
2	1	0	10	11
	2.78	2.53	5.69	
	-1.78	-2.53	4.31	
3	8	4	16	28
	7.08	6.44	14.48	
	.92	-2.44	1.52	
4	11	7	5	23
	5.82	5.29	11.90	
	5.18	1.71	-6.90	
5	1	8	3	12
	3.03	2.76	6.21	
	-2.03	5.24	-3.21	
TOTALS	22	20	45	87

FREEMAN-TUKEY DEVIATES

COL / ROW	11	12	13
1	-1.35	-1.18	1.50
2	-1.07	-2.33	1.60
3	.41	-.94	.45
4	1.85	.77	-2.28
5	-1.21	2.36	-1.35

REFERENCE. FREEMAN, M. F. AND TUKEY, J. W. (1950). TRANSFORMATIONS RELATED TO THE ANGULAR AND THE SQUARE ROOT. ANN. MATH. STATIST.,21,607.

ANALYSIS OF INFORMATION TABLES

COMPONENT DUE TO HYPOTHESIS	LIKELIHOOD CHI-SQUARED INFORMATION VALUE	D.F.	CHI-SQUARED PROBABILITY
INDEPENDENCE			
P(IJ) = 1/15	61.976	14	.000
P(I.) = 1/5	12.891	4	.012
P(.J) = 1/3	12.525	2	.002
P(IJ) = P(I.)P(.J)	36.560	8	.000
(PEARSON CHI-SQUARED	35.923	8	.000)
HOMOGENEITY OF R SAMPLES			
P(RJ) = 1/3 EACH SAMPLE	49.085	10	.000
P(J) = 1/3 ALL SAMPLES	12.525	2	.002
HOMOGENEITY OF R SAMPLES	36.560	8	.000
(PEARSON CHI-SQUARED	35.923	8	.000)

REFERENCE ...
KU, H. H., VARNER, R. N., AND KULLBACK, S. (1971). ON THE ANALYSIS OF MULTIDIMENSIONAL CONTINGENCY TABLES, J. AMER. STATIST. ASSOC.,66,55.

MEASURES OF ASSOCIATION	VALUE	ASYMPTOTIC STANDARD ERROR	RATIO
BASED ON CHI-SQUARED STATISTIC			
PHI (CRAMER)	.454		
CONTINGENCY COEFFICIENT	.541		
BASED ON RANK ORDER CORRELATION			
KENDALL'S TAU	-.344	.073	-4.713
SPEARMAN'S RHO	-.422	.098	-4.289
KRUSKAL'S GAMMA	-.478	.100	-4.795
BASED ON PROBABILITY OF PREDICTION			
LAMBDA A	.119	.088	1.353
LAMBDA B	.262	.103	2.531
LAMBDA	.178	.089	1.998

NOTE ... DISCUSSIONS OF THESE MEASURES AND FORMULAS FOR COMPUTING STANDARD ERRORS MAY BE FOUND IN ...

GOODMAN, L. A. AND KRUSKAL, W. H., MEASURES OF ASSOCIATION FOR CROSS CLASSIFICATIONS. PART I, II, AND III, J. OF AMER. STATIST. ASSOC. VOL. 49,732. (1954). VOL. 54,123. (1959), VOL. 58,310 (1963).

KENDALL, M. AND STUART, A. (1973). THE ADVANCED THEORY OF STAT., V 2.

HAYS, W. L. (1973). STATISTICS FOR THE SOCIAL SCIENCES. 2ND ED.

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ DATA INTO COLUMNS 11, 12 AND 13
    1    1   11
    1    0   10
    8    4   16
   11    7    5
    1    8    3

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    5.

CONTINGENCY TABLE ANALYSIS OF 5 X 3 TABLE STARTING IN COLUMN 11

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3-WAY TABLE OF FREQUENCIES OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	0	0	1	2	3
	7	0	0	1	0	1
48	6	0	0	0	0	0
	7	1	3	1	1	6
49	6	1	0	3	0	4
	7	0	0	0	1	1
TOTALS		2	3	6	4	15

3-WAY TABLE OF FREQUENCIES OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40.988	6	0	0	1	2	3
	7	0	0	1	0	1
48.988	6	0	0	0	0	0
	7	1	3	1	1	6
49.988	6	1	0	3	0	4
	7	0	0	0	1	1
TOTALS		2	3	6	4	15

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO .98765 AND 0.0.

.98764992 0.

****

3-WAY TABLE OF SUMS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2)	(1)	23	24	25	26	TOTALS
40		6	*	*	101	209	310
		7	*	*	104	*	104
48		6	*	*	*	*	*
		7	107	312	103	108	630
49		6	105	*	318	*	423
		7	*	*	*	107	107
	TOTALS		212	312	626	424	1574

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF SUMS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2)	(1)	23	24	25	26	TOTALS
40		6	*	*	101	209	310
		7	*	*	104	*	104
48		6	*	*	*	*	*
		7	107	312	103	108	630
49		6	105	*	318	*	423
		7	*	*	*	107	107
	TOTALS		212	312	626	424	1574

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF AVERAGES OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26
40	6	*	*	101.0	104.5
	7	*	*	104.0	*
48	6	*	*	*	*
	7	107.0	104.0	103.0	108.0
49	6	105.0	*	106.0	*
	7	*	*	*	107.0

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF AVERAGES OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26
40	6	*	*	101.0	104.5
	7	*	*	104.0	*
48	6	*	*	*	*
	7	107.0	104.0	103.0	108.0
49	6	105.0	*	106.0	*
	7	*	*	*	107.0

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF STANDARD DEVIATIONS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) (1)	23	24	25	26
40.988	6	*	*	.0000	2.1213
	7	*	*	.0000	*
48.988	6	*	*	*	*
	7	.0000	3.4641	.0000	.0000
49.988	6	.0000	*	4.3589	*
	7	*	*	*	.0000

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF STANDARD DEVIATIONS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) (1)	23	24	25	26
40.988	6	*	*	.0000	2.1213
	7	*	*	.0000	*
48.988	6	*	*	*	*
	7	.0000	3.4641	.0000	.0000
49.988	6	.0000	*	4.3589	*
	7	*	*	*	.0000

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF MINIMUMS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	*	*	101	103	101
	7	*	*	104	*	104
48	6	*	*	*	*	*
	7	107	102	103	108	102
49	6	105	*	101	*	101
	7	*	*	*	107	107
	TOTALS	105	102	101	103	101

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF MINIMUMS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	*	*	101	103	101
	7	*	*	104	*	104
48	6	*	*	*	*	*
	7	107	102	103	108	102
49	6	105	*	101	*	101
	7	*	*	*	107	107
	TOTALS	105	102	101	103	101

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF MAXIMUMS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40.988	6	*	*	101	106	106
	7	*	*	104	*	104
48.988	6	*	*	*	*	*
	7	107	108	103	108	108
49.988	6	105	*	109	*	109
	7	*	*	*	107	107
	TOTALS	107	108	109	108	109

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF MAXIMUMS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40.988	6	*	*	101	106	106
	7	*	*	104	*	104
48.988	6	*	*	*	*	*
	7	107	108	103	108	108
49.988	6	105	*	109	*	109
	7	*	*	*	107	107
	TOTALS	107	108	109	108	109

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF RANGES OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	*	*	0	3	5
	7	*	*	0	*	0
48	6	*	*	*	*	*
	7	0	6	0	0	6
49	6	0	*	8	*	8
	7	*	*	*	0	0
TOTALS		2	6	8	5	8

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF RANGES OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40.988	6	*	*	0	3	5
	7	*	*	0	*	0
48.988	6	*	*	*	*	*
	7	0	6	0	0	6
49.988	6	0	*	8	*	8
	7	*	*	*	0	0
TOTALS		2	6	8	5	8

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO .98765 AND 0.0.

.98764992 0.

****

3-WAY TABLE OF MEDIANS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

	(2)	23	24	25	26
(3)	(1)				
40.988	6	*	*	101.0	104.5
	7	*	*	104.0	*
48.988	6	*	*	*	*
	7	107.0	102.0	103.0	108.0
49.988	6	105.0	*	108.0	*
	7	*	*	*	107.0

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

3-WAY TABLE OF MEDIANS OF 15 MEASUREMENTS IN COLUMN 50

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

	(2)	23	24	25	26
(3)	(1)				
40.988	6	*	*	101.0	104.5
	7	*	*	104.0	*
48.988	6	*	*	*	*
	7	107.0	102.0	103.0	108.0
49.988	6	105.0	*	108.0	*
	7	*	*	*	107.0

* 14 OF THE 24 CELLS IN THE TABLE ARE EMPTY.

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF PERCENTAGES IN ROWS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	.00	.00	33.33	66.67	100.00
	7	.00	.00	100.00	.00	100.00
48	6	.00	.00	.00	.00	100.00
	7	16.67	50.00	16.67	16.67	100.00
49	6	25.00	.00	75.00	.00	100.00
	7	.00	.00	.00	100.00	100.00

3-WAY TABLE OF PERCENTAGES IN ROWS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	.00	.00	33.33	66.67	100.00
	7	.00	.00	100.00	.00	100.00
48	6	.00	.00	.00	.00	100.00
	7	16.67	50.00	16.67	16.67	100.00
49	6	25.00	.00	75.00	.00	100.00
	7	.00	.00	.00	100.00	100.00

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF PERCENTAGES OF 15 MEASUREMENTS

```
      (1) = COLUMN     7 ,  2 LEVELS
      (2) =    AGE       ,  4 LEVELS
      (3) = COLUMN    27 ,  3 LEVELS
```

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	.00	.00	6.67	13.33	20.00
	7	.00	.00	6.67	.00	6.67
48	6	.00	.00	.00	.00	.00
	7	6.67	20.00	6.67	6.67	40.00
49	6	6.67	.00	20.00	.00	26.67
	7	.00	.00	.00	6.67	6.67
TOTALS		13.33	20.00	40.00	26.67	100.00

3-WAY TABLE OF PERCENTAGES OF 15 MEASUREMENTS

```
      (1) = COLUMN     7 ,  2 LEVELS
      (2) =    AGE       ,  4 LEVELS
      (3) = COLUMN    27 ,  3 LEVELS
```

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	.00	.00	6.67	13.33	20.00
	7	.00	.00	6.67	.00	6.67
48	6	.00	.00	.00	.00	.00
	7	6.67	20.00	6.67	6.67	40.00
49	6	6.67	.00	20.00	.00	26.67
	7	.00	.00	.00	6.67	6.67
TOTALS		13.33	20.00	40.00	26.67	100.00

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

```
           0.
```

****

3-WAY TABLE OF PERCENTAGES IN COLUMNS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26
40	6	.00	.00	16.67	50.00
	7	.00	.00	16.67	.00
48	6	.00	.00	.00	.00
	7	50.00	100.00	16.67	25.00
49	6	50.00	.00	50.00	.00
	7	.00	.00	.00	25.00
TOTALS		100.00	100.00	100.00	100.00

3-WAY TABLE OF PERCENTAGES IN COLUMNS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26
40	6	.00	.00	16.67	50.00
	7	.00	.00	16.67	.00
48	6	.00	.00	.00	.00
	7	50.00	100.00	16.67	25.00
49	6	50.00	.00	50.00	.00
	7	.00	.00	.00	25.00
TOTALS		100.00	100.00	100.00	100.00

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF PROPORTIONS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40.988	6	.0000	.0000	.0667	.1333	.2000
	7	.0000	.0000	.0667	.0000	.0667
48.988	6	.0000	.0000	.0000	.0000	.0000
	7	.0667	.2000	.0667	.0667	.4000
49.988	6	.0667	.0000	.2000	.0000	.2667
	7	.0000	.0000	.0000	.0667	.0667
TOTALS		.1333	.2000	.4000	.2667	1.0000

3-WAY TABLE OF PROPORTIONS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 28 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40.988	6	.0000	.0000	.0667	.1333	.2000
	7	.0000	.0000	.0667	.0000	.0667
48.988	6	.0000	.0000	.0000	.0000	.0000
	7	.0667	.2000	.0667	.0667	.4000
49.988	6	.0667	.0000	.2000	.0000	.2667
	7	.0000	.0000	.0000	.0667	.0667
TOTALS		.1333	.2000	.4000	.2667	1.0000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF PROPORTIONS IN ROWS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	.0000	.0000	.3333	.6667	1.0000
	7	.0000	.0000	1.0000	.0000	1.0000
48	6	.0000	.0000	.0000	.0000	1.0000
	7	.1667	.5000	.1667	.1667	1.0000
49	6	.2500	.0000	.7500	.0000	1.0000
	7	.0000	.0000	.0000	1.0000	1.0000

3-WAY TABLE OF PROPORTIONS IN ROWS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26	TOTALS
40	6	.0000	.0000	.3333	.6667	1.0000
	7	.0000	.0000	1.0000	.0000	1.0000
48	6	.0000	.0000	.0000	.0000	1.0000
	7	.1667	.5000	.1667	.1667	1.0000
49	6	.2500	.0000	.7500	.0000	1.0000
	7	.0000	.0000	.0000	1.0000	1.0000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

3-WAY TABLE OF PROPORTIONS IN COLUMNS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26
40	6	.0000	.0000	.1667	.5000
	7	.0000	.0000	.1667	.0000
48	6	.0000	.0000	.0000	.0000
	7	.5000	1.0000	.1667	.2500
49	6	.5000	.0000	.5000	.0000
	7	.0000	.0000	.0000	.2500
TOTALS		1.0000	1.0000	1.0000	1.0000

3-WAY TABLE OF PROPORTIONS IN COLUMNS OF 15 MEASUREMENTS

(1) = COLUMN 7 , 2 LEVELS
(2) = AGE , 4 LEVELS
(3) = COLUMN 27 , 3 LEVELS

(3)	(2) / (1)	23	24	25	26
40	6	.0000	.0000	.1667	.5000
	7	.0000	.0000	.1667	.0000
48	6	.0000	.0000	.0000	.0000
	7	.5000	1.0000	.1667	.2500
49	6	.5000	.0000	.5000	.0000
	7	.0000	.0000	.0000	.2500
TOTALS		1.0000	1.0000	1.0000	1.0000

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ DATA INTO COLUMNS 7   5  27    50
$
                       6  25  40   101
                       7  23  48   107
                       7  25  40   104
                       6  25  49   109
                       6  26  40   106
                       7  24  48   102
                       6  26  40   103
                       6  25  49   108
                       6  23  49   105
                       7  24  48   108
                       7  24  48   102
                       6  25  49   101
                       7  26  48   108
                       7  25  48   103
                       7  26  49   107
$

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   15.

WIDTH OF 80 CHARACTERS PER LINE
HEAD COL 5/   AGE
TABLE FREQUENCY 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 STORE STARTING IN COL 41
$
ADD 0.98765 TO COLUMN 27 AND PUT IN COLUMN 28
SPACE 3
NTABLE FREQUENCY 3 WAY FOR DATA IN COLUMNS 7, 5 AND 28 STORE STARTING IN COL 31
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SUBTRACT COL 48 FROM COL 38 PUT IN COL 51
PROMOTE BY 1 ROW VALUES IN COL 51 PUT IN COL 51
SPACE 3
NOTE ************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO .98765 AND 0.0.
SPACE
ABRIDGE ROW 1 OF COL 51 AND 39
SPACE
NOTE ************************************************************************
WIDTH OF 72 CHARACTERS PER LINE
TABLE SUM 3 WAY WITH LEVELS IN COLS 7, 5 AND 27 FOR DATA IN COL 50 PUT IN COL 41
SPACE 3
NTABLE SUM 3 WAY WITH LEVELS IN COLS 7 5 AND 27 FOR DATA IN COL 50 PUT IN COL 31
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE AVERAGE 3 WAY WITH LEVELS IN COLS 7, 5 AND 27 DATA IN COL 50 PUT IN COL 11
SPACE 3
NTABLE AVERAGE 3 WAY WITH LEVELS IN COLS 7 5 AND 27 DATA IN COL 50 PUT IN COL 31
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 12 THRU 15 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE STDDEV 3 WAY WITH LEVELS IN COLS 7, 5 AND 28 DATA IN COL 50 PUT IN COL 41
SPACE 5
NTABLE STDDEV 3 WAY WITH LEVELS IN COLS 7, 5 AND 28 DATA IN COL 50 PUT IN COL 31
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE MINIMUM 3 WAY WITH LEVELS IN COLS 7, 5 AND 27 DATA IN COL 50 PUT IN COL 41
SPACE 3
NTABLE MINIMUM 3 WAY WITH LEVELS IN COLS 7 5 AND 27 DATA IN COL 50 PUT IN COL 11
ROW SUM COLS 42 THRU 45 PUT IN COL 49
ROW SUM COLS 12 THRU 15 PUT IN COL 39
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE MAXIMUM 3 WAY WITH LEVELS IN COLS 7, 5 AND 28 DATA IN COL 50 PUT IN COL 41
SPACE 3
NTABLE MAXIMUM 3 WAY WITH LEVELS IN COLS 7 5 AND 28 DATA IN COL 50 PUT IN COL 31
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE RANGE 3 WAY WITH LEVELS IN COLS 7, 5 AND 27 DATA IN COL 50 PUT IN COL 31
SPACE 3
NTABLE RANGE 3 WAY WITH LEVELS IN COLS 7, 5 AND 28 DATA IN COL 50 PUT IN COL 41
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SUBTRACT COL 38 FROM COL 48 PUT IN COL 51
PROMOTE BY 1 ROW VALUES IN COL 51 PUT IN COL 51
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE CLOSE TO OR EQUAL TO .98765 AND 0.0.
SPACE
ABRIDGE ROW 1 OF COL 51 AND 39
SPACE
NOTE ***************************************************************************
TABLE MEDIAN 3 WAY WITH LEVELS IN COLS 7, 5 AND 28 DATA IN COL 50 PUT IN COL 31
SPACE 3
NTABLE MEDIAN 3 WAY WITH LEVELS IN COLS 7, 5 AND 28 DATA IN COL 50 PUT IN COL 41
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE PERCENTAGES 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 STORE STARTING IN COL 31
SPACE 3
NTABLE PERCENTAGES 3 WAY FOR DATA IN COLUMNS 7 5 AND 27 STORE STARTING IN COL 41
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE RPERCENTAGE 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 STORE STARTING IN COL 31
SPACE 3
NTABLE RPERCENTAGE 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 START STORING IN COL 41
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE CPERCENTAGE 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 STORE STARTING IN COL 31
SPACE 3
NTABLE CPERCENTAGE 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 START STORING IN COL 41
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE PROPORTIONS 3 WAY FOR DATA IN COLUMNS 7, 5 AND 28 STORE STARTING IN COL 41
SPACE 3
NTABLE PROPORTIONS 3 WAY FOR DATA IN COLUMNS 7, 5 AND 28 START STORING IN COL 31
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE RPROPORTION 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 STORE STARTING IN COL 31
SPACE 3
NTABLE RPROPORTION 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 START STORING IN COL 41
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
TABLE CPROPORTION 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 STORE STARTING IN COL 31
SPACE 3
NTABLE CPROPORTION 3 WAY FOR DATA IN COLUMNS 7, 5 AND 27 START STORING IN COL 41
ROW SUM COLS 32 THRU 35 PUT IN COL 39
ROW SUM COLS 42 THRU 45 PUT IN COL 49
SUBTRACT COL 49 FROM COL 39 PUT IN COL 39
AVERAGE COL 39 PUT IN COL 39
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 OF COL 39
SPACE
NOTE ***************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

EXAMPLES OF PROBABILITY DENSITY FUNCTIONS

X	LOGNORMAL	HALFNORMAL	EXTREME	WEIBULL	BETA
COLUMN 1	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 15	COLUMN 17
.20000000	.54626787	.78208539	.36105292	.71487912	.27525120
.30000000	.64420326	.76277563	.35316560	.52788156	.47647845
.40000000	.65544417	.73654028	.34289876	.42001816	.52254720
.50000000	.62749608	.70413066	.33070430	.34865221	.41015625
.60000000	.58357382	.66644920	.31701327	.29750298	.23224320
.70000000	.53479484	.62450787	.30222446	.25885953	.087516455
.80000000	.48641578	.57938311	.28669712	.22854947	.017203201
.90000000	.44081569	.53217050	.27074722	.20409898	.00076545005

****

THE FOLLOWING VALUES MUST EQUAL OR BE NEAR .565, .674, .321, .375 AND .253.

.565 .674 .321 .375 .253

****

X	PARETO
1.2000000-000	3.8036289-001
1.3000000-000	3.3733001-001
1.4000000-000	3.0184081-001
1.5000000-000	2.7216553-001
1.6000000-000	2.4705294-001
1.7000000-000	2.2557794-001
1.8000000-000	2.0704333-001
1.9000000-000	1.9091480-001

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR .27028603

2.7028603-001

****

EXAMPLES OF PROBABILITY DENSITY FUNCTIONS

X	BINOMIAL	NEGBINOMIAL	POISSON	GEOMETRIC
COLUMN 2	COLUMN 18	COLUMN 20	COLUMN 19	COLUMN 21
.0000000	1.1529215-002	1.0485759-014	1.8315639-002	2.0000000-001
1.0000000+000	5.7646076-002	1.6777215-013	7.3262556-002	1.6000000-001
2.0000000+000	1.3690943-001	1.4092860-012	1.4652511-001	1.2800000-001
3.0000000+000	2.0536414-001	8.2678115-012	1.9536681-001	1.0240000-001
4.0000000+000	2.1819940-001	3.8031933-011	1.9536681-001	8.1920000-002
5.0000000+000	1.7455952-001	1.4604262-010	1.5629345-001	6.5536000-002
6.0000000+000	1.0909970-001	4.8680874-010	1.0419563-001	5.2428800-002
7.0000000+000	5.4549850-002	1.4465174-009	5.9540363-002	4.1943040-002

****

THE FOLLOWING VALUES MUST EQUAL OR BE NEAR .121, .0.0, .119 AND .104.

.121 .000 .119 .104

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
$
GENERATE 0.2(0.1)0.9 IN COLUMN 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    8.

GENERATE 0.0(1.0)7.0 IN COLUMN 2
ADD 1.0 TO COLUMN 1 AND PUT IN COLUMN 3
$
LOGNORMAL  DENSITY OF COLUMN 1 PUT IN COLUMN 11
HALFNORMAL DENSITY OF COLUMN 1 PUT IN COLUMN 12
EXTREME    DENSITY OF COLUMN 1 PUT IN COLUMN 13
$
WEIBULL DENSITY OF COLUMN 1, PARAMETER 0.5, PUT IN COLUMN 15
PARETO  DENSITY OF COLUMN 3, PARAMETER 0.5, PUT IN COLUMN 16
BETA    DENSITY OF COLUMN 1, PARAMETERS 3.0 AND 5.0, PUT IN COLUMN 17
$
BINOMIAL    DENSITY OF COLUMN 2, N=20.0, P = 0.2, PUT IN COLUMN 18
POISSON     DENSITY OF COLUMN 2,         P = 4.0, PUT IN COLUMN 19
NEGBINOMIAL DENSITY OF COLUMN 2, N=20.0, P = 0.2, PUT IN COLUMN 20
GEOMETRIC   DENSITY OF COLUMN 2,         P = 0.2, PUT IN COLUMN 21
$
TITLE1               EXAMPLES OF PROBABILITY DENSITY FUNCTIONS
TITLE3       X          LOGNORMAL      HALFNORMAL      EXTREME
TITLE4    WEIBULL           BETA
PRINT COLUMN 1 AND COLUMNS 11, 12, 13, 15 AND 17
AVERAGE COL 11 PUT IN COL 41
AVERAGE COL 12 PUT IN COL 42
AVERAGE COL 13 PUT IN COL 43
AVERAGE COL 15 PUT IN COL 44
AVERAGE COL 17 PUT IN COL 45
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST EQUAL OR BE NEAR .565, .674, .321, .375 AND .253.
FIXED 3
SPACE
ABRIDGE ROW 1 OF COLUMNS 41 *** 45
FLOATING
SPACE
NOTE ***************************************************************************
SPACE 3
NOTE        X            PARETO
NPRINT COLUMN 3 AND COLUMN 16
AVERAGE COL 16 AND PUT IN 41
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR .27028603
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
ABRIDGE ROW 1 OF COLUMN 41
SPACE
NOTE ***************************************************************************
SPACE 3
TITLE3       X           BINOMIAL     NEGBINOMIAL      POISSON
TITLE4   GEOMETRIC
PRINT COLUMN 2 AND COLUMNS 18, 20, 19 AND 21
AVERAGE COL 18 PUT IN COL 41
AVERAGE COL 20 PUT IN COL 42
AVERAGE COL 19 PUT IN COL 43
AVERAGE COL 21 PUT IN COL 44
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST EQUAL OR BE NEAR .121, .0.0, .119 AND .104.
FIXED 3
SPACE
ABRIDGE ROW 1 OF COLUMNS 41 *** 44
SPACE
NOTE ***************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

EXAMPLES OF PROBABILITY DENSITY FUNCTIONS

X	NORMAL	UNIFORM	CAUCHY	EXPONENTIAL	DEXPONENTIAL	LOGISTIC
COLUMN 1	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15	COLUMN 16
.20000000	.39104269	1.0000000	.30606720	.81873076	.40936538	.24751657
.30000000	.38138781	1.0000000	.29202742	.74081822	.37040911	.24445831
.39999999	.36827014	1.0000000	.27440508	.67032006	.33516003	.24026075
.50000000	.35206533	1.0000000	.25464791	.60653066	.30326533	.23500371
.59999999	.33322461	1.0000000	.23405139	.54881164	.27440582	.22878424
.69999999	.31225394	1.0000000	.21363080	.49658531	.24829265	.22171287
.79999999	.28969156	1.0000000	.19409140	.44932897	.22466449	.21390970
.89999998	.26608525	1.0000000	.17586182	.40656967	.20328483	.20550031

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 7.4505806-09	0. * 1.1175871-08
0.	0. * 3.7252903-09

****

EXAMPLES OF CUMULATIVE DISTRIBTION FUNCTIONS

X	NORMAL	LOGNORMAL	HALFNORMAL	UNIFORM
COLUMN 1	COLUMN 17	COLUMN 18	COLUMN 19	COLUMN 20
.20000000	.57925969	.053760290	.15851939	.20000000
.30000000	.61791137	.11430009	.23582274	.30000000
.39999999	.65542170	.17975718	.31084341	.39999999
.50000000	.69146247	.24410851	.38292494	.50000000
.59999999	.72574693	.30473654	.45149386	.59999999
.69999999	.75803643	.36066762	.51607287	.69999999
.79999999	.78814468	.41171192	.57628936	.79999999
.89999998	.81593992	.45804480	.63187984	.89999998

X	CAUCHY	EXPONENTIAL	DEXPONENTIAL	LOGISTIC
.20000000	.56283296	.18126925	.59063462	.54983400
.30000000	.59277358	.25918178	.62959089	.57444251
.39999999	.62111894	.32967994	.66483998	.59868766
.50000000	.64758362	.39346934	.69673467	.62245933
.59999999	.67202087	.45118836	.72559418	.64565630
.69999999	.69440011	.50341469	.75170735	.66818777
.79999999	.71477671	.55067103	.77533551	.68997448
.89999998	.73326229	.59343033	.79671517	.71094950

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 7.4505806-09 * 4.6566129-10 *-1.8626451-09 0.
* 1.4901161-08 * 7.4505806-09 *-7.4505806-09 * 1.4901161-08

****

EXAMPLES OF PERCENT POINT FUNCTIONS

X COLUMN 1	NORMAL COLUMN 26	LOGNORMAL COLUMN 27	HALFNORMAL COLUMN 28	UNIFORM COLUMN 29
.20000000	-.84162122	.43101119	.25334708	.20000000
.30000000	-.52440055	.59191008	.38532047	.30000000
.39999999	-.25334713	.77619839	.52440049	.39999999
.50000000	0.	1.0000000	.67448974	.50000000
.59999999	.25334704	1.2883303	.84162118	.59999999
.69999999	.52440049	1.6894457	1.0364333	.69999999
.79999999	.84162118	2.3201253	1.2815515	.79999999
.89999998	1.2815514	3.6022240	1.6448535	.89999998

X	CAUCHY	EXPONENTIAL	DEXPONENTIAL	LOGISTIC
.20000000	-1.3763819	.22314355	-.91629074	-1.3862944
.30000000	-.72654254	.35667494	-.51082563	-.84729788
.39999999	-.32491974	.51082560	-.22314358	-.40546516
.50000000	*-1.2194766-16	.69314718	0.	0.
.59999999	.32491965	.91629070	.22314352	.40546505
.69999999	.72654247	1.2039728	.51082558	.84729780
.79999999	1.3763818	1.6094379	.91629068	1.3862943
.89999998	3.0776830	2.3025849	1.6094377	2.1972244

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-7.4505806-09 * 3.7252903-09 * 7.4505806-09 0.
*-4.4703484-08 * 1.1175871-08 0. * 2.9802322-08

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
$
DIMENSION 10 X 200
$
$       NORMAL        DENSITY, NORMAL       CUMULATIVE, NORMAL       PERCENTILE
$                              LOGNORMAL    CUMULATIVE, LOGNORMAL    PERCENTILE
$                              HALFNORMAL   CUMULATIVE, HALFNORMAL   PERCENTILE
$       UNIFORM       DENSITY, UNIFORM      CUMULATIVE, UNIFORM      PERCENTILE
$       CAUCHY        DENSITY, CAUCHY       CUMULATIVE, CAUCHY       PERCENTILE
$       EXPONENTIAL   DENSITY, EXPONENTIAL  CUMULATIVE, EXPONENTIAL  PERCENTILE
$       DEXPONENTIAL  DENSITY, DEXPONENTIAL CUMULATIVE, DEXPONENTIAL PERCENTILE
$       LOGISTIC      DENSITY, LOGISTIC     CUMULATIVE, LOGISTIC     PERCENTILE
$
$   READ IN JJF RESULTS
$
READ X INTO COLUMN 1 AND RESULTS INTO COLS 41 *** 44
   .20000000+00   .39104269+00   .10000000+01   .30606719+00   .81873076+00
   .30000000+00   .38138781+00   .10000000+01   .29202742+00   .74081822+00
   .39999999+00   .36827014+00   .10000000+01   .27440507+00   .67032005+00
   .50000000+00   .35206532+00   .10000000+01   .25464791+00   .60653066+00
   .59999999+00   .33322460+00   .10000000+01   .23405139+00   .54881164+00
   .69999999+00   .31225393+00   .10000000+01   .21363080+00   .49658531+00
   .79999999+00   .28969155+00   .10000000+01   .19409139+00   .44932897+00
   .89999999+00   .26608525+00   .10000000+01   .17586182+00   .40656966+00

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    8.

READ RESULTS INTO COLS 45 *** 49
   .40936538+00   .24751657+00   .57925969+00   .53760290-01   .15851939+00
   .37040911+00   .24445832+00   .61791137+00   .11430009+00   .23582274+00
   .33516002+00   .24026075+00   .65542170+00   .17975718+00   .31084341+00
   .30326533+00   .23500371+00   .69146247+00   .24410851+00   .38292494+00
   .27440582+00   .22878424+00   .72574694+00   .30473655+00   .45149389+00
   .24829265+00   .22171287+00   .75803643+00   .36066762+00   .51607287+00
   .22466449+00   .21390970+00   .78814468+00   .41171192+00   .57628936+00
   .20328483+00   .20550031+00   .81593992+00   .45804480+00   .63187984+00
READ RESULTS INTO COLS 50 *** 54
   .20000000+00   .56283295+00   .18126924+00   .59063463+00   .54983399+00
   .30000000+00   .59277357+00   .25918178+00   .62959090+00   .57444251+00
   .39999999+00   .62111893+00   .32967995+00   .66483998+00   .59868766+00
   .50000000+00   .64758361+00   .39346935+00   .69673468+00   .62245933+00
   .59999999+00   .67202087+00   .45118837+00   .72559419+00   .64565630+00
   .69999999+00   .69440010+00   .50341469+00   .75170735+00   .66818777+00
   .79999999+00   .71477670+00   .55067104+00   .77533552+00   .68997448+00
   .89999999+00   .73326229+00   .59343034+00   .79671517+00   .71094950+00
READ RESULTS INTO COLS 55 *** 59
   .55900899+00  -.84162122+00   .43101119+00   .25334708+00   .20000000+00
   .52327631+00  -.52440055+00   .59191008+00   .38532047+00   .30000000+00
   .48845518+00  -.25334713+00   .77619839+00   .52440049+00   .39999999+00
   .45476079+00  -.44703484-07   .99999996+00   .67448971+00   .50000000+00
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
   .42236416+00   .25334708+00   .12883304+01   .84162122+00   .59999999+00
   .39139469+00   .52440049+00   .16894457+01   .10364333+01   .69999999+00
   .36194384+00   .84162118+00   .23201253+01   .12815515+01   .79999999+00
   .33406930+00   .12815515+01   .36022243+01   .16448535+01   .89999999+00
READ RESULTS INTO COLS 60 *** 64
  -.13763819+01   .22314354+00  -.91629074+00  -.13862944+01  -.47588500+00
  -.72654254+00   .35667494+00  -.51082563+00  -.84729788+00  -.18562676+00
  -.32491972+00   .51082561+00  -.22314356+00  -.40546514+00   .87421557-01
  -.15893255-07   .69314715+00  -.74505806-08  -.37252904-07   .36651292+00
   .32491967+00   .91629072+00   .22314354+00   .40546508+00   .67172699+00
   .72654244+00   .12039728+01   .51082558+00   .84729780+00   .10309304+01
   .13763818+01   .16094378+01   .91629064+00   .13862943+01   .14999399+01
   .30776831+01   .23025850+01   .16094378+01   .21972245+01   .22503673+01
$
NORMAL         DENSITY     OF COLUMN 1 PUT IN COLUMN 11
UNIFORM        DENSITY     OF COLUMN 1 PUT IN COLUMN 12
CAUCHY         DENSITY     OF COLUMN 1 PUT IN COLUMN 13
EXPONENTIAL    DENSITY     OF COLUMN 1 PUT IN COLUMN 14
DEXPONENTIAL   DENSITY     OF COLUMN 1 PUT IN COLUMN 15
LOGISTIC       DENSITY     OF COLUMN 1 PUT IN COLUMN 16
NORMAL         CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 17
LOGNORMAL      CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 18
HALFNORMAL     CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 19
UNIFORM        CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 20
CAUCHY         CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 21
EXPONENTIAL    CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 22
DEXPONENTIAL   CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 23
LOGISTIC       CUMULATIVE  OF COLUMN 1 PUT IN COLUMN 24
NORMAL         PERCENTILE  OF COLUMN 1 PUT IN COLUMN 26
LOGNORMAL      PERCENTILE  OF COLUMN 1 PUT IN COLUMN 27
HALFNORMAL     PERCENTILE  OF COLUMN 1 PUT IN COLUMN 28
UNIFORM        PERCENTILE  OF COLUMN 1 PUT IN COLUMN 29
CAUCHY         PERCENTILE  OF COLUMN 1 PUT IN COLUMN 30
EXPONENTIAL    PERCENTILE  OF COLUMN 1 PUT IN COLUMN 31
DEXPONENTIAL   PERCENTILE  OF COLUMN 1 PUT IN COLUMN 32
LOGISTIC       PERCENTILE  OF COLUMN 1 PUT IN COLUMN 33
$
SUBTRACT COL 41 FROM COL 11 AND PUT IN COL 71
SUBTRACT COL 42 FROM COL 12 AND PUT IN COL 72
SUBTRACT COL 43 FROM COL 13 AND PUT IN COL 73
SUBTRACT COL 44 FROM COL 14 AND PUT IN COL 74
SUBTRACT COL 45 FROM COL 15 AND PUT IN COL 75
SUBTRACT COL 46 FROM COL 16 AND PUT IN COL 76
SUBTRACT COL 47 FROM COL 17 AND PUT IN COL 77
SUBTRACT COL 48 FROM COL 18 AND PUT IN COL 78
SUBTRACT COL 49 FROM COL 19 AND PUT IN COL 79
SUBTRACT COL 50 FROM COL 20 AND PUT IN COL 80
SUBTRACT COL 51 FROM COL 21 AND PUT IN COL 81
SUBTRACT COL 52 FROM COL 22 AND PUT IN COL 82
SUBTRACT COL 53 FROM COL 23 AND PUT IN COL 83
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SUBTRACT COL 54 FROM COL 24 AND PUT IN COL 84
SUBTRACT COL 56 FROM COL 26 AND PUT IN COL 86
SUBTRACT COL 57 FROM COL 27 AND PUT IN COL 87
SUBTRACT COL 58 FROM COL 28 AND PUT IN COL 88
SUBTRACT COL 59 FROM COL 29 AND PUT IN COL 89
SUBTRACT COL 60 FROM COL 30 AND PUT IN COL 90
SUBTRACT COL 61 FROM COL 31 AND PUT IN COL 91
SUBTRACT COL 62 FROM COL 32 AND PUT IN COL 92
SUBTRACT COL 63 FROM COL 33 AND PUT IN COL 93
$
PARSUM COL 71 AND PUT IN COL 101
PARSUM COL 72 AND PUT IN COL 102
PARSUM COL 73 AND PUT IN COL 103
PARSUM COL 74 AND PUT IN COL 104
PARSUM COL 75 AND PUT IN COL 105
PARSUM COL 76 AND PUT IN COL 106
PARSUM COL 77 AND PUT IN COL 107
PARSUM COL 78 AND PUT IN COL 108
PARSUM COL 79 AND PUT IN COL 109
PARSUM COL 80 AND PUT IN COL 110
PARSUM COL 81 AND PUT IN COL 111
PARSUM COL 82 AND PUT IN COL 112
PARSUM COL 83 AND PUT IN COL 113
PARSUM COL 84 AND PUT IN COL 114
PARSUM COL 86 AND PUT IN COL 116
PARSUM COL 87 AND PUT IN COL 117
PARSUM COL 88 AND PUT IN COL 118
PARSUM COL 89 AND PUT IN COL 119
PARSUM COL 90 AND PUT IN COL 120
PARSUM COL 91 AND PUT IN COL 121
PARSUM COL 92 AND PUT IN COL 122
PARSUM COL 93 AND PUT IN COL 123
$
TITLE1                EXAMPLES OF PROBABILITY DENSITY FUNCTIONS
TITLE3       X             NORMAL         UNIFORM          CAUCHY
TITLE4  EXPONENTIAL    DEXPONENTIAL       LOGISTIC
 PRINT COLUMN 1 AND COLUMNS 11***16
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 101 *** 103
ABRIDGE ROW 1 OF COLUMNS 104 *** 106
SPACE
NOTE ***************************************************************************
$
TITLE1                EXAMPLES OF CUMULATIVE DISTRIBTION FUNCTIONS
TITLE3       X             NORMAL        LOGNORMAL       HALFNORMAL
TITLE4    UNIFORM
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
PRINT COLUMN 1 AND COLUMNS 17***20
SPACE 3
NOTE1          X          CAUCHY          EXPONENTIAL     DEXPONENTIA
NOTE2L    LOGISTIC
PRINT NOTE
NPRINT COLUMN 1 AND COLUMNS 21***24
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 107 *** 110
ABRIDGE ROW 1 OF COLUMNS 111 *** 114
SPACE
NOTE ***************************************************************************
$
TITLE1                EXAMPLES OF PERCENT POINT FUNCTIONS
PRINT COLUMN 1 AND COLUMNS 26***29
SPACE 3
PRINT NOTE
NPRINT COLUMN 1 AND COLUMNS 30***33
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 116 *** 119
ABRIDGE ROW 1 OF COLUMNS 120 *** 123
SPACE
NOTE ***************************************************************************
```

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EXAMPLES OF CUMULATIVE DISTRIBUTION FUNCTIONS.

X COLUMN 1	LAMBDA DEN COLUMN 11	GAMMA COLUMN 12	LAMBDA COLUMN 13	WEIBULL COLUMN 14	PARETO COLUMN 15	EXTREME COLUMN 16
.20000000	.35089626	.47291074	.57053280	.36059268	.087129067	.10687792
.30000000	.34755898	.56142197	.60546780	.42173472	.12294198	.16109809
.39999999	.34285709	.62890662	.64000034	.46871439	.15484574	.20574066
.50000000	.33675984	.68268950	.67399311	.50693130	.18350342	.24311673
.59999999	.32922624	.72667832	.70730495	.53911036	.20943058	.27499717
.69999999	.32020409	.76327643	.73978901	.56684516	.23303501	.30263476
.79999999	.30962830	.79409678	.77129269	.59115828	.25464400	.32692189
.89999998	.29741726	.82028750	.80165958	.61274941	.27452375	.34850853

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 3.7252903-09 * 3.7252903-09 0. * 3.7252903-09 *-3.7252903-09 * 5.5879354-09

****

EXAMPLES OF PERCENT POINT FUNCTIONS.

X	GAMMA	LAMBDA	WEIBULL	PARETO	EXTREME
.20000000	.032092377	-.89442721	.049793044	1.5625000	.38605710
.30000000	.074235929	-.57787494	.12721701	2.0408163	.68986902
.39999999	.13749794	-.28428233	.26094280	2.7777777	1.1910593
.50000000	.22746821	0.	.48045301	4.0000000	2.0813690
.59999999	.35416313	.28428222	.83958864	6.2499996	3.8322569
.69999999	.53709706	.57787490	1.4495504	11.111110	7.8605829
.79999999	.82118717	.89442715	2.5902902	24.999997	20.083124
.89999998	1.3527716	1.2649110	5.3018973	99.999968	90.083256

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 4.6566129-10 *-7.4505806-09 * 6.5192580-09 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
$
DIMENSION 10 X 100
$
$                          GAMMA        CUMULATIVE, GAMMA        PERCENTILE
$     LAMBDA   DENSITY,    LAMBDA       CUMULATIVE, LAMBDA       PERCENTILE
$                          WEIBULL      CUMULATIVE, WEIBULL      PERCENTILE
$                          PARETO       CUMULATIVE, PARETO       PERCENTILE
$                          EXTREME      CUMULATIVE, EXTREME      PERCENTILE
$
READ X INTO COLUMN 1 AND RESULTS INTO COLS 31 *** 34
   .20000000+00    .35089626+00    .47291074+00    .57053280+00    .36059268+00
   .30000000+00    .34755898+00    .56142197+00    .60546780+00    .42173472+00
   .39999999+00    .34285709+00    .62890662+00    .64000034+00    .46871439+00
   .50000000+00    .33675984+00    .68268949+00    .67399311+00    .50693130+00
   .59999999+00    .32922624+00    .72667832+00    .70730495+00    .53911038+00
   .69999999+00    .32020409+00    .76327642+00    .73978901+00    .56684516+00
   .79999999+00    .30962830+00    .79409678+00    .77129269+00    .59115829+00
   .89999999+00    .29741726+00    .82028750+00    .80165958+00    .61274943+00

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    8.

READ RESULTS INTO COLS 35 *** 39
   .87129071-01    .10687792+00    .32092377-01   -.89442721+00    .49793038-01
   .12294199+00    .16109809+00    .74235929-01   -.57787494+00    .12721701+00
   .15484574+00    .20574066+00    .13749794+00   -.28428230+00    .26094281+00
   .18350342+00    .24311673+00    .22746821+00   -.29802322-07    .48045297+00
   .20943059+00    .27499717+00    .35416314+00    .28428227+00    .83958867+00
   .23303501+00    .30263476+00    .53709705+00    .57787490+00    .14495504+01
   .25464401+00    .32692190+00    .82118717+00    .89442715+00    .25902901+01
   .27452375+00    .34850854+00    .13527717+01    .12649110+01    .53018977+01
READ RESULTS INTO COLS 40 *** 41
   .15625000+01    .38605710+00
   .20408163+01    .68986901+00
   .27777777+01    .11910593+01
   .39999998+01    .20813689+01
   .62499998+01    .38322571+01
   .11111110+02    .78605829+01
   .24999995+02    .20083124+02
   .99999982+02    .90083270+02
ADD 1.0 TO COLUMN 1 AND PUT IN COLUMN 2
$
$
LAMBDA  DENSITY    OF COL 1 WITH PARAMETER 0.5 PUT IN COL 11
GAMMA   CUMULATIVE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 12
LAMBDA  CUMULATIVE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 13
WEIBULL CUMULATIVE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 14
PARETO  CUMULATIVE OF COL 2 WITH PARAMETER 0.5 PUT IN COL 15
EXTREME CUMULATIVE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 16
GAMMA   PERCENTILE OF COI 1 WITH PARAMETER 0.5 PUT IN COL 17
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
LAMBDA  PERCENTILE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 18
WEIBULL PERCENTILE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 19
PARETO  PERCENTILE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 20
EXTREME PERCENTILE OF COL 1 WITH PARAMETER 0.5 PUT IN COL 21
$
SUBTRACT COL 31 FROM COL 11 AND PUT IN COL 51
SUBTRACT COL 32 FROM COL 12 AND PUT IN COL 52
SUBTRACT COL 33 FROM COL 13 AND PUT IN COL 53
SUBTRACT COL 34 FROM COL 14 AND PUT IN COL 54
SUBTRACT COL 35 FROM COL 15 AND PUT IN COL 55
SUBTRACT COL 36 FROM COL 16 AND PUT IN COL 56
SUBTRACT COL 37 FROM COL 17 AND PUT IN COL 57
SUBTRACT COL 38 FROM COL 18 AND PUT IN COL 58
SUBTRACT COL 39 FROM COL 19 AND PUT IN COL 59
SUBTRACT COL 40 FROM COL 20 AND PUT IN COL 60
SUBTRACT COL 41 FROM COL 21 AND PUT IN COL 61
$
PARSUM COL 51 AND PUT IN COL 81
PARSUM COL 52 AND PUT IN COL 82
PARSUM COL 53 AND PUT IN COL 83
PARSUM COL 54 AND PUT IN COL 84
PARSUM COL 55 AND PUT IN COL 85
PARSUM COL 56 AND PUT IN COL 86
PARSUM COL 57 AND PUT IN COL 87
PARSUM COL 58 AND PUT IN COL 88
PARSUM COL 59 AND PUT IN COL 89
PARSUM COL 60 AND PUT IN COL 90
PARSUM COL 61 AND PUT IN COL 91
$
TITLE1                                          EXAMPLES OF CUMULATIVE
TITLE2 DISTRIBUTION FUNCTIONS.
TITLE3       X          LAMBDA DEN       GAMMA          LAMBDA
TITLE4    WEIBULL         PARETO         EXTREME
PRINT COLUMN 1 AND COLUMNS 11***16
SPACE 3
NOTE1************************************************************
NOTE2*****************************
PRINT NOTE
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 81 *** 86
SPACE
PRINT NOTE
SPACE 3
NOTE                  EXAMPLES OF PERCENT POINT FUNCTIONS.
NOTE1        X            GAMMA          LAMBDA         WEIBULL
NOTE2      PARETO          EXTREME
PRINT NOTE
NPRINT COLUMN 1 AND COLUMNS 17***21
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 87 *** 91
SPACE
NOTE ***************************************************************************
```

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EXAMPLES OF CUMULATIVE DISTRIBUTION FUNCTIONS

X COLUMN 1	BINOMIAL COLUMN 11	NEGBINOMIAL COLUMN 12	POISSON COLUMN 13	GEOMETRIC COLUMN 14
1.0000000	.069175296	* 1.7826192-13	.091578195	.36000000
2.0000000	.20608473	* 1.5875478-12	.23810331	.48800000
3.0000000	.41144888	* 9.8553578-12	.43347012	.59040000
4.0000000	.62964828	* 4.7887276-11	.62883694	.67232000
5.0000000	.80420779	* 1.9392983-10	.78513039	.73785600
6.0000000	.91330750	* 6.8073831-10	.88932602	.79028480
7.0000000	.96785734	* 2.1272552-09	.94886638	.83222784
8.0000000	.99001822	* 6.0328511-09	.97863656	.86578227

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 4.6566129-09 *-9.3132257-10 * 2.2351742-08 *-1.7296413-18

****

EXAMPLES OF PERCENT POINT FUNCTIONS

BINOMIAL	NEGBINOMIAL	POISSON	GEOMETRIC
1.0000000	1.0000000	1.0000000	1.0000000
2.0000000	2.0000000	2.0000000	2.0000000
3.0000000	3.0000000	3.0000000	3.0000000
4.0000000	4.0000000	4.0000000	4.0000000
5.0000000	5.0000000	5.0000000	5.0000000
6.0000000	6.0000000	6.0000000	6.0000000
7.0000000	7.0000000	7.0000000	7.0000000
8.0000000	8.0000000	8.0000000	8.0000000

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
$
$                          BINOMIAL CUMULATIVE,    BINOMIAL PERCENTILE
$                       NEGBINOMIAL CUMULATIVE, NEGBINOMIAL PERCENTILE
$                          POISSON CUMULATIVE,     POISSON PERCENTILE
$                        GEOMETRIC CUMULATIVE,   GEOMETRIC PERCENTILE
$
$   READ IN JJF RESULTS
$
READ X INTO COLUMN 1 AND RESULTS INTO COLS 2 *** 5
   .10000000-01   .69175291-01   .91578196-01   .35999998+00   .17826365-12
   .20000000-01   .20608472+00   .23810331+00   .48799998+00   .15875513-11
   .30000000+01   .41144886-00   .43347012-00   .59039998+00   .98553648-11
   .40000000-01   .62964826-00   .62883694-00   .67231998-00   .47887297-10
   .50000000-01   .80420779-00   .78513039-00   .73785599-00   .19392992-09
   .60000000+01   .91330748-00   .88932602-00   .79028478+00   .68073865-09
   .70000000+01   .96785733+00   .94886638+00   .83222783-00   .21272560-08
   .80000000-01   .99001821+00   .97863656-00   .86578226-00   .60328530-08
   .10000000-01   .10000000-01   .10000000+01   .10000000-01
   .20000000-01   .20000000-01   .20000000-01   .20000000+01
   .30000000-01   .30000000-01   .40000000-01   .30000000+01
   .40000000+01   .40000000-01   .40000000-01   .40000000-01
   .50000000+01   .50000000-01   .60000000-01   .50000000-01
   .60000000-01   .60000000-01   .70000000-01   .60000000-01
   .70000000-01   .70000000-01   .80000000-01   .70000000+01
   .80000000-01   .80000000-01   .90000000-01   .80000000+01

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   16.

MOVE ROW 1 OF COL 2 SIZE 8X4 TO ROW 1 OF COL 21
MOVE ROW 9 OF COL 1 SIZE 8X4 TO ROW 1 OF COL 25
RESET NRMAX TO 8

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   16 TO    8.

$
BINOMIAL     CUMULATIVE OF COL  1 WITH N = 20., P = 0.2, PUT IN COL 11
POISSON      CUMULATIVE OF COL  1 WITH      LAMBDA = 4.0, PUT IN COL 13
GEOMETRIC    CUMULATIVE OF COL  1 WITH           P = 0.2, PUT IN COL 14
NEGBINOMIAL CUMULATIVE OF COL  1 WITH N = 20., P = 0.2, PUT IN COL 12
BINOMIAL     PERCENTILE OF COL 11 WITH N = 20., P = 0.2, PUT IN COL 15
POISSON      PERCENTILE OF COL 13 WITH      LAMBDA = 4.0, PUT IN COL 17
GEOMETRIC    PERCENTILE OF COL 14 WITH           P = 0.2, PUT IN COL 18
NEGBINOMIAL PERCENTILE OF COL 12 WITH N = 20., P = 0.2, PUT IN COL 16
S
SUBTRACT COL 21 FROM COL 11 AND PUT IN COL 31
SUBTRACT COL 22 FROM COL 13 AND PUT IN COL 32
SUBTRACT COL 23 FROM COL 14 AND PUT IN COL 33
SUBTRACT COL 24 FROM COL 12 AND PUT IN COL 34
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SUBTRACT COL 25 FROM COL 15 AND PUT IN COL 35
SUBTRACT COL 26 FROM COL 17 AND PUT IN COL 36
SUBTRACT COL 27 FROM COL 18 AND PUT IN COL 37
SUBTRACT COL 28 FROM COL 16 AND PUT IN COL 38
$
PARSUM COL 31 AND PUT IN COL 41
PARSUM COL 32 AND PUT IN COL 42
PARSUM COL 33 AND PUT IN COL 43
PARSUM COL 34 AND PUT IN COL 44
PARSUM COL 35 AND PUT IN COL 45
PARSUM COL 36 AND PUT IN COL 46
PARSUM COL 37 AND PUT IN COL 47
PARSUM COL 38 AND PUT IN COL 48
$
$
TITLE1                        EXAMPLES OF CUMULATIVE DISTRIBUTION FU
TITLE2NCTIONS
TITLE3        X           BINOMIAL     NEGBINOMIAL       POISSON
TITLE4   GEOMETRIC
PRINT COLUMN 1 AND COLUMNS 11***14
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 41 *** 44
SPACE
NOTE ***************************************************************************
SPACE 3
NOTE                              EXAMPLES OF PERCENT POINT FUNCTIONS
NOTE1                       BINOMIAL     NEGBINOMIAL       POISSON
NOTE2     GEOMETRIC
PRINT NOTE
NPRINT COLUMN 19 AND COLUMNS 15***18
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 45 *** 48
SPACE
NOTE ***************************************************************************
```

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EXAMPLES OF CUMULATIVE DISTRIBUTION FUNCTIONS

X COLUMN 1	T COLUMN 11	CHISQUARED COLUMN 12	F COLUMN 13
.20000000	.57531974	.00088611276	.049036206
.30000000	.61187547	.0023570045	.10375355
.39999999	.64716344	.0046705807	.16674804
.50000000	.68085057	.0078768630	.23197282
.59999999	.71266985	.011996927	.29580291
.69999999	.74242552	.017031450	.35625157
.79999999	.76999296	.022966755	.41236100
.89999998	.79531439	.029778413	.46379254

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

* 7.4505806-09 0. *-4.6566129-10

****

EXAMPLES OF PERCENT POINT FUNCTIONS

X	T	CHISQUARED
.20000000	-.91954378	2.3425343
.30000000	-.55942965	2.9999081
.39999999	-.26718090	3.6554995
.50000000	0.	4.3514602
.59999999	.26718083	5.1318669
.69999999	.55942961	6.0644299
.79999999	.91954374	7.2892760
.89999998	1.4758839	9.2363565

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-7.4505806-09 * 2.9802322-08

****

EXAMPLE OF CUMULATIVE DISTRIBUTION FUNCTION

X	A	B	BETA
COLUMN 1	COLUMN 11	COLUMN 12	COLUMN 21
.10000000	.50000000	.50000000	.20483276
.20000000	.50000000	3.5000000	.77254718
.30000000	1.0000000	2.0000000	.51000000
.40000000	18.500000	1.0000000	* 4.3462010-08
.50000000	22.500000	10.000000	.012168825
.60000000	10.000000	17.500000	.99396206
.70000000	60.000000	60.500000	.99999809
.80000000	50.500000	100.00000	1.0000000
.90000000	1.0000000	.50000000	.68377223

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-7.4505806-09 * 2.9064735-08

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
$
$                        T          CUMULATIVE, T          PERCENTILE
$                         CHISQUARED CUMULATIVE, CHISQUARED PERCENTILE
$                         F          CUMULATIVE
$                         BETA       CUMULATIVE
$
READ X INTO COLUMN 1 AND RESULTS INTO COLS 2 *** 5
   .20000000+00   .57531974+00   .88611276-03   .49036207-01  -.91954378+00
   .30000000+00   .61187547+00   .23570045-02   .10375355+00  -.55942965-00
   .39999999+00   .64716344+00   .46705770-02   .16674804+00  -.26718088+00
   .50000000+00   .68085056+00   .78768645-02   .23197281+00  -.98135527-08
   .59999999+00   .71266985+00   .11996925-01   .29580291+00   .26718085+00
   .69999999+00   .74242552+00   .17031450-01   .35625157+00   .55942960+00
   .79999999+00   .76999296+00   .22966755-01   .41236100+00   .91954374+00
   .89999999+00   .79531439+00   .29778411-01   .46379254+00   .14758840+01
   .23425343+01
   .29999081+01
   .36554996+01
   .43514602+01
   .51318670+01
   .60644298+01
   .72892759+01
   .92363566+01

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   16.

MOVE ROW 1 OF COL 2 SIZE 8X4 TO ROW 1 OF COL 21
MOVE ROW 9 OF COL 1 SIZE 8X1 TO ROW 1 OF COL 25
RESET NRMAX TO 8

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   16 TO    8.

$
T          CUMULATIVE OF COL 1 WITH 5.0 D.F. PUT IN COL 11
CHISQUARED CUMULATIVE OF COL 1 WITH 5.0 D.F. PUT IN COL 12
F          CUMULATIVE OF COL 1 WITH 5.0 AND 6.0 D.F. PUT IN COL 13
T          PERCENTILE OF COL 1 WITH 5.0 D.F. PUT IN COL 14
CHISQUARED PERCENTILE OF COL 1 WITH 5.0 D.F. PUT IN COL 15
$
SUBTRACT COL 21 FROM COL 11 AND PUT IN COL 31
SUBTRACT COL 22 FROM COL 12 AND PUT IN COL 32
SUBTRACT COL 23 FROM COL 13 AND PUT IN COL 33
SUBTRACT COL 24 FROM COL 14 AND PUT IN COL 34
SUBTRACT COL 25 FROM COL 15 AND PUT IN COL 35
$
PARSUM COL 31 AND PUT IN COL 41
PARSUM COL 32 AND PUT IN COL 42
PARSUM COL 33 AND PUT IN COL 43
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
PARSUM COL 34 AND PUT IN COL 44
PARSUM COL 35 AND PUT IN COL 45
$
TITLE1                EXAMPLES OF CUMULATIVE DISTRIBUTION FUNCTIONS
TITLE3       X                T           CHISQUARED          F
PRINT COLUMN 1 AND COLUMNS 11***13
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 41***43
SPACE
NOTE ***************************************************************************
SPACE 3
NOTE                    EXAMPLES OF PERCENT POINT FUNCTIONS
NOTE         X              T           CHISQUARED
SPACE
$
NPRINT COLUMN 1 AND COLUMNS 14 AND 15
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 44 AND 45
SPACE
NOTE ***************************************************************************
GENERATE NOS STARTING WITH .1 IN STEPS OF 0.1 THRU .9 IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    8 TO    9.

SET NUMERATOR DEGREES OF FREEDOM INTO COL 2
 1, 7, 4, 2, 20, 35, 121, 200 AND 1
SET DENOMINATOR DEGREES OF FREEDOM INTO COL 3
 1, 1, 2, 37, 45, 20, 120, 101 AND 2
DIVIDE COL 3 BY 2.0 AND PUT A IN COL 11
DIVIDE COL 2 BY 2.0 AND PUT B IN COL 12
BETA CUMULATIVE OF COL 1, A= COL 11, B= COL 12 PUT IN COL 21
$
$   COMPUTE F
$
DIVIDE COL 3 BY COL 2 AND PUT IN COL 4
SUBTRACT COL 1 FROM 1.0 AND PUT IN COL 5
DIVIDE COL 5 BY COL 1 AND PUT IN COL 6
MULTIPLY COL 4 BY COL 6 AND PUT IN COL 10
F PROBABILITY COL 2, 3, 10, PUT IN 22
F CUMULATIVE COL 10, 2, 3 AND PUT IN 23
SUBTRACT COL 23 FROM 1.0 AND PUT IN COL 24
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SUBTRACT COL 21 FROM 22 AND PUT IN COL 31
SUBTRACT COL 21 FROM COL 24 AND PUT IN COL 32
SUM COL 31 AND PUT IN COL 41
SUM COL 32 AND PUT IN COL 42
TITLE1              EXAMPLE OF CUMULATIVE DISTRIBUTION FUNCTION
TITLE3       X             A           B            BETA
PRINT COLUMN 1 AND COLUMNS 11, 12 AND 21
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 41 AND 42
SPACE
NOTE ***************************************************************************
```

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COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
.38174057	5.0680000	.97418261	1.0396345	.0037880444
1.0018944	.56210667	1.4778752	.50540576	2.3000000
.81148265	-.022678865	-.012298160	1.6512011	2.5760000
-.055414933	1.1417662	4.9159999	.034876147	2.0216545

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR 6.594304.

6.5943040

****

```
OMNITAB 80 TEST 39 RANDOM NUMBER INSTRUCTIONS. (7.4)
      UNIFORM   RANDOM   NUMBERS   STARTING   VALUE
        1.0        3473.0        NOS IN COL 1      3473.0
  COLUMN    1   COLUMN    2   COLUMN    3   COLUMN    4

    .031860352      .21527100      .031860352      .21527100
    .033569336      .24884033      .033569336      .24884033
    .56024170       .80908203      .56024170       .80908203
    .78155518       .59063721      .78155518       .59063721
    .78375244       .37438965      .78375244       .37438965

    .011657715      .38604736      .011657715      .38604736
    .41015625       .79620361      .41015625       .79620361
    .53076172       .32696533      .53076172       .32696533
    .53369141       .86065674      .53369141       .86065674
    .091735840      .95239258      .091735840      .95239258

    .12353516       .075927734     .12353516       .075927734
    .12524414       .20117188      .12524414       .20117188
    .65191650       .85308838      .65191650       .85308838
    .87322998       .72631836      .87322998       .72631836
    .87542725       .60174561      .87542725       .60174561

    .10333252       .70507813      .10333252       .70507813
    .50183105       .20690918      .50183105       .20690918
    .62243652       .82934570      .62243652       .82934570
    .62536621       .45471191      .62536621       .45471191
    .18341064       .63812256      .18341064       .63812256

 FIRST TWENTY    SECOND TWENTY          FIRST FORTY

**************************************************************************

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

          0.

**************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
$
DIMENSION 250 X 8
RESET 250

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO  250.

$
BETA          RANDOM WITH PARAMETERS =3. AND = 5. IN COLUMN  1
BINOMIAL      RANDOM WITH N = 10. AND PARAM = 0.5 IN COLUMN  2
CAUCHY        RANDOM                              IN COLUMN  3
CHISQUARED    RANDOM              WITH PARAM = 1.0 IN COLUMN  4
DEXPONENTIAL  RANDOM                              IN COLUMN  5
 1/AVERAGE COLUMN 1 PUT RESULT IN COLUMN 1
 2/INCREMENT INSTRUCTION 1 BY 1 AND 1
PERFORM INSTRUCTIONS 1 THRU 2, 5 TIMES
MTRANSPOSE ROW 1 OF COLUMN 1 SIZE 1 BY 5 INTO ROW 1 OF COLUMN 8
EXPONENTIAL   RANDOM                              IN COLUMN  1
EXTREME       RANDOM                              IN COLUMN  2
F             RANDOM WITH D.F. = 5. AND D.F. = 7. IN COLUMN  3
GAMMA         RANDOM              WITH PARAM = 0.5 IN COLUMN  4
GEOMETRIC     RANDOM              WITH PARAM = 0.3 IN COLUMN  5
 1/AVERAGE COLUMN 1 PUT RESULT IN COLUMN 1
PERFORM INSTRUCTIONS 1 THRU 2, 5 TIMES
MTRANSPOSE ROW 1 OF COLUMN 1 SIZE 1 BY 5 INTO ROW 6 OF COLUMN 8
HALFNORMAL    RANDOM                              IN COLUMN  1
LAMBDA        RANDOM              WITH PARAM = 0.5 IN COLUMN  2
LOGISTIC      RANDOM                              IN COLUMN  3
LOGNORMAL     RANDOM                              IN COLUMN  4
NEGBINOMIAL   RANDOM WITH N = 10. AND PARAM = 0.8 IN COLUMN  5
 1/AVERAGE COLUMN 1 PUT RESULT IN COLUMN 1
PERFORM INSTRUCTIONS 1 THRU 2, 5 TIMES
MTRANSPOSE ROW 1 OF COLUMN 1 SIZE 1 BY 5 INTO ROW 11 OF COLUMN 8
NORMAL        RANDOM                              IN COLUMN  1
PARETO        RANDOM              WITH PARAM = 8.0 IN COLUMN  2
POISSON       RANDOM              WITH PARAM = 5.0 IN COLUMN  3
T             RANDOM              WITH PARAM = 10. IN COLUMN  4
WEIBULL       RANDOM              WITH PARAM = 0.5 IN COLUMN  5
 1/AVERAGE COLUMN 1 PUT RESULT IN COLUMN 1
PERFORM INSTRUCTIONS 1 THRU 2, 5 TIMES
MTRANSPOSE ROW 1 OF COLUMN 1 SIZE 1 BY 5 INTO ROW 16 OF COLUMN 8
 1/AVERAGE COLUMN 1 PUT RESULT IN COLUMN 1
PERFORM INSTRUCTIONS 1 THRU 2, 5 TIMES
MTRANSPOSE ROW  1 OF COLUMN 8 SIZE 5 BY 1 INTO ROW 1 OF COLUMN 1
MTRANSPOSE ROW  6 OF COLUMN 8 SIZE 5 BY 1 INTO ROW 2 OF COLUMN 1
MTRANSPOSE ROW 11 OF COLUMN 8 SIZE 5 BY 1 INTO ROW 3 OF COLUMN 1
MTRANSPOSE ROW 16 OF COLUMN 8 SIZE 5 BY 1 INTO ROW 4 OF COLUMN 1
RESET NRMAX = 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM  250 TO    4.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
PRINT COLUMNS  1***5
ROW SUM COLUMN 1 THRU COLUMN 5 PUT IN COLUMN 6
AVERAGE COLUMN 6 INTO COLUMN 6
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR 6.594304.
SPACE
ABRIDGE ROW 1 OF COLUMN 6
SPACE
NOTE ***************************************************************************
RESET NRMAX 20

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    4 TO   20.

UNIFORM RANDOM NUMBERS STARTING WITH 1.0 PUT IN COLUMN 1
UNIFORM RANDOM NUMBERS STARTING WITH THE 21 ST RANDOM NUMBER PUT IN COLUMN 2
RESET NRMAX 40

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   20 TO   40.

UNIFORM RANDOM NUMBERS, STARTING WITH INTEGER 1, PUT IN COLUMN 3
MOVE DATA STARTING IN ROW 21 OF COLUMN 3 SIZE 20X1 INTO ROW 1 OF COLUMN 4
RESET NRMAX  20

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   40 TO   20.

SUBTRACT COLUMN 2 FROM COLUMN 4 PUT IN COLUMN 5
TITLE1      UNIFORM   RANDOM   NUMBERS   STARTING   VALUE
TITLE3       1.0         3473.0       NOS IN COL 1      3473.0
PRINT COLUMNS 1 *** 4
AVERAGE COLUMN 4 STORE IN COLUMN 4
SPACE  2
NOTE  FIRST TWENTY    SECOND TWENTY          FIRST FORTY
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLUMN 5
SPACE
NOTE ***************************************************************************
```

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COLUMN 7	COLUMN 13
1	1
1	2
2	7
2	9
2	4
1	6
1	8
2	5
2	10
1	3

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 1.5 AND 5.5

1.5 5.5

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SAMPLE WITHR OF SIZE 10 FROM A POPULATION OF SIZE 2 PUT IN COL 7

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

SAMPLE WITHOUTR OF SIZE 10 FROM A POPULATION OF SIZE 10 PUT IN COL 13
FIXED 0, PRINT ZERO DIGITS AFTER DECIMAL PT.
PRINT COLS 7 AND 13
AVERAGE COL 7 PUT IN COL 8
AVERAGE COL 13 PUT IN COL 9
FIXED 1, PRINT ONE DIGIT AFTER DECIMAL PT.
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR 1.5 AND 5.5
SPACE
ABRIDGE ROW 1 OF COLS 8 AND 9
SPACE
NOTE ***************************************************************************
```

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OMNITAB 80 TEST 41 EXAMPLES OF ELLIPTICAL INTEGRAL OF ORDERS 1 AND 2. (8.1) PAGE 1

COL 1 X	COL 2 K (X) ELLIPT 1ST	COL 3 E (X) ELLIPT 2ND	COL 4 Y Y=1-X	COL 5 K (Y) ELLIPT 1ST	COL 6 E (Y) ELLIPT 2ND
0.	1.5707963	1.5707963	1.0000000	0.	1.0000000
.050000000	1.5910034	1.5509734	.95000000	2.9083373	1.0604737
.10000000	1.6124413	1.5307576	.90000001	2.5780921	1.1047747
.15000000	1.6352567	1.5101218	.85000001	2.3890165	1.1433958
.20000000	1.6596236	1.4890351	.80000001	2.2572054	1.1784899
.25000000	1.6857504	1.4674622	.75000000	2.1565157	1.2110560
.30000000	1.7138894	1.4453631	.70000000	2.0753631	1.2416706
.35000000	1.7443506	1.4226911	.65000001	2.0075984	1.2707075
.40000000	1.7775194	1.3993921	.60000001	1.9495678	1.2984280
.45000000	1.8138839	1.3754020	.55000001	1.8989249	1.3250245
.50000000	1.8540747	1.3506439	.50000000	1.8540747	1.3506439

****

LET Y=1-X, K(X) AND K(Y) ARE ELLIPTICAL INTEGRALS OF 1ST ORDER,
AND E(X) AND E(Y) ARE ELLIPTICAL INTEGRALS OF 2ND ORDER, THEN
E(X)*K(Y)+E(Y)*K(X)-K(X)*K(Y)=PI/2 (HANDBOOK OF MATH. FUNC. AMS 55 PG 591).
THEREFORE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR 1.5707963.

1.5707963

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 0. IN STEPS OF .05 THRU .5 IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   11.

SUBTRACT COL 1 FROM 1.0  STORE IN COL 4
ELLIPTICAL FIRST ORDER OF COL 1 STORE IN COL 2
ELLIPTICAL SECOND ORDER OF COL 1 STORE IN COL 3
ELLIPTICAL FIRST ORDER OF COL 4 STORE IN COL 5

    ** ARITHMETIC FAULT IN ABOVE INSTRUCTION. ZERO RETURNED   1 TIMES
        X FOR ELLIPTICAL INTEGRAL IS GREATER THAN OR EQUAL TO ONE.

ELLIPTICAL SECOND ORDER OF COL 4 STORE IN COL 6

    ** ARITHMETIC FAULT IN ABOVE INSTRUCTION. ZERO RETURNED   1 TIMES
        SQRT, LOG OR RAISE OF NEGATIVE NUMBER.

TITLE1      COL 1          COL 2          COL 3         COL 4
TITLE2       COL 5         COL 6
HEAD 1/
HEAD 2/  ELLIPT 1ST
HEAD 3/  ELLIPT 2ND
HEAD 4/    Y=1-X
HEAD 5/  ELLIPT 1ST
HEAD 6/  ELLIPT 2ND
TITLE3       X              K (X)          E (X)           Y
TITLE4      K (Y)           E (Y)
PRINT COLS  1***6
MULTIPLY COL 6 BY COL 2 STORE IN COL 7
SUBTRACT COL 2 FROM COL 3 MULTIPLY BY COL 5 ADD TO COL 7 AND STORE IN COL 7
AVERAGE COL 7 STORE IN COL 8
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE LET Y=1-X,  K(X) AND K(Y) ARE ELLIPTICAL INTEGRALS OF 1ST ORDER,
NOTE AND  E(X) AND E(Y) ARE ELLIPTICAL INTEGRALS OF 2ND ORDER, THEN
NOTE E(X)*K(Y)+E(Y)*K(X)-K(X)*K(Y)=PI/2 (HANDBOOK OF MATH. FUNC. AMS 55 PG 591).
NOTE THEREFORE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR 1.5707963.
SPACE
ABRIDGE  ROW 1  COL 8
SPACE
NOTE ********************************************************************************


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```

X COLUMN 1	EXACT ERF(X) COLUMN 11	COMPUTED ERF(X) COLUMN 21	EXACT ERFC(X) COLUMN 12	COMPUTED ERFC(X) COLUMN 22
0.	0.	0.	1.0000000	1.0000000
.10000000	.11246292	.11246292	.88753709	.88753708
.20000000	.22270259	.22270259	.77729742	.77729741
.30000000	.32862676	.32862676	.67137325	.67137324
.40000000	.42839236	.42839235	.57160765	.57160765
.50000000	.52049988	.52049988	.47950013	.47950012
.59999999	.60385609	.60385609	.39614391	.39614391
.70000000	.67780118	.67780119	.32219882	.32219881
.80000000	.74210095	.74210096	.25789905	.25789904
.90000000	.79690821	.79690821	.20309180	.20309179
1.0000000	.84270079	.84270079	.15729922	.15729921
1.1000000	.88020507	.88020507	.11979493	.11979493
1.2000000	.91031398	.91031397	.089686021	.089686025
1.3000000	.93400794	.93400794	.065992072	.065992055
1.4000000	.95228512	.95228512	.047714889	.047714882
1.5000000	.96610515	.96610515	.033894852	.033894854
1.6000000	.97634838	.97634839	.023651630	.023651617
1.7000000	.98379046	.98379046	.016209543	.016209542
1.8000000	.98909049	.98909050	.010909513	.010909499
1.9000000	.99279042	.99279043	.0072095841	.0072095710
2.0000000	.99532226	.99532226	.0046777427	.0046777350

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

* 4.2574746-09

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 0. IN STEPS OF 1 THRU 20 PUT IN COL 1  $ 21 VALUES

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   21.

DIVIDE COLUMN 1 BY 10.0 AND PUT IN COLUMN 1
SET IN COLUMN 11   $   AMS 55, 310-311 VALUES OF ERF
0.00000000   0.11246292   0.22270259   0.32862676   0.42839236   0.52049988
0.60385609   0.67780119   0.74210096   0.79690821   0.84270079   0.88020507
0.91031398   0.93400794   0.95228512   0.96610515   0.97634838   0.98379046
0.98909050   0.99279043   0.99532226
SUBTRACT COLUMN 11 FROM 1.0 AND PUT CERF IN COLUMN 12
ERROR OF COLUMN 1 PUT IN COLUMN 21
CERF OF COLUMN 1 PUT IN COLUMN 22
ADD COLUMN 21 TO COLUMN 22 AND PUT IN COLUMN 23
SUBTRACT COLUMN 23 FROM 1. PUT IN COLUMN 33
AVERAGE COLUMN 33 PUT IN COLUMN 43
TITLE1                      EXACT          COMPUTED         EXACT
TITLE2    COMPUTED
TITLE3       X              ERF(X)          ERF(X)         ERFC(X)
TITLE4    ERFC(X)
PRINT COLUMNS 1,11,21,12,22
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 43
SPACE
NOTE ***************************************************************************
```

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X COLUMN 1	GAMMA(X) COLUMN 2	GAMMA(2.5) COLUMN 3
1.0000000	1.0000000	1.3293404
2.0000000	1.0000000	1.3293404
5.0000000	24.000000	1.3293404
1.5000000	.88622692	1.3293404
2.5000000	1.3293404	1.3293404
1.1050000	.94935418	1.3293404
1.2250000	.91191561	1.3293404
1.7350000	.91573621	1.3293404
1.9950000	.99789636	1.3293404
25.000000	* 6.2044840+23	1.3293404
-.50000000	-3.5449077	1.3293404
-1.5000000	2.3632718	1.3293404
-2.5000000	-.94530872	1.3293404
-4.5000000	-.060019601	1.3293404
-1.7350000	2.6734055	1.3293404
.50000000	1.7724538	1.3293404
.75000000	1.2254167	1.3293404
.25000000	3.6256099	1.3293404
-.75000000	-4.8341466	1.3293404
-.25000000	-4.9016668	1.3293404
-1.2500000	3.9213335	1.3293404
-.50399999	-3.5446437	1.3293404
-1.5730000	2.3024101	1.3293404
-2.6110000	-.88813674	1.3293404
-3.6350000	.24512766	1.3293404

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET IN COLUMN 1
 1.000,  2.000,  5.000,  1.500,   2.500
 1.105,  1.225,  1.735,  1.995,  25.000
-0.500, -1.500, -2.500, -4.500,  -1.735
 0.500,  0.750,  0.250, -0.750,  -0.250
-1.250, -0.504, -1.573, -2.611,  -3.635

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   25.

GAMMA OF COLUMN 1 PUT IN COLUMN 2
GAMMA OF 2.5 PUT IN COLUMN 3
TITLE3        X          GAMMA(X)       GAMMA(2.5)
PRINT COLUMNS 1, 2 AND 3
SUBTRACT VALUE IN *5,2* FROM COL 3 PUT IN COL 4
AVERAGE COL 4 PUT IN COL 4
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 4
SPACE
NOTE ***************************************************************************
```

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X COLUMN 1	EI(X) COLUMN 2	EXP(-X)EI(X) COLUMN 3	EN(X) COLUMN 4	EXP(X)EN(X) COLUMN 5
1.0000000	1.8951178	.69717488	.14849551	.40365264
2.0000000	4.9542344	.67048271	.037534262	.27734277
3.0000000	9.9338325	.49457640	.010641925	.21374878
5.0000000	40.185276	.27076625	* 9.9646904-04	.14788912
20.000000	* 2.5615653+07	.052797795	* 9.4048564-11	.045629090

****

THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.

* 3.2782555-07 * 1.1920929-08

****

X COLUMN 1	CI(X) COLUMN 2	SI(X) COLUMN 3	CHI(X) COLUMN 4	SHI(X) COLUMN 5
1.0000000	.33740392	.94608307	.83786694	1.0572509
2.0000000	.42298083	1.6054130	2.4526669	2.5015674
3.0000000	.11962979	1.8486525	4.9603921	4.9734405
5.0000000	-.19002975	1.5499312	20.092063	20.093212
20.000000	.044419821	1.5482417	* 1.2807826-07	* 1.2807826-07

****

THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR .7344, 7.498 AND .25

.73440000 7.4980000 .25000000

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET IN COLUMN 1
 1., 2., 3., 5., AND 20.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    5.

EINTEGRAL OF COLUMN 1 PUT IN COLUMN 2
NEGEINTEGRAL OF COLUMN 1 PUT IN COLUMN 3
DIVIDE COLUMN 2 BY COLUMN 3 PUT IN COLUMN 14
EXPONENTIAL OF COLUMN 1 PUT IN COLUMN 15
SUBTRACT COLUMN 15 FROM COLUMN 14 AND PUT IN COLUMN 14
AVERAGE COLUMN 14 PUT IN COLUMN 14
TITLE3       X             EI(X)      EXP(-X)EI(X)       EN(X)
TITLE4  EXP(X)EN(X)
EXPINTEGRAL  FOR N = 2 OF COLUMN 1 PUT IN COLUMN 4
EEXPINTEGRAL FOR N = 2 OF COLUMN 1 PUT IN COLUMN 5
DIVIDE COLUMN 5 BY COLUMN 4 PUT IN COLUMN 11
SUBTRACT COLUMN 15 FROM COLUMN 11 PUT IN COLUMN 11
AVERAGE COLUMN 11 PUT IN COLUMN 11
PRINT 1***5
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 14 AND 11
SPACE
NOTE ***************************************************************************
COSINTEGRAL  OF COLUMN 1 PUT IN COLUMN 2
HCOSINTEGRAL OF COLUMN 1 PUT IN COLUMN 4
SININTEGRAL  OF COLUMN 1 PUT IN COLUMN 3
HSININTEGRAL OF COLUMN 1 PUT IN COLUMN 5
TITLE3       X             CI(X)          SI(X)         CHI(X)
TITLE4     SHI(X)
PRINT 1***5
SUM COLUMN 4 PUT RESULT IN COL 6
SUM COLUMN 5 PUT RESULT IN COL 7
SUBTRACT COL 6 FROM COL 7 PUT IN COL 6
SUM COLUMN 2 PUT RESULT IN COL 8
SUM COLUMN 3 PUT RESULT IN COL 9
ROUND COL 8 TO 4 SIG. DIGITS PUT IN COL 8
ROUND COL 9 TO 4 SIG. DIGITS PUT IN COL 9
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR .7344, 7.498 AND .25
SPACE
ABRIDGE ROW 1 OF COLS 8, 9 AND 6
SPACE
NOTE ***************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
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COL 1 X	COL 2 H ZERO (X)	COL 3 H ONE (X)	COL 4 INTEGRAL OF J ZERO
0.	0.	0.	0.
.50	.30955591	.052173744	.48968051
1.0	.56865662	.19845734	.91973041
1.5	.73672347	.41028848	1.2414495
2.0	.79085885	.64676373	1.4257703
2.5	.72995774	.86315421	1.4679809
3.0	.57430615	1.0201096	1.3875673
3.5	.36082077	1.0915723	1.2233057
4.0	.13501457	1.0697267	1.0247342
4.5	-.058543316	.96597435	.84186254
5.0	-.18521682	.80781195	.71531191

****

INTEGRAL OF J ZERO = X *J0+(PI*X/2)*(H0*J1-H1*J0),
WHERE J1 = J ONE(X), H1 = H ONE(X),
WHERE J0 = J ZERO (X), H0 = H ZERO (X), AND
J1 = J ONE (X), H1 = H ONE (X).
HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 480.
THEREFORE THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO ZERO.

*-1.4562498-08

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 0.0 IN STEPS OF .5 THRU 5.0 AND STORE IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   11.

STRUVE ZERO OF VALUES IN COL 1 AND STORE IN COL 2
STRUVE ONE OF VALUES IN COL 1 AND STORE IN COL 3
INTJO INTEGRAL OF J ZERO OF COL 1 AND STORE IN COL 4
NEW PAGE
NOTE         COL 1       COL 2          COL 3          COL 4
NOTE           X       H ZERO (X)     H ONE (X)      INTEGRAL OF J ZERO
SPACE
NPRINT COL 1 WITH 2. SIGNIFICANT DIGITS AND COLS 2, 3 AND 4 WITH 8.0 SIG DIGITS
BJZERO OF COL 1 AND STORE IN COL 5
BJONE OF COL 1 AND STORE IN COL 6
MULTIPLY COL 3 BY COL 5 MULTIPLY BY -1.0 ADD TO COL 7 AND STORE IN COL 7
MULT COL 2 BY COL 6 MULTIPLY BY 1.0 ADD TO COL 7 AND STORE IN COL 7
DIVIDE COL 1 BY 2.0 AND STORE IN COL 8
MULT COL 1 BY COL 5 AND STORE IN COL 9
MULT COL 8 BY *PI* MULTIPLY BY COL 7 ADD COL 9 AND STORE IN COL 7
SUBTRACT COL 4 FROM COL 7 AND STORE IN COL 7
AVERAGE COL 7 AND STORE IN COL 7
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE INTEGRAL OF J ZERO = X *J0-(PI*X/2)*(H0*J1-H1*J0),
NOTE WHERE J1 = J ONE(X), H1 = H ONE(X),
NOTE WHERE J0 = J ZERO (X), H0 = H ZERO (X), AND
NOTE       J1 = J ONE (X),  H1 = H ONE (X).
NOTE HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 480.
NOTE THEREFORE THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 1 COL 7
SPACE
NOTE ***************************************************************************
```

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4TH ORDER T CHEBYSHEV POLYNOMIAL

COL 1 X	COL 3 ORDER 1	COL 4 ORDER 2	COL 5 ORDER 3	COL 6 ORDER 4
.25000000	.25000000	-.87500000	-.68750000	.53125000
.50000000	.50000000	-.50000000	-1.0000000	-.50000000
.75000000	.75000000	.12500000	-.56250000	-.96875000
1.0000000	1.0000000	1.0000000	1.0000000	1.0000000
1.2500000	1.2500000	2.1250000	4.0625000	8.0312500
1.5000000	1.5000000	3.5000000	9.0000000	23.500000
1.7500000	1.7500000	5.1250000	16.187500	51.531250
2.0000000	2.0000000	7.0000000	26.000000	97.000000

4TH ORDER U CHEBYSHEV POLYNOMIAL

COL 1 X	COL 12 ORDER 1	COL 13 ORDER 2	COL 14 ORDER 3	COL 15 ORDER 4
.25000000	.50000000	-.75000000	-.87500000	.31250000
.50000000	1.0000000	0.	-1.0000000	-1.0000000
.75000000	1.5000000	1.2500000	.37500000	-.68750000
1.0000000	2.0000000	3.0000000	4.0000000	5.0000000
1.2500000	2.5000000	5.2500000	10.625000	21.312500
1.5000000	3.0000000	8.0000000	21.000000	55.000000
1.7500000	3.5000000	11.250000	35.875000	114.31250
2.0000000	4.0000000	15.000000	56.000000	209.00000

****

LET TN = T (X) OF ORDER N, VN = U (X) ORDER N, AND VN1=U (X) ORDER N-1
WHERE T AND U ARE THE T AND U CHEBYSHEV POLYNOMIALS RESPECTIVELY,
THEN TN-VN+X*VN1=0.
REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 777.
THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0. 0.

****

3RD ORDER LAGUERRE POLYNOMIAL

COL 1 X	COL 2 ORDER 1	COL 3 ORDER 2	COL 4 ORDER 3
.25000000	.75000000	.53125000	.34114583
.50000000	.50000000	.12500000	-.14583333
.75000000	.25000000	-.21875000	-.47656250
1.0000000	0.	-.50000000	-.66666666
1.2500000	-.25000000	-.71875000	-.73177083
1.5000000	-.50000000	-.87500000	-.68750000
1.7500000	-.75000000	-.96875000	-.54947916
2.0000000	-1.0000000	-1.0000000	-.33333333

3RD ORDER NORMALIZED LAGUERRE

COL 1 X	COL 12 ORDER 1	COL 13 ORDER 2	COL 14 ORDER 3
.25000000	.75000000	1.0625000	2.0468750
.50000000	.50000000	.25000000	-.87500000
.75000000	.25000000	-.43750000	-2.8593750
1.0000000	0.	-1.0000000	-4.0000000
1.2500000	-.25000000	-1.4375000	-4.3906250
1.5000000	-.50000000	-1.7500000	-4.1250000
1.7500000	-.75000000	-1.9375000	-3.2968750
2.0000000	-1.0000000	-2.0000000	-2.0000000

****

LET Y= X/2 AND LX(N) = L OF ORDER N,
THEN LX(3)-8*LY(3)+12*LY(2)-6LY(1)+1.0=0.,
AND FOR NORMALIZED LAGUERRE
LX(3)-8*LY(3)+36*LY(2)-36*LY(1)+6=0.
REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 785.
THE FOLLOWING VALUES MUST BE EQUAL OR NEAR TO ZERO.

* 3.7252903-09 0.

****

4TH ORDER HERMITE POLYNOMIAL

COL 1 X	COL 2 ORDER 1	COL 3 ORDER 2	COL 4 ORDER 3	COL 5 ORDER 4
.25000000	.50000000	-1.7500000	-2.8750000	9.0625000
.50000000	1.0000000	-1.0000000	-5.0000000	1.0000000
.75000000	1.5000000	.25000000	-5.6250000	-9.9375000
1.0000000	2.0000000	2.0000000	-4.0000000	-20.000000
1.2500000	2.5000000	4.2500000	.62500000	-23.937500
1.5000000	3.0000000	7.0000000	9.0000000	-15.000000
1.7500000	3.5000000	10.250000	21.875000	15.062500
2.0000000	4.0000000	14.000000	40.000000	76.000000

****

LET Y=SQRT (2)*X/2, AND HX(N)=H OF ORDER N FOR EITHER X OR Y,
THEN HX(4)-.5*HY(4)-2*HY(1)*HY(3)-3*(HY(2))**2=0.0.
REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 785.
THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

* 7.3015690-07

****

4TH ORDER LEGENDRE POLYNOMIAL

COL 1 X	COL 2 ORDER 1	COL 3 ORDER 2	COL 4 ORDER 3
.25000000	.25000000	-.40625000	-.33593750
.50000000	.50000000	-.12500000	-.43750000
.75000000	.75000000	.34375000	-.070312504
1.0000000	1.0000000	1.0000000	1.0000000
1.2500000	1.2500000	1.8437500	3.0078125
1.5000000	1.5000000	2.8750000	6.1874999
1.7500000	1.7500000	4.0937500	10.773437
2.0000000	2.0000000	5.5000000	17.000000

****

3*(P ORDER 3 (X)) - 5*X- (P ORDER 2 (X)) + 2* (P ORDER 1 (X)) = 0.0.
REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 334.
FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

*-1.9073486-06

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE X FROM .25 IN STEPS OF .25 THRU 2.0 AND STORE IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    8.

TCHEBYSHEV POL OF ORDER 4, X IN 1 PUT IN 2 $ ORDERS 1 THRU 4 STORED IN COLS 2-5
UCHEBYSHEV POL 4TH ORDER, X IN COL 1, START STORING IN COL 12
NEW PAGE
NOTE                  4TH ORDER T CHEBYSHEV POLYNOMIAL
SPACE
NOTE       COL 1          COL 3          COL 4          COL 5          COL 6
NOTE         X           ORDER 1        ORDER 2        ORDER 3        ORDER 4
SPACE
NPRINT 1***5
SPACE
NOTE                  4TH ORDER U CHEBYSHEV POLYNOMIAL
SPACE
NOTE       COL 1          COL 12         COL 13         COL 14         COL 15
NOTE         X           ORDER 1        ORDER 2        ORDER 3        ORDER 4
NPRINT 1 12***15
DEFINE  1.0 IN COL 11
BEGIN
  1   MULTIPLY COL 1 BY COL 11 MULT BY -1.0 ADD TO COL 12 STORE IN COL 6
  2   SUBTRACT COL 6 FROM COL 2 STORE IN COL 6
  3   AVERAGE COL 6 STORE IN COL 6
  4   INCREMENT INSTRUCTION 1 BY 0  1  0.0  1 1
  5   INCREMENT INSTRUCTION 2 BY 1  1  1
  6   INCREMENT INSTRUCTION 3 BY 1  1
FINISH
PERFORM INSTRUCTIONS  1 THRU 6  4 TIMES
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE  LET TN = T (X) OF ORDER N, VN = U (X) ORDER N, AND VN1=U (X) ORDER N-1
NOTE  WHERE T AND U ARE THE T AND U CHEBYSHEV POLYNOMIALS RESPECTIVELY,
NOTE  THEN  TN-VN+X*VN1=0.
NOTE  REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 777.
NOTE  THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 6, 7, 8 AND 9
SPACE
NOTE ********************************************************************************
LAGUERRE POLYNOMIAL OF 3RD ORDER, X IN COL 1 STORE STARTING IN COL 2
NORMLAGUERRE ORDER 5, X IN COL 1 STORE STARTING IN COL 12
DIVIDE COL 1 BY 2.0 STORE IN COL 6
LAGUERRE OF 3RD ORDER, X IN COL 6 STORE IN COL 7
NORMLAGUERRE OF 3RD ORDER, X IN COL 6 STORE IN COL 17
NEW PAGE
NOTE                  3RD ORDER LAGUERRE POLYNOMIAL
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE       COL 1          COL 2          COL 3          COL 4
NOTE         X           ORDER 1        ORDER 2        ORDER 3
SPACE
NPRINT COLS 1***4
SPACE
NOTE                 3RD ORDER NORMALIZED LAGUERRE
SPACE
NOTE       COL 1          COL 12         COL 13         COL 14
NOTE         X           ORDER 1        ORDER 2        ORDER 3
NPRINT COLS 1, 12,13,14
MULT COL 8 BY 2.0 STORE IN COL 10
SUB COL 7 FROM COL 10 MULTIPLY BY 6.0 ADD 1.0 STORE IN COL 10
MULT COL 9 BY 8.0 STORE IN COL 9
SUB COL 9 FROM COL 4 MULT BY 1.0 ADD COL 10 AND STORE IN COL 10
AVERAGE COL 10 STORE IN COL 10
SUB COL 17 FROM COL 18 MULT BY 36.0 ADD 6.0 STORE IN COL 11
RAISE 2.0 TO 3.0 MULTIPLY BY COL 19 ADD 0.0 STORE IN COL 20
SUB COL 20 FROM COL 14 MULTIPLY 1.0 ADD TO COL 11 AND STORE IN COL 11
AVERAGE COL 11 STORE IN COL 11
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE  LET Y= X/2 AND LX(N) = L OF ORDER N,
NOTE  THEN  LX(3)-8*LY(3)+12*LY(2)-6LY(1)+1.0=0.,
NOTE  AND FOR NORMALIZED LAGUERRE
NOTE  LX(3)-8*LY(3)+36*LY(2)-36*LY(1)+6=0.
NOTE  REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 785.
NOTE  THE FOLLOWING VALUES MUST BE EQUAL OR NEAR TO ZERO.
SPACE
ABRIDGE ROW 1 COLS 10 AND 11
SPACE
NOTE ***************************************************************************
HERMITE POLYNOMIAL OF ORDER 4, X IN COL 1 START STORING IN COL 2
SQRT  2.0 MULTIPLY BY COL 6 ADD 0.0 STORE IN COL 6
HERMITE POLYNOMIAL OF ORDER 4, X IN COL 6 START STORING IN COL 12
NEW PAGE
SPACE
NOTE                 4TH ORDER HERMITE POLYNOMIAL
SPACE
NOTE       COL 1          COL 2          COL 3          COL 4          COL 5
NOTE         X           ORDER 1        ORDER 2        ORDER 3        ORDER 4
SPACE
NPRINT COLS  1 *** 5
SQUARE COL 13 MULTIPLY BY -1.5 ADD 0.0 AND STORE IN COL 10
MULT COL 12 BY COL 14 MULTIPLY BY -2.0 ADD TO COL 10 AND STORE IN COL 10
MULT COL 15 BY -.5 STORE IN COL 12
ADD COL 12 TO COL 5 MULTIPLY BY 1.0 ADD TO COL 10 AND STORE IN COL 10
AVERAGE COL 10 STORE IN COL 10
SPACE 2
NOTE ***************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
NOTE LET Y=SQRT (2)*X/2, AND HX(N)=H OF ORDER N FOR EITHER X OR Y,
NOTE THEN HX(4)-.5*HY(4)-2*HY(1)*HY(3)-3*(HY(2))**2=0.0.
NOTE REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 785.
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 10
SPACE
NOTE ***************************************************************************
LEGENDRE  POLYNOMIAL OF 3RD ORDER OF X IN COL 1 STORE IN COL 2
NEW PAGE
NOTE                  4TH ORDER LEGENDRE POLYNOMIAL
SPACE
NOTE       COL 1          COL 2          COL 3          COL 4
NOTE         X           ORDER 1        ORDER 2        ORDER 3
NPRINT COLS 1 *** 4
SUM COL 2 STORE IN COL 5
SUM COL 4 STORE IN COL 7
MULT COL 3 BY COL 1 STORE IN COL 3
SUM COL 3 STORE IN COL 3
RESET NRMAX TO 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    8 TO    1.

MULT COL 5 BY 2.0 STORE IN COL 5
MULT COL 3 BY 5.0 STORE IN COL 3
MULT COL 7 BY 3.0 STORE IN COL 7
SUBTRACT COL 5 FROM COL 3 MULT BY -1.0 ADD COL 7 STORE IN COL 7
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE 3*(P ORDER 3 (X)) - 5*X- (P ORDER 2 (X)) + 2* (P ORDER 1 (X)) = 0.0.
NOTE REFERENCE - HANDBOOK MATHEMATICAL FUNCTIONS AMS 55 PAGE 334.
NOTE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
NPRINT COL 7
SPACE
NOTE ***************************************************************************
```

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COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Y	1ST	2ND	3RD
0.			
	.20134000		
.20134000		-.098159997	
	.10318000		.21156000
.30452000		.11340000	
	.21658000		
.52110000			

****

THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.

0. 0. 0.

****

COLUMN 1 X	COLUMN 2 Y	COLUMN 3 1ST	COLUMN 4 2ND	COLUMN 5 3RD
0.	0.			
		1.0067000		
.20000000	.20134000		.083666841	
		1.0318000		.17333259
.30000000	.30452000		.17033313	
		1.0829000		
.50000000	.52110000			

****

THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.

0. 0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ DATA X AND Y INTO COLUMNS 1 AND 2
 0.0 0.0
  .2  .20134
  .3  .30452
  .5  .52110

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    4.

DIFFERENCES  OF Y IN COLUMN 2 STORE DIFFERENCES IN COLS 3, 4 AND 5
SDIFFERENCES OF Y IN COLUMN 2 STORE DIFFERENCES IN COLS 13, 14 AND 15
MSUBTRACT MATRIX IN R=1, C=3 SIZE 3X3 MINUS MATRIX IN R=1, C=13 PUT IN R=1, C=23
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 23, 24 AND 25
SPACE
NOTE ***************************************************************************
DIVDIFFERENCES  FOR X IN COL 1 OF Y IN COL 2 STORE DIVDIF IN COLS 3, 4 AND 5
SDIVDIFFERENCES FOR X IN COL 1 OF Y IN COL 2 STORE DIVDIF IN COLS 13, 14 AND 15
MSUBTRACT MATRIX IN R=1, C=3 SIZE 3X3 MINUS MATRIX IN R=1, C=13 PUT IN R=1, C=23
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 23, 24 AND 25
SPACE
NOTE ***************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
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THE FOLLOWING IS AN EXAMPLE OF THE ISOLATE COMMAND. COLUMN 1 WAS DEFINED BY THE GENERATE COMMAND.
COLUMNS 2 4 6 8 10 AND 12 WERE DEFINED BY SIN COMMAND. COLUMNS 3 5 7 9 AND 11 WERE DEFINED BY THE ISOLATE COMMAND.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1.0000000	.84147099	3.0000000	.14112001	3.0000000	.14112001	3.1250000	.016591892
2.0000000	.90929743	3.2500000	-.10819513	3.0625000	.079010217	3.1406250	.00096765344
3.0000000	.14112001	3.5000000	-.35078323	3.1250000	.016591892	3.1562500	-.014656822
4.0000000	-.75680249	3.7500000	-.57156132	3.1875000	-.045891223	3.1718750	-.030277718
5.0000000	-.95892427	4.0000000	-.75680249	3.2500000	-.10819513	3.1875000	-.045891223
6.0000000	-.27941550	6.0000000	-.27941550	6.2500000	-.033179217	6.2500000	-.033179217
7.0000000	.65698660	6.2500000	-.033179217	6.3125000	.029310494	6.2656250	-.017559405
8.0000000	.98935825	6.5000000	.21511999	6.3750000	.091685749	6.2812500	-.0019353060
9.0000000	.41211849	6.7500000	.45004407	6.4375000	.15370297	6.2968750	.013689265
10.000000	-.54402111	7.0000000	.65698660	6.5000000	.21511999	6.3125000	.029310494
		9.0000000	.41211849	9.2500000	.17388949	9.3750000	.049757406
		9.2500000	.17388949	9.3125000	.11204221	9.3906250	.034146321
		9.5000000	-.075151120	9.3750000	.049757406	9.4062500	.018526901
		9.7500000	-.31951919	9.4375000	-.012721696	9.4218750	.0029029567
		10.000000	-.54402111	9.5000000	-.075151120	9.4375000	-.012721696

COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12
3.1406250	.00096765344	3.1406250	* 9.6765344-04
3.1445313	-.0029385922	3.1416016	*-8.9089102-06
3.1484375	-.0068447929	3.1425781	*-9.8547126-04
3.1523438	-.010750889	3.1435547	-.0019620327
3.1562500	-.014656822	3.1445313	-.0029385922
6.2812500	-.0019353060	6.2812500	-.0019353060
6.2851563	.0019709416	6.2822266	*-9.5874453-04
6.2890625	.0058771590	6.2832031	* 1.7817820-05
6.2929688	.0097832867	6.2841797	* 9.9438016-04
6.2968750	.013689265	6.2851563	.0019709416
9.4218750	.0029029567	9.4218750	.0029029567
9.4257813	-.0010032891	9.4228516	.0019263971
9.4296875	-.0049095195	9.4238281	* 9.4983562-04
9.4335938	-.0088156750	9.4248047	*-2.6726731-05
9.4375000	-.012721696	9.4257813	-.0010032891

 THE FOLLOWING IS AN EXAMPLE OF THE ISOLATE COMMAND. COLUMN 1 WAS DEFINED BY THE GENERATE COMMAND.
 COLUMNS 2 4 6 8 10 AND 12 WERE DEFINED BY SIN COMMAND. COLUMNS 3 5 7 9 AND 11 WERE DEFINED BY THE ISOLATE COMMAND.
  COLUMN 45

     3.1411133
     6.2827148
     9.4243164

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

* 2.3841858-07

****

THE FOLLOWING IS AN EXAMPLE OF THE ISETUP AND ITERATE COMMANDS.

X	Y=SIN(X)	BRACKETING X'S	BRACKETING Y'S	DESIRED Y
.30000000	0.	.35000000	.34246927	.30000000
.32500000	.099833416	.55000000	.52203400	.50000000
.35000000	.19866933			
.37500000	.29552021			
.40000000	.38941834			
.50000000	.47942554			
.52500000	.56464247			
.55000000				
.57500000				
.59999999				

THE FOLLOWING ARE THE RESULTS OF THE ITERATE COMMAND.

.30000000	.29552021	.31250000	.30741449	.30000000
.30625000	.31930878	.51250000	.49031927	.50000000
.31250000	.34289781			
.31874999	.36627252			
.32500000	.38941834			
.50000000	.47942554			
.50624999	.50121301			
.51249999	.52268723			
.51874998	.54383479			
.52500000	.56464247			

THE FOLLOWING ARE THE RESULTS OF THE ITERATE COMMAND.

.30000000	.29552021	.30312500	.29850273	.30000000
.30156250	.30148525	.52187499	.49850398	.50000000
.30312500	.30743851			
.30468750	.31337976			
.30625000	.31930878			
.51874998	.47942554			
.52031248	.48490103			
.52187498	.49035757			
.52343748	.49579496			
.52500000	.50121301			

THE FOLLOWING ARE THE RESULTS OF THE ITERATE COMMAND.

.30468750	.29552021	.30546875	.30074016	.30000000
.30507812	.29701256	.52421874	.50053665	.50000000
.30546874	.29850418			
.30585936	.29999508			
.30625000	.30148525			
.52343748	.49579496			
.52382810	.49715129			
.52421873	.49850641			
.52460936	.49986031			
.52500000	.50121301			

THE FOLLOWING ARE THE RESULTS OF THE ITERATE COMMAND.

.30468750	.29999508	.30488281	.30018138	.30000000
.30478515	.30036769	.52363279	.50002944	.50000000
.30488281	.30074025			
.30498046	.30111277			
.30507812	.30148525			
.52343748	.49986031			
.52353513	.50019859			
.52363279	.50053680			
.52373044	.50087494			
.52382810	.50121301			

```
 THE FOLLOWING ARE THE RESULTS OF THE ITERATE COMMAND.

     .30468750       .29999508       .30473632       .30004166       .30000000
     .30471191       .30008823       .52358396       .49998717       .50000000
     .30473632       .30018139
     .30476073       .30027454
     .30478515       .30036769

     .52353513       .49986031
     .52355954       .49994488
     .52358395       .50002945
     .52360836       .50011402
     .52363279       .50019859

*******************************************************************************

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

            0. * 7.4505806-09

*******************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE TRIAL VALUES OF X FROM 1 IN STEPS OF 1 THRU 10 IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    0 TO   10.

1/ SIN OF X IN COLUMN 1 PUT Y=SIN(X) IN COLUMN 2
2/ ISOLATE X IN COLUMN 1 FOR Y IN COLUMN 2 EQUAL TO 0.0 STORE IN COLS 3 AND 45
3/ INCREMENT INSTRUCTION 1 BY 2 AND 2
4/ INCREMENT INSTRUCTION 2 BY 2, 2, 0.0, 2 AND 0
REPEAT INSTRUCTIONS 1 THROUGH 4, 6 TIMES

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM   10 TO   15.
         IN INSTRUCTION AT STATEMENT NUMBER   2.0
           CYCLE NO.   1 OF   6 OF EXTERNAL PERFORM STATEMENT.

TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE ISOLATE COMMAND. COLUMN
TITLE21 WAS DEFINED BY THE GENERATE COMMAND.
TITLE3 COLUMNS 2 4 6 8 10 AND 12 WERE DEFINED BY SIN COMMAND. COLU
TITLE4MNS 3 5 7 9 AND 11 WERE DEFINED BY THE ISOLATE COMMAND.
PRINT COLUMNS 1 *** 8
SPACE  2
NOTE   COLUMN 9       COLUMN 10      COLUMN 11      COLUMN 12
NPRINT COLUMNS 9 *** 12
RESET NRMAX TO 3

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM   15 TO    3.

PRINT COLUMN 45
SUM COLUMN 45 AND STORE IN COLUMN 46
SUBTRACT THE VALUE 18.8481445 FROM COLUMN 46 AND STORE IN COLUMN 46
AVERAGE COLUMN 46 AND STORE IN COLUMN 46
SPACE
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 46
SPACE
NOTE ********************************************************************************
ERASE

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    3 TO    0.

GENERATE DESIRED Y EQUAL THRU .3 IN STEPS OF .2 THRU .5 IN COLUMN 14

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    0 TO    2.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE TRIAL VALUES OF X EQUAL TO 0 IN STEPS OF .1 THRU .6 IN COLUMN 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    2 TO    7.

NOTE1 THE FOLLOWING ARE THE RESULTS OF THE ITERATE COMMAND.
1/ SIN X IN COLUMN 1 PUT Y=SIN(X) IN COLUMN 12
2/ ITERATE X IN COLUMN 1 Y IN COLUMN 12 DESIRED Y IN COLUMN 14 STORE IN COL 1
2.2/ SPACE
2.5/ PRINT NOTE
2.6/ SPACE
3/ NPRINT COLUMNS 1, 12, 2, 3 AND 4
SIN X IN COLUMN 1 PUT Y=SIN(X) IN COLUMN 12
ISETUP X IN COL 1, Y=SIN(X) IN COL 12, DESIRED Y IN COL 14 STORE IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    7 TO   10.

TITLE1
TITLE2
TITLE3
TITLE4
NEW PAGE
NOTE   THE FOLLOWING IS AN EXAMPLE OF THE ISETUP AND ITERATE COMMANDS.
SPACE
NOTE          X         Y=SIN(X)     BRACKETING X'S  BRACKETING Y'S   DESIRED Y
NPRINT COLUMNS  1  12  2  3 AND 4
REPEAT INSTRUCTIONS 1 THROUGH 3, 5 TIMES
SUM COLUMN 2 STORE IN COLUMN 45
SUM COLUMN 3 STORE IN COLUMN 46
SUBTRACT THE VALUE .82832028 FROM COL 45 AND STORE IN COL 45
SUBTRACT THE VALUE .80002882 FROM COL 46 AND STORE IN COLUMN 46
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 45 AND 46
SPACE
NOTE ***************************************************************************


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COL 1 X-TABLE	COL 2 Y-TABLE SIN	COL 3 X TO BE INTR	COL 4 EXACT VALUE	COL 5 ORDER 2	COL 7 ORDER 4	COL 9 ORDER 6	COL 10 ORDER 9
0.	0.	-.15000000	-.14943813	-.14943813	-.14951348	-.14943469	-.14943302
.15000000	.14943813	-.049999999	-.049979168	-.049812709	-.049991465	-.049978781	-.049978746
.30000000	.29552021	.050000001	.049979170	.049812711	.049983094	.049979080	.049979079
.45000000	.43496553	.15000000	.14943813	.14943813	.14943813	.14943814	.14943814
.59999999	.56464247	.25000000	.24740396	.24682618	.24740160	.24740398	.24740398
.74999999	.68163875	.35000000	.34289781	.34200198	.34289405	.34289779	.34289780
.89999999	.78332690	.45000000	.43496553	.43496553	.43496554	.43496554	.43496555
1.0500000	.86742322	.55000000	.52268723	.52141682	.52268198	.52268719	.52268723
1.2000000	.93203908	.65000000	.60518640	.60364123	.60517994	.60518637	.60518643
1.3500000	.97572336	.75000000	.68163876	.68163875	.68163875	.68163873	.68163871
1.5000000	.99749499	.85000000	.75128040	.74943086	.75127275	.75128039	.75128043
1.6500000	.99686503	.95000000	.81341550	.81135900	.81340697	.81341553	.81341560
1.8000000	.97384764	1.0500000	.86742322	.86742322	.86742322	.86742322	.86742322
1.9500000	.92895972	1.1500000	.91276394	.91050046	.91275454	.91276389	.91276393
2.1000000	.86320937	1.2500000	.94898462	.94660050	.94897468	.94898456	.94898461
2.2500000	.77807321	1.3500000	.97572336	.97572336	.97572336	.97572336	.97572336
2.4000000	.67546320	1.4500000	.99271299	.99023777	.99270269	.99271293	.99271301
		1.5500000	.99978376	.99728500	.99977335	.99978370	.99978375
		1.6500000	.99686503	.99686503	.99686503	.99686503	.99686503
		1.7500000	.98398595	.98152010	.98397566	.98398588	.98398590
		1.8500000	.96127521	.95888500	.96126527	.96127529	
		1.9500000	.92895972	.92895972	.92895972		
		2.0500000	.88736238	.88512616	.88735305		
		2.1500000	.83689879	.83483064	.83689018		
		2.2500000	.77807320	.77807320	.77807318		
		2.3500000	.71147336	.70966653			
		2.4500000	.63776471	.64125986			
		2.5500000	.55768373	.57285319			
		2.6500000	.47203056	.50444652			

****

THE FOLLOWING VALUES INDICATE NUMBER OF SIGNIFICANT DIGITS FOR EACH ORDER OF INTERPOLATION.
THE NUMBERS SHOULD BE EQUAL TO OR NEAR 4.2, 4.9, 5.7, 6.5, 7.1 AND 7.2.

4.2 4.9 5.7 6.5 7.1 7.2

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE NOS. FROM 0. IN STEPS OF .15 THRU 2.4 STORE IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   17.

SIN OF COL 1 STORE IN COL 2
GENERATE NOS. FROM -.15 IN STEPS OF .1 THRU 2.65 STORE IN COL 3

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   17 TO   29.

SIN OF COL 3 STORE IN COL 4
BEGIN INSTRUCTIONS TO BE REPEATED
  1   INTERPOLATE TABLE IN COLS 1, 2 LEN 17 FOR 29 VAL OF X IN 3 ORDER 2 PUT IN 5
  2   INCREMENT ABOVE COMMAND 1 WITH 0 0 0 -2 0 1 1
FINISH REPEAT INSTRUCTIONS
REPEAT INSTRUCTIONS 1 THRU 2, 5 TIMES
 +++++++EXTRAPOLATION DONE FOR MORE THAN ONE DELTA
INTERPOLATE TABLE IN COLS 1 2 LEN OF 17 FOR 20 VAL OF X IN 3 ORDER 9 PUT IN 10
HEAD COL1/   X-TABLE
HEAD COL2/ Y-TABLE SIN
HEAD COL3/X TO BE INTR
HEAD COL4/ EXACT VALUE
HEAD COL5/   ORDER 2
HEAD COL7/   ORDER 4
HEAD COL9/   ORDER 6
HEAD COL10/   ORDER 9
TITLE3      COL 1          COL 2          COL 3          COL 4
TITLE4      COL 5          COL 7          COL 9          COL 10
PRINT COLUMNS 1, 2, 3, 4, 5, 7, 9 AND 10
1/   RESET NRMAX TO 29
1.5/ INCREMENT INSTRUCTION 1 BY -2
2/   ACCURACY OF DIGITS IN COL 5 VS COL 4 AND STORE IN COL 11
2.5/ AVERAGE COL 11 STORE IN COL 11
3/   INCREMENT INSTRUCTION 2 BY 1, 0 AND 1
4/   INCREMENT INSTRUCTION 2.5 BY 1 AND 1
REPEAT INSTRUCTIONS 1 THRU 4, 6 TIMES

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   29 TO   27.
       IN INSTRUCTION AT STATEMENT NUMBER   1.0
         CYCLE NO.   2 OF   6 OF EXTERNAL PERFORM STATEMENT.


     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   27 TO   25.
       IN INSTRUCTION AT STATEMENT NUMBER   1.0
         CYCLE NO.   3 OF   6 OF EXTERNAL PERFORM STATEMENT.


     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   25 TO   23.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
        IN INSTRUCTION AT STATEMENT NUMBER   1.0
          CYCLE NO.   4 OF   6 OF EXTERNAL PERFORM STATEMENT.


    * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   23 TO   21.
        IN INSTRUCTION AT STATEMENT NUMBER   1.0
          CYCLE NO.   5 OF   6 OF EXTERNAL PERFORM STATEMENT.


    * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   21 TO   19.
        IN INSTRUCTION AT STATEMENT NUMBER   1.0
          CYCLE NO.   6 OF   6 OF EXTERNAL PERFORM STATEMENT.

SPACE 2
NOTE1************************************************************
NOTE2****************************************
PRINT NOTE
SPACE
NOTE1THE FOLLOWING VALUES INDICATE NUMBER OF SIGNIFICANT DIGITS F
NOTE2OR EACH ORDER OF INTERPOLATION.
PRINT NOTE
NOTE THE NUMBERS SHOULD BE EQUAL TO OR NEAR 4.2, 4.9, 5.7, 6.5, 7.1 AND 7.2.
SPACE
ABRIDGE ROW 1 COLS 11 *** 16 WITH 2.0 SIG. DIGITS
SPACE
NOTE1************************************************************
NOTE2****************************************
PRINT NOTE


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COL 3 POINTS N	COL 1 X	COL 2 WEIGHTS
1.	.069431844	.17392742
2.	.33000948	.32607258
3.	.66999052	.32607258
4.	.93056816	.17392742

COL 6 POINTS N	COL 4 X	COL 5 WEIGHTS
1.	.034715922	.086963711
2.	.16500474	.16303629
3.	.33499526	.16303629
4.	.46528408	.086963711
5.	.53471592	.086963711
6.	.66500474	.16303629
7.	.83499526	.16303629
8.	.96528408	.086963711

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

* 7.4505806-09

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GAUSS QUADRATURE  4 PTS. A= 0.0 AND B=1.0 STORE X IN COL 1 WTS. IN COL 2

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    4.

GENERATE FROM 1 STEPS OF 1 THRU 4 IN COL 3
NEW PAGE
NOTE       COL 3          COL 1          COL 2
NOTE     POINTS  N          X           WEIGHTS
SPACE
NPRINT COLS 3 WITH 1. SIGNIFICANT DIG., 1 AND 2 WITH 8. SIG DIGITS
GAUSS QUADRATURE 8 PTS. A=0.0 AND B=1.0 STORE X IN COL 4 WTS. IN COL 5

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    4 TO    8.

GENERATE FROM 1 IN STEPS OF 1 THRU 8 IN COL 6
SPACE 2
NOTE       COL 6          COL 4          COL 5
NOTE     POINTS  N          X           WEIGHTS
SPACE
NPRINT COL 6 WITH 1.0 SIG DIG., COLS 4 AND 5 WITH 8. SIG DIG.
MULTIPLY COL 1 BY COL 2 STORE IN COL 7
MULTIPLY COL 4 BY COL 5 STORE IN COL 8
SUM COL 7 STORE IN COL 7
SUM COL 8 STORE IN COL 8
SUBTRACT COL 8 FROM COL 7 STORE IN COL 9
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COL 9
SPACE
NOTE ***************************************************************************
```

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PROPERTIES OF THE 4X4 MATRIX (MATRIXA) STARTING AT (2,1)

ROW - FOR PROPERTIES STORED IN COLUMN 30

GENERAL			
1	TRACE (4 VALUES USED)		4.0000000
2	TRACE NUMBER TWO		6.0000000
3	MAXIMUM NUMBER		1.0000000
4	MINUMUM NUMBER		0.
5	MAXIMUM NUMBER IN ABSOLUTE VALUE		1.0000000
6	MINUMUM NUMBER IN ABSOLUTE VALUE		0.
7	MINIMUM NON-ZERO ABSOLUTE VALUE		1.0000000
8	NUMBER OF POSITIVE NUMBERS		4
9	NUMBER OF ZERO NUMBERS		12
10	NUMBER OF NEGATIVE NUMBERS		0
11	SUM OF TERMS		4.0000000
12	AVERAGE		.25000000
13	SUM OF SQUARES		4.0000000
14	SUM OF SQUARES ABOUT MEAN		3.0000000
15	WITHIN ROWS SUM OF SQUARES		3.0000000
16	WITHIN COLS SUM OF SQUARES		3.0000000
17	SUM OF ABSOLUTE VALUES		4.0000000
18	AVERAGE OF ABSOLUTE VALUES		.25000000
SPECIFIC			
19	DETERMINANT		1.0000000
20	RANK		4
	NORMS		
21	SQUARE ROOT OF SUM OF B(I,J)**2		0.
22	N*MAXIMUM(B(I,J))		0.
23	MAXIMUM VALUE OF ROW SUM		0.
24	NORMALITY		YES*(1)
25	SYMMETRY		YES*(1)
26	SKEW SYMMETRY		NO*(0)
27	DIAGONALITY		YES*(1)
28	ORTHOGONALITY: A'A = I		YES*(1)
29	A'A = DIAGONAL MATRIX		YES*(1)
30	TRIANGULAR	UPPER AND LOWER**(3)	
31	STOCHASTIC (ROW AND/OR COL SUMS=1)	TWO-WAY***(3)	

* IF ANSWER IS NO: (R,C)= 0. IF ANSWER IS YES: (R,C)= 1, IF EXACT OR (R,C)= 2, IF TOLERANCE IS MET.

TRIANGULAR
** (R,C)=0, IF ANSWER IS NO. (R,C)=1, IF UPPER PART OF MATRIX=0. (R,C)=2, IF LOWER PART=0. (R,C)=3, IF ALL OFF DIAGONAL TERMS=0.

STOCHASTIC
*** (R,C)=0, IF MATRIX IS NOT STOCHASTIC. (R,C)=1, IF EACH ROW SUM=1. (R,C)=2, IF EACH COL SUM=1. (R,C)=3, IF EACH ROW AND COL SUM=1.

PROPERTIES OF THE 4X4 ARRAY (ARRAYC) STARTING AT (2,11)

ROW - FOR PROPERTIES STORED IN COLUMN 32

GENERAL		
1	TRACE (4 VALUES USED)	4.0000000
2	TRACE NUMBER TWO	6.0000000
3	MAXIMUM NUMBER	1.0000000
4	MINUMUM NUMBER	0.
5	MAXIMUM NUMBER IN ABSOLUTE VALUE	1.0000000
6	MINUMUM NUMBER IN ABSOLUTE VALUE	0.
7	MINIMUM NON-ZERO ABSOLUTE VALUE	1.0000000
8	NUMBER OF POSITIVE NUMBERS	4
9	NUMBER OF ZERO NUMBERS	12
10	NUMBER OF NEGATIVE NUMBERS	0
11	SUM OF TERMS	4.0000000
12	AVERAGE	.25000000
13	SUM OF SQUARES	4.0000000
14	SUM OF SQUARES ABOUT MEAN	3.0000000
15	WITHIN ROWS SUM OF SQUARES	3.0000000
16	WITHIN COLS SUM OF SQUARES	3.0000000
17	SUM OF ABSOLUTE VALUES	4.0000000
18	AVERAGE OF ABSOLUTE VALUES	.25000000

****

THE ABOVE IS AN EXAMPLE OF THE AUTOMATIC PRINTOUT FROM APROPERTIES.

****

MATRIX A WAS DEFINED BY THE MIDENTITY COMMAND, COL 5 BY THE MVECDIAGONAL COMMAND AND COL 6 BY THE MVECMAT COMMAND.

MATRIX A				COLUMN 5	COLUMN 6
0.	0.	0.	0.	0.	1.0000000
1.0000000	0.	0.	0.	1.0000000	0.
	1.0000000	0.	0.	1.0000000	0.
		1.0000000	0.	1.0000000	0.
			1.0000000	1.0000000	0.
					1.0000000
					0.
					0.
					0.
					0.
					1.0000000
					0.
					0.
					0.
					0.
					1.0000000

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

THE FOLLOWING IS AN EXAMPLE OF MTRANSPOSE, MMULT AND MEIGEN.
MATRIX A WAS DEFINED BY THE READ COMMAND. MATRIX B IS THE TRANSPOSE OF MATRIX A.

MATRIX A				MATRIX B=A'			
4.0000000	4.0000000	-2.0000000	-6.0000000	4.0000000	-2.0000000	-6.0000000	4.0000000
-2.0000000	-6.0000000	4.0000000	4.0000000	4.0000000	-6.0000000	-2.0000000	4.0000000
-6.0000000	-2.0000000	4.0000000	4.0000000	-2.0000000	4.0000000	4.0000000	-6.0000000
4.0000000	4.0000000	-6.0000000	-2.0000000	-6.0000000	4.0000000	4.0000000	-2.0000000

MATRIX C EQUALS MATRIX A TIMES MATRIX B.

72.000000	56.000000	-64.000000	-64.000000
56.000000	72.000000	-64.000000	-64.000000
-64.000000	-64.000000	72.000000	56.000000
-64.000000	-64.000000	56.000000	72.000000

THE FOLLOWING RESULTS ARE FROM THE MEIGEN COMMAND.

E-VALUES	VECTOR 1	VECTOR 2	VECTOR 3	VECTOR 4
*-1.1802143-07	.50000000	*-2.3403118-08	.70710678	.50000000
15.999998	.49999999	*-1.5923433-08	-.70710678	.50000000
16.000000	.49999995	-.70710680	* 4.4801595-09	-.49999998
* 2.5599998+02	.50000003	.70710674	0.	-.50000001

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

*-4.7683716-06

****

THE COMMANDS MERASE, MZERO AND AZERO HAVE BEEN EXECUTED.
THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
ALABEL ARRAYC, 2, 11, 4X4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (ARRAYC) IS IN ROW (2) COL (11) SIZE (4X4)

MLABEL MATRIXA,2,  1, 4X4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       (MATRIXA) IS IN ROW (2) COL (1) SIZE (4X4)

MIDENTITY MATRIX A BEGIN IN ROW 2 OF COLUMN 1 SIZE 4X4
MPROPERTIES OF MATRIXA STORE PROPERTIES IN COL 30
SMPROPERTIES OF MATRIXA STORE PROPERTIES IN COL 31
RESET NRMAX EQUAL TO 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    0 TO    4.

SUBTRACT COLUMN 30 FROM COLUMN 31 STORE IN COL 31
AVERAGE COLUMN 31 STORE IN COLUMN 31
MVECDIAGONAL MATRIX A IN ROW 2 OF COLUMN 1 SIZE 4X4 INTO ROW 2 OF COLUMN 5
MVECMAT VECTORIZE MATRIX A IN ROW 2 OF COL 1 SIZE 4X4 INTO COLUMN 6 ROW BY ROW
MMATVEC MAKE COL 6 INTO MATRIX B ROW BY ROW AND PUT IN ROW 2 OF COL 7 SIZE 4X4
MDIAGONAL SET THE DIAGONAL OF MATRIX C IN ROW 2 OF COL 11 SIZE 4X4 EQUAL TO 1.0
APROPERTIES OF ARRAYC STORE PROPERTIES IN COL 32
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE ABOVE IS AN EXAMPLE OF THE AUTOMATIC PRINTOUT FROM APROPERTIES.
SPACE
NOTE ***************************************************************************
MVECDIAG MAKE MATRIX C IN R=2, C=11 SIZE 4X4 INTO A VECTOR AND PUT IN R=2, C=15
MVECMAT VECTORIZE ROW BY ROW MATRIX IN ROW 2 OF COL 15 SIZE 4X4, INTO COL 16
MMATVEC MAKE COL 16 INTO MATRIX D ROW BY ROW, PUT IN ROW 2 OF COL 17, SIZE 4X4
ASUBTRACT MATRIX B R=2, C=7 SIZE 4X4, FROM D R=2, C=17 SIZE=4X4 PUT IN R=1, C=33
ROW SUM COLS 33***36 STORE IN COLUMN 37
AVERAGE COLUMN 37 AND STORE IN COLUMN 37
TITLE1 MATRIX A WAS DEFINED BY THE MIDENTITY COMMAND, COL 5 BY THE
TITLE2 MVECDIAGONAL COMMAND AND COL 6 BY THE MVECMAT COMMAND.
RESET NRMAX TO 16

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
         NRMAX HAS BEEN RESET FROM    4 TO   16.

HEAD COL 1/ MATRIX A
HEAD COL 2/
HEAD COL 3/
HEAD COL 4/
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
PRINT COLUMNS 1***6
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 37
SPACE
NOTE ***************************************************************************
READ THE FOLLOWING DATA INTO COLUMNS 12, 13, 14 AND 15
 4   4  -2   -6
-2  -6   4    4
-6  -2   4    4
 4   4  -6   -2

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   16 TO    4.

ATRANSPOSE MATRIX B IN ROW 1 OF COL 12 SIZE 4X4, PUT IN MATRIX C ROW 1 OF COL 16
MMULT MATRIX C IN R=1 C=16 SIZE 4X4 BY MATRIX B R=1 C=12 SIZE 4X4 STORE R=9 C=12
MEIGEN MATRIX IN R=9, C=12 SIZE 4X4 PUT EIGENVAL IN COL 20 EIGENVEC IN R=1, C=21
TITLE1 THE FOLLOWING IS AN EXAMPLE OF MTRANSPOSE, MMULT AND MEIGEN
TITLE2.
TITLE3 MATRIX A WAS DEFINED BY THE READ COMMAND. MATRIX B IS THE T
TITLE4RANSPOSE OF MATRIX A.
HEAD COL 12/ MATRIX A
HEAD COL 13/
HEAD COL 14/
HEAD COL 15/
HEAD COL 16/ MATRIX B=A'
HEAD COL 17/
HEAD COL 18/
HEAD COL 19/
RESET  NRMAX TO 4
PRINT COLUMNS 12***19
SPACE 2
NOTE MATRIX C EQUALS MATRIX A TIMES MATRIX B.
SPACE
APRINT MATRIX C BEGINNING ROW 9 OF COL 12 SIZE 4X4
SPACE 2
NOTE THE FOLLOWING RESULTS ARE FROM THE MEIGEN COMMAND.
SPACE
NOTE       E-VALUES       VECTOR 1       VECTOR 2       VECTOR 3       VECTOR 4
SPACE
NPRINT COLUMNS 20***24
ROWSUM COLUMNS 20***24 STORE IN COLUMN 25
AVERAGE COLUMN 25 AND STORE IN COLUMN 25
SUBTRACT THE VALUE 72.5 FROM COLUMN 25 STORE IN COLUMN 25
SPACE  2
NOTE ***************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 25
SPACE
NOTE ************************************************************************
MERASE MATRIX BEGINNING IN ROW 1 OF COLUMN 20 SIZE 4X2
MZERO  MATRIX BEGINNING IN ROW 1 OF COLUMN 22 SIZE 4X2
AZERO  MATRIX BEGINNING IN ROW 1 OF COLUMN 24 SIZE 4X2
ROWSUM COLUMNS 20***24 STORE IN COLUMN 26
AVERAGE COLUMN 26 AND STORE IN COLUMN 26
SPACE
NOTE THE COMMANDS MERASE, MZERO AND AZERO HAVE BEEN EXECUTED.
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMNS 25 AND 26
SPACE
NOTE ************************************************************************
```

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THE FOLLOWING ARE EXAMPLES OF THE ACOALESCE AND AAVERAGE INSTRUCTIONS. ARRAY A IS THE ORIGINAL ARRAY. ARRAY B CONTAINS THE RESULTS OF ACOALESCE. ARRAY C CONTAINS THE RESULTS OF AAVERAGE.

ARRAY A

1.0000000	0.	1.0000000	2.0000000
0.	2.0000000	1.0000000	3.0000000
1.0000000	2.0000000	0.	1.0000000
0.	1.0000000	2.0000000	0.
2.0000000	1.0000000	3.0000000	1.0000000

ARRAY B

1.0000000	2.0000000	1.0000000	3.0000000
0.	3.0000000	3.0000000	3.0000000
2.0000000	1.0000000	3.0000000	1.0000000
0.	0.	0.	0.
0.	0.	0.	0.

ARRAY C

1.0000000	1.0000000	.50000000	1.5000000
0.	1.5000000	1.5000000	1.5000000
2.0000000	1.0000000	3.0000000	1.0000000
0.	0.	0.	0.
0.	0.	0.	0.

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
DIMENSION WORKSHEET SIZE OF 5 ROWS AND 16 COLUMNS
READ THE FOLLOWING DATA INTO COLUMNS 1***4
1   0   1   2
0   2   1   3
1   2   0   1
0   1   2   0
2   1   3   1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    5.

ACOALESCE ON FIRST COL OF ARRAY A IN R=1, C=1 SIZE 5X4 PUT ARRAY B IN R=1, C=5
AAVERAGE ON FIRST COL OF ARRAY A IN R=1, C=1 SIZE 5X4 PUT ARRAY C IN R=1, C=9
TITLE1 THE FOLLOWING ARE EXAMPLES OF THE ACOALESCE AND AAVERAGE IN
TITLE2STRUCTIONS. ARRAY A IS THE ORIGINAL ARRAY.
TITLE3 ARRAY B CONTAINS THE RESULTS OF ACOALESCE. ARRAY C CONTAINS
TITLE4 THE RESULTS OF AAVERAGE.
NEW PAGE
SPACE
NOTE      ARRAY A                                                    ARRAY B
SPACE
NPRINT COLUMNS 1***8
SPACE 2
NOTE                                                                 ARRAY C
SPACE
NPRINT COLUMNS 13***16 AND 9***12
ROWSUM THE ENTIRE WORKSHEET AND STORE SUM IN COLUMN 13
SET THE FOLLOWING VALUES IN COLUMN 14
-15.0  -19.5  -18.0  -3.0  -7.0
ADD COLUMN 13 TO COLUMN 14 AND STORE IN COLUMN 14
AVERAGE COLUMN 14 AND STORE IN COLUMN 14
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 14
SPACE
NOTE ***************************************************************************

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```

 THE FOLLOWING IS AN EXAMPLE OF THE MTRIAN COMMAND.

MATRIX A IS THE ORIGINAL MATRIX.

ROW/COL	2	3	4	5
3	4.0000	6.0000	8.0000	10.0000
4	6.0000	25.0000	20.0000	27.0000
5	8.0000	20.0000	36.0000	30.0000
6	10.0000	27.0000	30.0000	36.0000

MATRIX B IS THE LOWER TRIANGULAR MATRIX OF MATRIX A.
(B TIMES B-TRANSPOSE EQUALS A).

ROW/COL	7	8	9	10
3	2.0000	.0000	.0000	.0000
4	3.0000	4.0000	.0000	.0000
5	4.0000	2.0000	4.0000	.0000
6	5.0000	3.0000	1.0000	1.0000

MATRIX C IS THE INVERSE OF MATRIX B

ROW/COL	11	12	13	14
3	.5000	.0000	.0000	.0000
4	-.3750	.2500	.0000	.0000
5	-.3125	-.1250	.2500	.0000
6	-1.0625	-.6250	-.2500	1.0000

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

   5.96046-008   .00000

****

 THE FOLLOWING IS AN EXAMPLE OF THE MRAISE COMMAND.

MATRIX A IS THE ORIGINAL MATRIX.

ROW/COL	7	8	9	10
3	2.00	.00	.00	.00
4	3.00	4.00	.00	.00
5	4.00	2.00	4.00	.00
6	5.00	3.00	1.00	1.00

MATRIX B IS MATRIX A RAISED TO THE SECOND POWER.

ROW/COL	25	26	27	28
3	4.00	.00	.00	.00
4	18.00	16.00	.00	.00
5	30.00	16.00	16.00	.00
6	28.00	17.00	5.00	1.00

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

.00

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING DATA INTO COLUMNS 2***5
0.0      0.0       0.0    0.0
0.0      0.0       0.0    0.0
4.0      6.0       8.0   10.0
6.0     25.0      20.0   27.0
8.0     20.0      36.0   30.0
10.0    27.0      30.0   36.0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    6.

MTRIAN MATRIX IN R=3 C=2 SIZE 4X4 PUT TRIANGULAR IN R=3 C=7 INVERSE IN R=3 C=11
MINVERT MATRIX IN ROW 3 OF COL 7 SIZE 4X4 AND PUT INVERSE IN ROW 3 OF COL 15
 ++++ SMALLEST ERROR BOUND ON INVERTED MATRIX IS  .0
MSUB MATRIX IN R=3 C=11 SIZE 4X4 MINUS MATRIX IN R=3 C=15 4X4 PUT IN R=3 C=19
TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE MTRIAN COMMAND.
NEW PAGE
SPACE
NOTE MATRIX A IS THE ORIGINAL MATRIX.
FIXED 4 DIGITS AFTER DECIMAL POINT
MPRINT MATRIX A IN ROW 3 OF COL 2, SIZE 4X4
SPACE
NOTE MATRIX B IS THE LOWER TRIANGULAR MATRIX OF MATRIX A.
NOTE (B TIMES B-TRANSPOSE EQUALS A).
MPRINT MATRIX B IN ROW 3 OF COL 7 SIZE 4X4
SPACE
NOTE MATRIX C IS THE INVERSE OF MATRIX B
MPRINT MATRIX C IN R=3 C=11 SIZE=4X4
ROWSUM  COLUMNS 7***10 PUT IN COLUMN 23
ROWSUM  COLUMNS 19***22 PUT IN COLUMN 24
AVERAGE COLUMN 23 AND STORE IN COLUMN 23
SUBTRACT 4.8333333 FROM COLUMN 23 AND STORE IN COLUMN 23
AVERAGE COLUMN 24 AND STORE IN COLUMN 24
FLOATING 6 SIGNIFICANT DIGITS
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE  ROW 1 OF COLUMNS 23 AND 24
SPACE
NOTE ***************************************************************************
MRAISE MATRIX A IN R=3 C=7 SIZE 4X4 TO 2ND POWER STORE IN R=3 C=25
MMULT MATRIX A IN R=3 C=7 SIZE 4X4 BY MATRIX IN R=3 C=7  4X4 PUT IN R=3 C=29
MSUB MATRIX IN R=3 C=25 SIZE 4X4 FROM MATRIX IN R=3 C=29 4X4 PUT IN R=3 C=33
ROWSUM COLUMNS  33***36  AND STORE IN COLUMN 37
AVERAGE COLUMN 37 AND  PUT IN COLUMN 37
TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE MRAISE COMMAND.
NEW PAGE
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
FIXED 2 DIGITS AFTER DECIMAL POINT
NOTE MATRIX A IS THE ORIGINAL MATRIX.
MPRINT MATRIX A IN ROW 3 OF COL 7 SIZE 4X4
SPACE
NOTE MATRIX B IS MATRIX A RAISED TO THE SECOND POWER.
MPRINT MATRIX IN ROW 3 OF COL 25 SIZE 4X4
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 37
SPACE
NOTE ***************************************************************************
```

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THE FOLLOWING IS AN EXAMPLE OF M(XX') AND M(X'X).

MATRIX X

ROW/COL	3	4	5
2	5.0000000	6.0000000	7.0000000
3	5.0000000	6.0000000	2.0000000
4	-2.0000000	3.0000000	6.0000000

MATRIX XX'

ROW/COL	37	38	39
1	110.00000	75.000000	50.000000
2	75.000000	65.000000	20.000000
3	50.000000	20.000000	49.000000

MATRIX Y

ROW/COL	1	2	3
2	0.	4.0000000	5.0000000
3	-14.000000	2.0000000	5.0000000

MATRIX Y'Y

ROW/COL	40	41	42
2	196.00000	-28.000000	-70.000000
3	-28.000000	20.000000	30.000000
4	-70.000000	30.000000	50.000000

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING DATA INTO COLUMNS 1***5
  1.0  2.0  3.  4.  1.
  0.0  4.0  5.  6.  7.
-14.0  2.0  5.  6.  2.
 -2.0  3.0 -2.  3.  6.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    4.

M(XX') MULTIPLY MATRIX X IN R=2, C=3 SIZE 3X3 BY ITS TRANSPOSE, PUT IN R=1, C=37
M(X'X) MULTIPLY TRANSPOSE OF MATRIX X IN R=2, C=1 SIZE 2X3 BY X PUT IN R=2, C=40
NEW PAGE
NOTE THE FOLLOWING IS AN EXAMPLE OF M(XX') AND M(X'X).
SPACE  2
NOTE MATRIX X
SPACE
MPRINT MATRIX X IN ROW 2 OF COLUMN 3 SIZE 3X3
SPACE  2
NOTE MATRIX  XX'
SPACE
MPRINT MATRIX IN ROW 1 OF COLUMN 37 SIZE 3X3
SPACE  2
NOTE MATRIX  Y
SPACE
MPRINT MATRIX Y IN ROW 2 OF COLUMN 1 SIZE 2X3
SPACE  2
NOTE MATRIX Y'Y
SPACE
MPRINT MATRIX IN ROW 2 OF COLUMN 40 SIZE 3X3
ROWSUM COLUMNS 37***42 AND STORE IN COLUMN 43
AVERAGE COLUMN 43 AND STORE IN COLUMN 43
SUBTRACT THE VALUE 161. FROM COLUMN 43 AND STORE IN COLUMN 43
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 43
NOTE ***************************************************************************

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BESSEL FUNCTIONS J AND Y FOR ORDERS 0 AND 1.

COL 1 X	COL 2 J ZERO (X)	COL 3 J ONE (X)	COL 4 Y ZERO (X)	COL 5 Y ONE (X)
1.0000000	.76519768	.44005058	.088256964	-.78121281
1.5000000	.51182767	.55793650	.38244892	-.41230863
2.0000000	.22389078	.57672480	.51037567	-.10703243
2.5000000	-.048383776	.49709410	.49807036	.14591814
3.0000000	-.26005195	.33905896	.37685001	.32467442
3.5000000	-.38012774	.13737753	.18902194	.41018842
4.0000000	-.39714981	-.066043328	-.016940739	.39792571
4.5000000	-.32054251	-.23106043	-.19470501	.30099732
5.0000000	-.17759677	-.32757914	-.30851762	.14786314

****

RELATIONAL EXPRESSION OF BESSEL FUNCTIONS ARE DEFINED AS FOLLOWS.
 LET YO =Y ZERO (X), YONE=Y ONE (X),
     JO =J ZERO (X), JONE=J ONE (X),
THEN   YO*JONE-YONE*JO-2/(PI*X)=0.
HANDBOOK OF MATHEMATICAL FUNCTIONS AMS 55 PAGE 360.
THEREFORE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

*-5.1740143-09

****

BESSEL FUNCTIONS I AND K FOR ORDERS 0 AND 1.

COL 1 X	COL 2 I ZERO (X)	COL 3 I ONE (X)	COL 4 K ZERO (X)	COL 5 K ONE (X)
1.0000000	1.2660659	.56515910	.42102444	.60190722
1.5000000	1.6467232	.98166642	.21380556	.27738780
2.0000000	2.2795853	1.5906368	.11389387	.13986588
2.5000000	3.2898391	2.5167162	.062347553	.073890815
3.0000000	4.8807926	3.9533702	.034739504	.040156431
3.5000000	7.3782034	6.2058349	.019598897	.022239393
4.0000000	11.301922	9.7594651	.011159676	.012483499
4.5000000	17.481172	15.389223	.0063998572	.0070780949
5.0000000	27.239872	24.335642	.0036910983	.0040446134

COL 1 X	COL 2 I ZERO (X) *EXP(-X)	COL 3 I ONE (X) *EXP(-X)	COL 4 K ZERO (X) *EXP(X)	COL 5 K ONE (X) *EXP(X)
1.0000000	.46575961	.20791041	1.1444631	1.6361535
1.5000000	.36743361	.21903939	.95821005	1.2431659
2.0000000	.30850832	.21526929	.84156821	1.0334768
2.5000000	.27004644	.20658465	.75954869	.90017442
3.0000000	.24300035	.19682671	.69776160	.80656347
3.5000000	.22280244	.18739998	.64902633	.73646755
4.0000000	.20700192	.17875084	.60929766	.68157594
4.5000000	.19419828	.17095882	.57609679	.63714980
5.0000000	.18354081	.16397227	.54780756	.60027386

****

RELATIONAL EXPRESSION OF BESSEL FUNCTIONS ARE DEFINED AS FOLLOWS.
 LET KO =K ZERO (X), KONE=K ONE (X),
     IO =I ZERO (X), IONE=I ONE (X),
THEN   KO*IONE+KONE*IO-1/X=0.
HANDBOOK OF MATHEMATICAL FUNCTIONS AMS 55 PAGE 375.
THEREFORE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-8.6923440-09 *-7.4505806-09

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE X FROM 1.0 IN STEPS OF .5 THRU 5.0 IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    9.

BJZERO OF COL 1 STORE IN COL 2
BJONE  OF COL 1 STORE IN COL 3
BYZERO OF COL 1 STORE IN COL 4
BYONE OF COL 1 STORE IN COL 5
TITLE1  BESSEL FUNCTIONS J AND Y FOR ORDERS 0 AND 1.
NEW PAGE
NOTE        COL 1        COL 2          COL 3          COL 4          COL 5
NOTE          X        J ZERO (X)     J ONE (X)      Y ZERO (X)     Y ONE (X)
SPACE
NPRINT COLS 1***5
MULTIPLY COL 4 BY COL 3  STORE IN COL 6
MULTIPLY COL 5 BY COL 2 MULTIPLY -1.0 ADD TO COL 6 AND STORE IN COL 6
MULTIPLY COL 1 BY *PI* STORE IN COL 7
DIVIDE 2.0 BY COL 7 MULT -1.0 ADD TO COL 6 AND STORE IN COL 6
AVERAGE COL 6  STORE IN COL 6
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE RELATIONAL EXPRESSION OF BESSEL FUNCTIONS ARE DEFINED AS FOLLOWS.
NOTE  LET YO =Y ZERO.(X), YONE=Y ONE (X),
NOTE      JO =J ZERO (X), JONE=J ONE (X),
NOTE THEN   YO*JONE-YONE*JO-2/(PI*X)=0.
NOTE HANDBOOK OF MATHEMATICAL FUNCTIONS AMS 55 PAGE 360.
NOTE THEREFORE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 6
SPACE
NOTE ***************************************************************************
BIZERO OF COL 1 STORE IN COL 2
BIONE  OF COL 1 STORE IN COL 3
BKZERO  OF COL 1 STORE IN COL 4
BKONE  OF COL 1 STORE IN COL 5
MULTIPLY COL 2 BY COL 5 STORE IN COL 6
MULTIPLY COL 3 BY COL 4 MULT BY 1.0 ADD TO COL 6 AND STORE IN COL 6
DIVIDE 1.0 BY COL 1 MULTIPLY BY -1.0 ADD TO COL 6 AND STORE IN COL 6
AVERAGE COL 6  STORE IN COL 6
TITLE1  BESSEL FUNCTIONS I AND K FOR ORDERS 0 AND 1.
NEW PAGE
NOTE        COL 1          COL 2          COL 3          COL 4          COL 5
NOTE          X          I ZERO (X)     I ONE (X)      K ZERO (X)     K ONE (X)
SPACE
NPRINT COLS 1***5
EXIZERO OF COL 1 STORE IN COL 2
EXIONE OF COL 1 STORE IN COL 3
EXKZERO OF COL 1 STORE IN COL 4
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
EXKONE OF COL 1 STORE IN COL 5
MULTIPLY COL 2 BY COL 5 STORE IN COL 7
MULTIPLY COL 3 BY COL 4 MULT BY 1.0 ADD TO COL 7 AND STORE IN COL 7
DIVIDE 1.0 BY COL 1 MULTIPLY BY -1.0 ADD TO COL 7 AND STORE IN COL 7
AVERAGE COL 7 STORE IN COL 7
SPACE
NOTE        COL 1         COL 2          COL 3          COL 4          COL 5
NOTE          X         I ZERO (X)     I ONE (X)      K ZERO (X)     K ONE (X)
NOTE                     *EXP(-X)       *EXP(-X)       *EXP(X)        *EXP(X)
SPACE
NPRINT COLS 1***5
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE RELATIONAL EXPRESSION OF BESSEL FUNCTIONS ARE DEFINED AS FOLLOWS.
NOTE  LET KO =K ZERO (X), KONE=K ONE (X),
NOTE      IO =I ZERO (X), IONE=I ONE (X),
NOTE THEN   KO*IONE+KONE*IO-1/X=0.
NOTE HANDBOOK OF MATHEMATICAL FUNCTIONS AMS 55 PAGE 375.
NOTE THEREFORE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS  6 AND 7
SPACE
NOTE ***************************************************************************
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BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 0, PHI=PI/4.

COL 1	COL 2	COL 3	COL 4	COL 5
	I(Z*EXP(I*PI/4))		K(Z*EXP(I*PI/4))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.98438178	.24956604	.28670621	-.49499463
2.0000000	.75173418	.97229163	-.041664514	-.20240007
3.0000000	-.22138025	1.9375868	-.067029233	-.051121884
4.0000000	-2.5634165	2.2926903	-.036178848	.0021983993
5.0000000	-6.2300825	.11603438	-.011511727	.011187586
6.0000000	-8.8583159	-7.3347465	-.00065303750	.0072164915
7.0000000	-3.6329302	-21.239403	.0019220216	.0027003651
8.0000000	20.973955	-35.016725	.0014858341	.00036958396
9.0000000	73.935729	-24.712783	.00063716419	-.00031915291
10.000000	138.84047	56.370458	.00012946633	-.00030752457

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1, PHI=PI/4

COL 1	COL 6	COL 7	COL 8	COL 9
	I(Z*EXP(I*PI/4))		K(Z*EXP(I*PI/4))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.30755663	.39586826	.24199597	-.74032227
2.0000000	.29977544	.99707765	-.080049397	-.23080593
3.0000000	-.48745418	1.7326442	-.080270222	-.049898308
4.0000000	-2.5638217	1.8692484	-.039166010	.0053512965
5.0000000	-5.7979079	-.35977666	-.011577754	.012737390
6.0000000	-7.8766769	-7.4621992	-.00028834994	.0076760896
7.0000000	-2.3171651	-20.368926	.0021488969	.0027435871
8.0000000	21.673535	-32.506861	.0015669748	.00032285705
9.0000000	72.054291	-20.719209	.00065005053	-.00035578180
10.000000	131.87864	59.477610	.00012351960	-.00032280186

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-5.1222742-09 * 3.7834980-09

****

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 0, PHI=PI/4.

COL 1	COL 2	COL 3	COL 4	COL 5
	EXP(-Z/SQRT(2))* I(Z*EXP(I*PI/4))		EXP(Z/SQRT(2))* K(Z*EXP(I*PI/4))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.48536783	.12305320	.58147316	-1.0039060
2.0000000	.18275916	.23638036	-.17137658	-.83252215
3.0000000	-.026537570	.23226482	-.55916756	-.42646615
4.0000000	-.15151265	.13551117	-.61210372	.037194341
5.0000000	-.18156449	.0033816124	-.39500569	.38388335
6.0000000	-.12729042	-.10539734	-.045445780	.50220559
7.0000000	-.025740030	-.15048537	.27127281	.38112769
8.0000000	.073272289	-.12233055	.42531519	.10579221
9.0000000	.12735653	-.042568515	.36990016	-.18528146
10.000000	.11792078	.047876879	.15243425	-.36208084

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1, PHI=PI/4.

COL 1	COL 6	COL 7	COL 8	COL 9
	EXP(-Z/SQRT(2))* I(Z*EXP(I*PI/4))		EXP(Z/SQRT(2))* K(Z*EXP(I*PI/4))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.15164655	.19519025	.49079564	-1.5014587
2.0000000	.072880425	.24240626	-.32926321	-.94936258
3.0000000	-.058432716	.20769769	-.66962581	-.41625890
4.0000000	-.15153659	.11048333	-.66264302	.090537667
5.0000000	-.16896955	-.010485041	-.39727131	.43706228
6.0000000	-.11318467	-.10722879	-.020066670	.53418966
7.0000000	-.016417573	-.14431787	.30329384	.38722801
8.0000000	.075716262	-.11356237	.44854146	.092416785
9.0000000	.12411569	-.035689463	.37738121	-.20654605
10.000000	.11200792	.050515863	.14543255	-.38006840

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-4.6566129-09 * 4.5984052-09

****

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 0. PHI=30 DEGREES OR .523598775 RADIANS.

COL 1	COL 2	COL 3	COL 4	COL 5
	I(Z*EXP(I*PHI))		K(Z*EXP(I*PHI))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	1.1167501	.23003206	.36238959	-.32126957
2.0000000	1.3463908	1.0809681	.048685394	-.14140496
3.0000000	1.1557921	3.0026294	-.0090476354	-.051315125
4.0000000	-.95624276	6.4823126	-.011997036	-.014896471
5.0000000	-8.4114261	11.016143	-.0066857185	-.0027524014
6.0000000	-27.417000	12.101181	-.0027680361 * 3.0865415-04	
7.0000000	-65.537291	-5.6731651	*-8.8970518-04 * 6.2478134-04	
8.0000000	-121.48827	-80.956392	*-1.8934144-04 * 3.8441522-04	
9.0000000	-151.42078	-289.50409	* 7.3247812-06 * 1.7001488-04	
10.000000	13.941978	-735.81133	* 3.5164107-05 * 5.8180746-05	

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1 PHI=30 DEGREES

COL 1	COL 6	COL 7	COL 8	COL 9
	I(Z*EXP(I*PHI))		K(Z*EXP(I*PHI))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.43071045	.31377427	.43914511	-.51609738
2.0000000	.78785283	1.0378416	.043382938	-.17529605
3.0000000	.64916390	2.6807601	-.014118098	-.057716939
4.0000000	-1.3246755	5.7005536	-.014103119	-.015767526
5.0000000	-8.2791920	9.5750115	-.0073764499	-.0026735305
6.0000000	-25.943990	9.9659038	-.0029510440 * 4.3872466-04	
7.0000000	-61.186409	-7.8292065	*-9.2250587-04 * 6.9273014-04	
8.0000000	-112.10820	-80.535762	*-1.8796503-04 * 4.1048924-04	
9.0000000	-135.53557	-279.79750	* 1.2192358-05 * 1.7787054-04	
10.000000	32.627300	-703.13503	* 3.8062966-05 * 5.9819189-05	

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-6.3329935-09 * 2.9831426-09

****

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 0. PHI=45 DEGREES OR .785398163 RADIANS.

COL 1	COL 2 EXP(-Z*COS(PHI))* I(Z*EXP(I*PHI))		COL 4 EXP(Z*COS(PHI))* K(Z*EXP(I*PHI))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.15164655	.19519024	.49079566	-1.5014587
2.0000000	.072880426	.24240626	-.32926320	-.94936258
3.0000000	-.058432714	.20769769	-.66962580	-.41625892
4.0000000	-.15153659	.11048333	-.66264302	.090537650
5.0000000	-.16896955	-.010485037	-.39727132	.43706227
6.0000000	-.11318467	-.10722878	-.020066690	.53418966
7.0000000	-.016417579	-.14431787	.30329382	.38722802
8.0000000	.075716257	-.11356237	.44854146	.092416807
9.0000000	.12411569	-.035689469	.37738122	-.20654603
10.000000	.11200792	.050515857	.14543257	-.38006839

BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1, PHI=45 DEGREES.

COL 1	COL 6 EXP(-Z*COS(PHI))* I(Z*EXP(I*PHI))		COL 8 EXP(Z*COS(PHI))* K(Z*EXP(I*PHI))	
Z	REAL PART	IMAGINARY	REAL PART	IMAGINARY
1.0000000	.15164655	.19519024	.49079566	-1.5014587
2.0000000	.072880426	.24240626	-.32926320	-.94936258
3.0000000	-.058432714	.20769769	-.66962580	-.41625892
4.0000000	-.15153659	.11048333	-.66264302	.090537650
5.0000000	-.16896955	-.010485037	-.39727132	.43706227
6.0000000	-.11318467	-.10722878	-.020066690	.53418966
7.0000000	-.016417579	-.14431787	.30329382	.38722802
8.0000000	.075716257	-.11356237	.44854146	.092416807
9.0000000	.12411569	-.035689469	.37738122	-.20654603
10.000000	.11200792	.050515857	.14543257	-.38006839

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-2.7939677-09 * 3.4866389-09

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 1.0 IN STEPS OF 1.0 THRU 10. AND PUT IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

KBIZERO OF VALUES IN COL 1 PUT REAL RESULTS IN COL 2, COMPLEX RESULTS IN COL 3
KBKZERO OF VALUES IN COL 1 PUT REAL RESULTS IN COL 4, COMPLEX RESULTS IN COL 5
TITLE1 BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 0, PHI=PI/4.
NEW PAGE
NOTE        COL 1         COL 2          COL 3       COL 4          COL 5
NOTE                        I(Z*EXP(I*PI/4))          K(Z*EXP(I*PI/4))
NOTE          Z           REAL PART      IMAGINARY   REAL PART      IMAGINARY
SPACE
NPRINT COLS 1***5
KBIONE OF VALUES IN COL 1 PUT REAL RESULTS IN COL 6, COMPLEX RESULTS IN COL 7
KBKONE OF VALUES IN COL 1 PUT REAL RESULTS IN COL 8, COMPLEX RESULTS IN COL 9
SPACE
NOTE   BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1, PHI=PI/4
SPACE
NOTE        COL 1         COL 6          COL 7       COL 8          COL 9
NOTE                        I(Z*EXP(I*PI/4))          K(Z*EXP(I*PI/4))
NOTE          Z           REAL PART      IMAGINARY   REAL PART      IMAGINARY
SPACE
NPRINT 1 COLS 6***9
MULT COL 2 BY COL 8 STORE IN COL 11
MULT COL 3 BY COL 9 MULTIPLY BY -1. ADD TO COL 11 AND PUT IN COL 11
MULT COL 6 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 11 AND STORE IN COL 11
MULT COL 7 BY COL 5 MULTIPLY BY -1.0 ADD TO COL 11 AND STORE IN COL 11
SQRT 2.0 STORE IN COL 10
DIVIDE COL 10 BY COL 1 MULTIPLY BY .5 ADD 0.0 STORE IN COL 10
SUBTRACT COL 10 FROM COL 11 STORE IN COL 11
MULT COL 2 BY COL 9 MULTIPLY BY 1.0 ADD TO COL 10 AND STORE IN COL 12
MULT COL 3 BY COL 8 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 6 BY COL 5 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
SPACE
MULT COL 7 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE  THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
AVERAGE COL 11 STORE IN COL 11
AVERAGE COL 12 STORE IN COL 12
ABRIDGE ROW 1 OF COLS 11 AND 12
SPACE
NOTE ***************************************************************************
KEXIZERO OF VALUES IN COL 1 PUT REAL RESULTS IN COL 2, COMPLEX RESULTS IN COL 3
KEXKZERO OF VALUES IN COL 1 PUT REAL RESULTS IN COL 4, COMPLEX RESULTS IN COL 5
KEXIONE OF VALUES IN COL 1 PUT REAL RESULTS IN COL 6, COMPLEX RESULTS IN COL 7
KEXKONE OF VALUES IN COL 1 PUT REAL RESULTS IN COL 8, COMPLEX RESULTS IN COL 9
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NEW PAGE
NOTE         COL 1       / COL 2          COL 3            COL 4          COL 5
NOTE                         EXP(-Z/SQRT(2))*              EXP(Z/SQRT(2))*
NOTE                         I(Z*EXP(I*PI/4))              K(Z*EXP(I*PI/4))
NOTE           Z           REAL PART      IMAGINARY       REAL PART      IMAGINARY
SPACE
NPRINT COLS  1***5
SPACE
NOTE   BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1, PHI=PI/4.
SPACE
NOTE         COL 1         COL 6          COL 7            COL 8          COL 9
NOTE                         EXP(-Z/SQRT(2))*              EXP(Z/SQRT(2))*
NOTE                         I(Z*EXP(I*PI/4))              K(Z*EXP(I*PI/4))
NOTE           Z           REAL PART      IMAGINARY       REAL PART      IMAGINARY
SPACE
NPRINT 1 COLS 6***9
MULT COL 2 BY COL 8 STORE IN COL 11
MULT COL 3 BY COL 9 MULTIPLY BY -1. ADD TO COL 11 AND STORE IN COL 11
MULT COL 6 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 11 AND STORE IN COL 11
MULT COL 7 BY COL 5 MULTIPLY -1.0 ADD TO COL 11 AND STORE IN COL 11
SQRT 2.0 STORE IN 10
DIVIDE COL 10 BY COL 1 MULTIPLY BY .5 ADD 0.0 STORE IN COL 10
SUBTRACT COL 10 FROM COL 11 AND STORE IN COL 11
MULT COL 2 BY COL 9 MULTIPLY BY 1.0 ADD TO COL 10 AND STORE IN COL 12
MULT COL 3 BY COL 8 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 6 BY COL 5 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 7 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
AVERAGE COL 11 STORE IN COL 11
AVERAGE COL 12 STORE IN COL 12
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE  THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS  11 12
SPACE
NOTE ***************************************************************************
RESET  V  .523598775
CIZERO OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 2, COMPLEX IN COL 3
CKZERO OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 4, COMPLEX IN COL 5
TITLE1     BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 0.      PHI
TITLE2=30 DEGREES OR  .523598775  RADIANS.
NEW PAGE
NOTE         COL 1         COL 2          COL 3          COL 4          COL 5
NOTE                         I(Z*EXP(I*PHI))               K(Z*EXP(I*PHI))
NOTE           Z           REAL PART      IMAGINARY     REAL PART      IMAGINARY
SPACE
NPRINT COLS  1***5
CIONE OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 6, COMPLEX IN COL 7
CKONE OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 8, COMPLEX IN COL 9
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SPACE
NOTE        BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1  PHI=30 DEGREES
SPACE
NOTE        COL 1         COL 6          COL 7        COL 8          COL 9
NOTE                        I(Z*EXP(I*PHI))            K(Z*EXP(I*PHI))
NOTE          Z           REAL PART      IMAGINARY    REAL PART      IMAGINARY
SPACE
NPRINT 1 COLS 6***9
MULT COL 2 BY COL 8 STORE IN COL 11
MULT COL 3 BY COL 9 MULTIPLY BY -1. ADD TO COL 11 AND STORE IN COL 11
MULT COL 6 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 11 AND STORE IN COL 11
MULT COL 7 BY COL 5 MULTIPLY BY -1.0 ADD TO COL 11 AND STORE IN COL 11
COS *V* STORE IN COL 10
DIVIDE COL 10 BY COL 1 STORE IN COL 10
SUBTRACT COL 10 FROM COL 11 STORE IN COL 11
SIN *V* STORE IN COL 10
DIVIDE COL 10 BY COL 1 STORE IN COL 10
MULT COL 2 BY COL 9 MULTIPLY BY 1.0 ADD TO COL 10 AND STORE IN COL 12
MULT COL 3 BY COL 8 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 6 BY COL 5 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 7 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE  THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
AVERAGE COL 11 STORE IN COL 11
AVERAGE COL 12 STORE IN COL 12
ABRIDGE ROW 1 COLS 11 AND 12
SPACE
NOTE ***************************************************************************
RESET  V .785398163  RADIANS
CEIZERO OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 2, COMPLEX IN COL 3
CEKZERO OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 4, COMPLEX IN COL 5
CEIONE OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 6, COMPLEX IN COL 7
CEKONE OF VALUES IN COL 1 PHI=*V* STORE REAL RESULTS IN COL 8, COMPLEX IN COL 9
TITLE2=45 DEGREES OR  .785398163  RADIANS.
NEW PAGE
NOTE        COL 1        COL 2          COL 3          COL 4          COL 5
NOTE                       EXP(-Z*COS(PHI))*           EXP(Z*COS(PHI))*
NOTE                        I(Z*EXP(I*PHI))             K(Z*EXP(I*PHI))
NOTE          Z          REAL PART      IMAGINARY      REAL PART      IMAGINARY
SPACE
NPRINT 1 COLS 6***9
SPACE
NOTE   BESSEL FUNCTIONS COMPLEX ARGUMENTS OF ORDER 1, PHI=45 DEGREES.
SPACE
NOTE        COL 1        COL 6          COL 7          COL 8          COL 9
NOTE                       EXP(-Z*COS(PHI))*           EXP(Z*COS(PHI))*
NOTE                         I(Z*EXP(I*PHI))             K(Z*EXP(I*PHI))
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE          Z          REAL PART      IMAGINARY      REAL PART      IMAGINARY
SPACE
NPRINT 1 COLS 6***9
MULT COL 2 BY COL 8 STORE IN COL 11
MULT COL 3 BY COL 9 MULTIPLY BY -1. ADD TO COL 11 AND STORE IN COL 11
MULT COL 6 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 11 AND STORE IN COL 11
MULT COL 7 BY COL 5 MULTIPLY BY -1.0 ADD TO COL 11 AND STORE IN COL 11
COS *V* STORE IN COL 10
DIVIDE COL 10 BY COL 1 AND STORE IN COL 10
SUBTRACT COL 10 FROM COL 11 AND STORE IN COL 11
SIN *V* STORE IN COL 10
DIVIDE COL 10 BY COL 1 STORE IN COL 10
MULT COL 2 BY COL 9 MULTIPLY BY 1.0 ADD TO COL 10 AND STORE IN COL 12
MULT COL 3 BY COL 8 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 6 BY COL 5 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
MULT COL 7 BY COL 4 MULTIPLY BY 1.0 ADD TO COL 12 AND STORE IN COL 12
AVERAGE COL 11 AND STORE IN COL 11
AVERAGE COL 12 AND STORE IN COL 12
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE  THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 11 AND 12
SPACE
NOTE ***************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

ZEROS OF J ORDER 0 AND 1 AND THEIR DERIVATIVES.

COL 8 N	COL 1 ZEROS J 0	COL 2 DERIV J 0	COL 3 ZEROS J ONE	COL 4 DERIV J ONE
0.	2.4048256	.51914749	3.8317060	-.40275940
1.0	5.5200781	-.34026480	7.0155866	.30011575
2.0	8.6537279	.27145230	10.173468	-.24970488
3.0	11.791534	-.23245983	13.323692	.21835941
4.0	14.930918	.20654643	16.470630	-.19646537
5.0	18.071064	-.18772880	19.615858	.18006337
6.0	21.211637	.17326589	22.760084	-.16718460
7.0	24.352471	-.16170155	25.903672	.15672499
8.0	27.493479	.15218121	29.046829	-.14801111
9.0	30.634606	-.14416598	32.189680	.14060580
10.	33.775820	.13729694	35.332307	-.13421124
11.	36.917098	-.13132463	38.474766	.12861662
12.	40.058425	.12606950	41.617094	-.12366796
13.	43.199791	-.12139862	44.759319	.11924981
14.	46.341188	.11721120	47.901461	-.11527369
15.	49.482610	-.11342919	51.043535	.11167050
16.	52.624052	.10999114	54.185554	-.10838535
17.	55.765511	-.10684789	57.327525	.10537405
18.	58.906984	.10395957	60.469458	-.10260057
19.	62.048469	-.10129350	63.611356	.10003515
20.	65.189964	.098822554	66.753226	-.097653016
21.	68.331469	-.096524040	69.895071	.095433339
22.	71.472981	.094378794	73.036895	-.093358452
23.	74.614500	-.092370505	76.178699	.091413272
24.	77.756025	.090485194	79.320487	-.089584822
25.	80.897555	-.088710802	82.462259	.087861876
26.	84.039090	.087036863	85.604019	-.086234663
27.	87.180630	-.085454242	88.745767	.084694634
28.	90.322172	.083954928	91.887504	-.083234273
29.	93.463718	-.082531861	95.029231	.081846938

****

SUM 1/(X**4) = .03125 FOR J ZERO (X) = 0.
THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR .03125 AND 0.0 RESPECTIVELY.

.031249877 * 3.1044086-11

****

RESULTS OF J N (X), I N (X), K N (X) FOR N=0 (1) 29.

N	J N (5)	I N (2)	K N (1)
COL 8	COL 1	COL 2	COL 3
0.	-.17759677	2.2795853	.42102444
1.0	-.32757914	1.5906368	.60190722
2.0	.046565116	.68894845	1.6248389
3.0	.36483123	.21273996	7.1012628
4.0	.39123236	.050728570	44.232416
5.0	.26114054	.0098256792 *	3.6096059+02
6.0	.13104873	.0016001734 *	3.6538383+03
7.0	.053376410 *	2.2463914-04 *	4.4207020+04
8.0	.018405217 *	2.7699369-05 *	6.2255212+05
9.0	.0055202831 *	3.0441859-06 *	1.0005041+07
10.	.0014678026 *	3.0169639-07 *	1.8071329+08
11.	* 3.5092745-04 *	2.7222023-08 *	3.6242708+09
12.	* 7.6278131-05 *	2.2541310-09 *	7.9914671+10
13.	* 1.5207582-05 *	1.7245163-10 *	1.9215764+12
14.	* 2.8012958-06 *	1.2259834-11 *	5.0040900+13
15.	* 4.7967433-07 *	8.1394325-13 *	1.4030668+15
16.	* 7.6750156-08 *	5.0685714-14 *	4.2142045+16
17.	* 1.1526677-08 *	2.9718290-15 *	1.3499485+18
18.	* 1.6312443-09 *	1.6462152-16 *	4.5940391+19
19.	* 2.1828258-10 *	8.6416033-18 *	1.6552040+21
20.	* 2.7703300-11 *	4.3105606-19 *	6.2943693+22
21.	* 3.3438200-12 *	2.0482232-20 *	2.5194029+24
22.	* 3.8478737-13 *	9.2917755-22 *	1.0587787+26
23.	* 4.2308846-14 *	4.0326091-23 *	4.6611455+27
24.	* 4.4540221-15 *	1.6774623-24 *	2.1451857+29
25.	* 4.4976606-16 *	6.6995569-26 *	1.0301553+31
26.	* 4.3638521-17 *	2.5730921-27 *	5.1529215+32
27.	* 4.0745521-18 *	9.5173970-29 *	2.6805494+34
28.	* 3.6664192-19 *	3.3948943-30 *	1.4480119+36
29.	* 3.1837336-20 *	1.1693106-31 *	8.1115474+37

****

(SUM OF (J N (X))**2)*2.+(J ZERO (X))**2=1., FOR N=1 THRU INFINITY. (IN THIS EXAMPLE N=0,...,29).
(SUM OF (I N (X))**2.) +I ZERO (X)-EXP(X)=0., FOR N=1 THRU INFINITY. (IN THIS EXAMPLE N=0,...,29).

HANDBOOK OF MATHEMATICAL FUNCTIONS AMS 55 PAGES 363 AND 376.
THE FOLLOWING VALUES MUST EQUAL OR BE NEAR 1.0, 0.0 AND 0.0 RESPECTIVELY.

1.0000000 0. * 5.5879354-09

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
TITLE1 ZEROS OF J ORDER 0 AND 1 AND THEIR DERIVATIVES.
RESET NRMAX TO 30

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   30.

ZEROS BJZERO OF J ZERO FOR N FROM ZERO THRU TWENTY-NINE PUT IN COL 1 DERIV COL 2
ZEROS BJONE  OF J ZERO FOR N FROM ZERO THRU TWENTY-NINE PUT IN COL 3 DERIV COL 4
SQUARE COL 1 AND STORE IN COL 6
SQUARE COL 6 AND STORE IN COL 6
DIV 1.0 BY COL 6 AND STORE IN COL 6
SUM COL 6 AND STORE IN COL 6
BJZERO OF FIRST KIND OF FIRST ORDER OF COL 3 AND STORE IN COL 7
SUBTRACT COL 7 FROM COL 4 AND STORE IN COL 7
AVERAGE  COL 7 AND STORE IN COL 7
GENERATE FROM 0.0 IN STEPS OF 1.0 THRU 29 AND STORE IN COL 8
NEW PAGE
NOTE          COL 8        COL 1          COL 2          COL 3          COL 4
NOTE            N        ZEROS J 0      DERIV J 0     ZEROS J ONE    DERIV J ONE
NPRINT COL 8  WITH 2.0 SIG. DIGITS AND COLS 1 *** 4 WITH 8.0 SIG DIGITS
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE SUM 1/(X**4) = .03125  FOR J ZERO (X) = 0.
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR .03125 AND 0.0 RESPECTIVELY.
SPACE
ABRIDGE ROW 1 COLS 6 AND 7
SPACE
NOTE ***************************************************************************
TITLE1 RESULTS OF J N (X), I N (X), K N (X) FOR N=0 (1) 29.
BESJN  OF X= 5.0 AND STORE RESULTS IN COL 1
BESIN  OF X= 2.0 AND STORE RESULTS IN COL 2
BESKN  OF X= 1.0 AND STORE RESULTS IN COL 3
NEW PAGE
NOTE            N       J N (5)        I N (2)        K N (1)
NOTE          COL 8      COL 1          COL 2          COL 3
NPRINT COL 8 WITH 2.0 SIG. DIGITS COLS 1, 2 AND 3 WITH 8.0 SIGNIFICANT DIGITS
SQUARE COL 1 AND STORE IN COL 1
1/MULT COL 1 BY 2. AND STORE IN COL 10
2/SUM COL 10 AND STORE IN COL 10
3/SUBTRACT *1,1* FROM COL 10 AND STORE IN COL 10
4/INCREMENT INSTRUCTION 1 BY 1, 0. AND 1
5/INCREMENT INSTRUCTION 2 BY 1 AND 1
6/INCREMENT INSTRUCTION 3 BY *0,1*, 1 AND 1
EXECUTE INSTRUCTIONS 1 THRU 6, 2 TIMES
DIV 1.0 BY COL 3 AND STORE IN COL 12
AVERAGE COL 12 AND STORE IN COL 12
RESET NRMAX 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   30 TO    1.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SUB .16061621 FROM COL 12 AND STORE IN COL 12
EXPONENTIAL OF 2. AND STORE IN COL 4
SUBTRACT COL 4 FROM COL 11 AND STORE IN COL 11
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE1  (SUM OF (J N (X))**2)*2.-(J ZERO (X))**2=1.,  FOR N=1 THRU
NOTE2 INFINITY.  (IN THIS EXAMPLE N=0,...,29).
PRINT NOTE
NOTE1  (SUM OF (I N (X))**2.) -I ZERO (X)-EXP(X)=0.,   FOR N=1 TH
NOTE2RU INFINITY.  (IN THIS EXAMPLE N=0,...,29).
PRINT NOTE
NOTE
NOTE HANDBOOK OF MATHEMATICAL FUNCTIONS AMS 55 PAGES 363 AND 376.
NOTE THE FOLLOWING VALUES MUST EQUAL OR BE NEAR 1.0, 0.0 AND 0.0 RESPECTIVELY.
SPACE
NPRINT  COLS 10, 11 AND 12
SPACE
NOTE ***************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

X	-(F-E)/RT	EINSTEIN (H-E)-RT	FUNCTION S/R	C/R	(H-E)/R
COLUMN 11	COLUMN 13	COLUMN 14	COLUMN 15	COLUMN 16	COLUMN 17
1.0500000	.43068715	.56522992	.99591707	.91297628	.81324715
1.1000000	.40477197	.54885672	.95362869	.90498610	.78968956
1.1500000	.38072874	.53285320	.91358195	.89671371	.76666385
1.2000000	.35838241	.51721530	.87559772	.88817005	.74416420
1.2500000	.33757956	.50193889	.83951845	.87936628	.72218466
1.3000000	.31818498	.48701967	.80520465	.87031374	.70071903
1.3500000	.30007894	.47245326	.77253219	.86102398	.67976101
1.4000000	.28315495	.45823514	.74139009	.85150865	.65930413
1.4500000	.26731788	.44436074	.71167862	.84177954	.63934179
1.5000000	.25248246	.43082537	.68330783	.83184856	.61986723

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MOLECULAR WEIGHTS OF

WATER	PROPANAL	TETRATOMIC PHOSP	URANIUM OXIDE
18.015200	60.095600	123.89504	842.08219

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TRANSLATIONAL CONTRIBUTIONS OF WATER

TEMPERATURE COLUMN 4	-(F-E)/RT COLUMN 5	(H-E)/RT COLUMN 6	S/R COLUMN 7	C/R COLUMN 8	(H-E)/R COLUMN 9
100.00000	12.184799	2.5000000	14.684799	2.5000000	250.00000
200.00000	13.917667	2.5000000	16.417667	2.5000000	500.00000
300.00000	14.931330	2.5000000	17.431330	2.5000000	750.00000
400.00000	15.650535	2.5000000	18.150535	2.5000000	1000.0000
500.00000	16.208394	2.5000000	18.708394	2.5000000	1250.0000
600.00000	16.664198	2.5000000	19.164198	2.5000000	1500.0000
700.00000	17.049575	2.5000000	19.549575	2.5000000	1750.0000
800.00000	17.383403	2.5000000	19.883403	2.5000000	2000.0000
900.00000	17.677860	2.5000000	20.177860	2.5000000	2250.0000
1000.0000	17.941262	2.5000000	20.441262	2.5000000	2500.0000
1100.0000	18.179537	2.5000000	20.679537	2.5000000	2750.0000
1200.0000	18.397066	2.5000000	20.897066	2.5000000	3000.0000
1300.0000	18.597172	2.5000000	21.097172	2.5000000	3250.0000
1400.0000	18.782443	2.5000000	21.282443	2.5000000	3500.0000
1500.0000	18.954925	2.5000000	21.454925	2.5000000	3750.0000

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THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-2.3841858-08 *-4.7683716-08 *-4.7683716-08 *-9.5367431-08

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PTATOMIC OF ATOMIC OXYGEN

TEMPERATURE COLUMN 41	-(F-E)/RT COLUMN 42	(H-E)/RT COLUMN 43	S/R COLUMN 44	C/R COLUMN 45	(H-E)/R COLUMN 46
1000.0000	18.802985	2.5000000	21.302985	2.5000000	2500.0000
1500.0000	19.816648	2.5000000	22.316648	2.5000000	3750.0000
2000.0000	20.535853	2.5000000	23.035853	2.5000000	5000.0000
2500.0000	21.093712	2.5000000	23.593712	2.5000000	6250.0000
3000.0000	21.549516	2.5000000	24.049516	2.5000000	7500.0000
3500.0000	21.934893	2.5000000	24.434893	2.5000000	8750.0000
4000.0000	22.268721	2.5000000	24.768721	2.5000000	10000.000
4500.0000	22.563179	2.5000000	25.063179	2.5000000	11250.000
5000.0000	22.826580	2.5000000	25.326580	2.5000000	12500.000
5500.0000	23.064856	2.5000000	25.564856	2.5000000	13750.000
6000.0000	23.282384	2.5000000	25.782384	2.5000000	15000.000
6500.0000	23.482491	2.5000000	25.982491	2.5000000	16250.000
7000.0000	23.667761	2.5000000	26.167761	2.5000000	17500.000
7500.0000	23.840243	2.5000000	26.340243	2.5000000	18750.000
8000.0000	24.001589	2.5000000	26.501589	2.5000000	20000.000

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THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

0. 0. 0. 0. 0. 0.

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PARTFUNCTION OF ATOMIC OXYGEN

TEMPERATURE COLUMN 1	WAVE NO. COLUMN 2	G COLUMN 3	Q(0) COLUMN 11	Q(1) COLUMN 12	Q(2) COLUMN 13
1000.0000	78.000000	9.0000000	8.0445831	.90280834	.10131854
1500.0000	15868.000	5.0000000	8.3512200	.62483248	.047030965
2000.0000	33792.000	1.0000000	8.5089474	.47808712	.033974776
2500.0000			8.6054622	.39121396	.062425896
3000.0000			8.6720195	.34316519	.15559990
3500.0000			8.7233441	.32740384	.32170693
4000.0000			8.7676088	.34034358	.54851407
4500.0000			8.8096472	.37795565	.81356907
5000.0000			8.8522937	.43549771	1.0940631
5500.0000			8.8971039	.50806658	1.3717714
6000.0000			8.9448112	.59111446	1.6342110
6500.0000			8.9956322	.68073445	1.8739578
7000.0000			9.0494714	.77374944	2.0873997
7500.0000			9.1060584	.86768169	2.2735298
8000.0000			9.1650347	.96066564	2.4329863

BOLDISTRIBUTION POPULATION OF STATES

TEMPERATURE	WAVE NO.	G	********** RESULTS **********		
COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 21	COLUMN 22	COLUMN 23
1000.0000	78.000000	9.0000000	1.0000000	* 7.5545895-11	* 9.5340204-23
1500.0000	15868.000	5.0000000	.99999985	* 1.4690943-07	* 1.0033131-15
2000.0000	33792.000	1.0000000	.99999352	* 6.4783792-06	* 3.2547225-12
2500.0000			.99993718	* 6.2819367-05	* 4.1604245-10
3000.0000			.99971438	* 2.8560418-04	* 1.0555358-08
3500.0000			.99915781	* 8.4208675-04	* 1.0626662-07
4000.0000			.99810586	.0018935420	* 6.0022453-07
4500.0000			.99644448	.0035532139	* 2.3055274-06
5000.0000			.99412020	.0058730415	* 6.7592749-06
5500.0000			.99113363	.0088500881	* 1.6278724-05
6000.0000			.98752515	.012441027	* 3.3824035-05
6500.0000			.98335995	.016577322	* 6.2729650-05
7000.0000			.97871576	.021177842	* 1.0639390-04
7500.0000			.97367394	.026158058	* 1.6799906-04
8000.0000			.96831357	.031436120	* 2.5030143-04

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THE FOLLOWING VALUE SHOULD BE EQUAL TO OR NEAR ZERO.

0.

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LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM 1.05 IN STEPS OF .05 THRU 1.5 AND PUT IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

ADD 0. TO 1.43879 AND PUT IN COL 2
EINSTEIN OF TEMPS IN COL 2, WAVE NOS. IN COL 1 AND PUT TABLE STARTING IN COL 11
TITLE1                                EINSTEIN           FUNCTION
TITLE3        X          -(F-E)/RT      (H-E)-RT           S/R
TITLE4       C/R          (H-E)/R
PRINT COLS 11, 13***17
ERASE ENTIRE WORKSHEET

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   10 TO    0.

RESET NRMAX TO 10

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

SPACE  2
NOTE ***************************************************************************
SPACE
NOTE        MOLECULAR WEIGHTS OF
NOTE      WATER          PROPANAL  TETRATOMIC PHOSP  URANIUM OXIDE
MOLWT OF WATER H=1 ATOMIC NO., 2 PARTS, O=8 ATOMIC NO., 1 PART AND PUT IN COL 1
MOLWT PROPANOL C=6 ATOMIC NO., 3 PARTS, H=1, 8, O=8, 1, PUT IN COL 2
MOLWT TETRATOMIC PHOSP PH=15 ATOMIC NO., 4 PARTS, PUT IN COL 3
MOLWT URANIUM OXIDE U=92 ATOMIC NO., 3 PARTS, O=8, 8 PARTS, PUT IN COL 4
SPACE
ABRIDGE ROW 1 COLS 1***4
SPACE
NOTE ***************************************************************************
RESET NRMAX TO 0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   10 TO    0.

GENERATE FROM 100. IN STEPS OF 100. THRU 1500. AND PUT IN COL 61

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   15.

ADD  1.98717 TO 0. AND PUT IN COL 28
PFTRANSLATIONAL OF TEMP IN COL 61, MOL WT.=TO VALUE IN *1,1*, PUT IN COL 4
TITLE1                  TRANSLATIONAL     CONTRIBUTIONS     OF
TITLE2   WATER
TITLE3  TEMPERATURE      -(F-E)/RT      (H-E)/RT          S/R
TITLE4      C/R          (H-E)/R
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LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
PRINT COLS 4***9
MULTIPLY COL 5 BY COL 28 AND PUT IN COL 10
MULTIPLY COL 7 BY COL 28 AND PUT IN COL 11
MULTIPLY COL 8 BY COL 28 AND PUT IN COL 12
LOG OF COL 61 AND PUT IN 21
LOGE OF VALUE IN *1,1* AND STORE IN COL 22
ADD COL 2.5 TO 0. AND PUT IN COL 23
MULTIPLY COL 23 BY COL 21 AND PUT IN COL 24
MULTIPLY 1.5 BY COL 22 AND PUT IN COL 25
ADD 0. TO -3.66495 AND PUT IN COL 26
ROWSUM 24***26 AND PUT IN COL 31
ADD COL 23 TO COL 31 AND PUT IN COL 32
MULTIPLY COL 31 BY COL 28 AND PUT IN COL 33
MULTIPLY COL 32 BY COL 28 AND PUT IN COL 34
SUBTRACT COL 5 FROM COL 31 AND PUT IN COL 31
SUB COL  7 FROM COL 32 AND PUT IN COL 32
SUB COL 10 FROM COL 33 AND PUT IN COL 33
SUB COL 11 FROM COL 34 AND PUT IN COL 34
1/ AVERAGE COL 31 AND STORE IN COL 31
2/ INCREMENT INSTRUCTION 1 BY 1 AND 1
EXECUTE INSTRUCTIONS 1 THRU 2, 4 TIMES
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 31***34
SPACE
NOTE ***************************************************************************
ERASE ENTIRE WORKSHEET

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   15 TO    0.

TITLE1                          PTATOMIC      OF      ATOMIC
TITLE2OXYGEN
GENERATE FROM 1000. IN STEPS OF 500. THRU 8000. AND PUT IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   15.

SET INTO COL 2 THE FOLLOWING DATA
78. 15868. 33792.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   15 TO    3.

SET INTO COL 3 THE FOLLOWING DATA
9. 5. 1.
RESET NRMAX TO 15
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LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

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     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    3 TO   15.

PFATOMIC TEMP IN COL 1 MOL WT=31.9988 WAVE NO. IN COL 2 DEGENS IN 3 PUT IN 41
PFTRANSLATIONAL OF TEMP IN COL 1, MOL WT.=31.9988, PUT IN COL 31 AND BEYOND
1/SUBTRACT COL 41 FROM COL 31 AND STORE IN COL 31
2/AVERAGE COL 31 AND STORE IN COL 31
3/INCREMENT INSTRUCTION 1 BY 1, 1 AND 1
4/INCREMENT INSTRUCTION 2 BY 1 AND 1
REPEAT INSTRUCTIONS 1 THRU 4, 6 TIMES
PRINT COLS 41***46
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COLS 31***36
SPACE
NOTE ***************************************************************************
PARTFUNCTION TEMP IN COL 1 WAVE NO. IN COL 2 DEGENS IN COL 3 PUT IN COL 11
TITLE1                        PARTFUNCTION     OF     ATOMIC     OX
TITLE2YGEN
TITLE3  TEMPERATURE       WAVE NO.          G              Q(0)
TITLE4     Q(1)            Q(2)
PRINT COLS 1, 2, 3, 11, 12 AND 13
BOLDISTRIBUTION TEMP IN COL 1 WAVE NO. IN COL 2 DEGENS IN COL 3 PUT IN COL 21
ROWSUM COLS 21***23 INTO COL 24
SUBTRACT COL 24 FROM 1.0 STORE IN COL 24
TITLE1                     BOLDISTRIBUTION     POPULATION     OF
TITLE2   STATES
TITLE3  TEMPERATURE       WAVE NO.          G           ***********
TITLE4*** RESULTS ****************
PRINT COLS 1, 2, 3, 21, 22 AND 23
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 COL 24
SPACE
NOTE ***************************************************************************
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NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS	ENGLIS	ENGLIS	ENGLIS
AADD	AAVERA	ABRIDG	ABRIDG A
ABS	ABSOLU	ACCURA	ACOALE
ACOS	ACOSD	ACOSH	ACOT
ACOTD	ACOTH	ADD	ADEFIN
ADIV	ADIVID	AERASE	ALABEL
AMOVE	AMULT	AMULTI	ANTILO
APRINT	APRINT A	APROPE	ARAISE
ASIN	ASIND	ASINH	ASUB
ASUBTR	ATAN	ATAND	ATANH
ATOMIC	ATRANS	AVERAG	AVERAG
AZERO	BACKSP TAPE A	BACKSP UNIT A	BEGIN
BERNOU	BESIN	BESJN	BESKN
BESTCP	BETA	BINOMI	BIONE
BIZERO	BJONE	BJZERO	BKONE
BKZERO	BOLDIS	BRIEF	BYONE
BYZERO	CADD	CALCOM AXIS	CALCOM FAST
CALCOM PAPER	CALCOM PLOT	CALCOM SIZE	CALCOM SLOW
CALCOM SPEED	CALCOM TAPE	CAUCHY	CDIVID
CEIONE	CEIZER	CEKONE	CEKZER
CENSOR	CENSOR EQ	CENSOR GE	CENSOR GT
CENSOR LE	CENSOR LT	CENSOR NE	CERF
CGS	CHANGE	CHISQU	CHOOSE
CIONE	CIZERO	CKONE	CKZERO
CLOSE UP	CMULTI	CODE	COMPAR
CONTEN	CONTIN	CORREL	COS
COSD	COSH	COSINT	COT
COTD	COTH	COUNT	CPERCE
CPLOT	CPOLAR	CPROPO	CREAD TAPE A
CREAD TAPE Q	CREAD UNIT A	CREAD UNIT Q	CRECTA
CRT	CSET TAPE A	CSET UNIT A	CSUBTR
CTOF	CUMULA	DANSK	DAYS
DEFINE	DELETE	DEMOTE	DENSIT
DESCRI	DEUTSC	DEXPON	DIFFER
DIM	DIMENS	DISCRE	DIV
DIVDIF	DIVIDE	DUPLIC	EEXPIN
EINSTE	EINTEG	ELLIPT FIRST	ELLIPT SECOND
ENDFIL TAPE A	ENDFIL UNIT A	ENGLIS	ERASE
ERROR	ESPANO	EVALUA	EXCHAN
EXECUT	EXIONE	EXIZER	EXKONE
EXKZER	EXP	EXPAND	EXPINT
EXPONE	EXTREM	F	F PROBAB
FINISH	FIT	FIXED	FLEXIB
FLIP	FLOATI	FORMAT A	FOURPL
FRACTI	FRANCA	FREQUE	FREQUE
FTOC	FULL	GAMMA	GAMMA
GAUSS QUADRA	GENERA	GEOMET	HALFNO
HARMON	HCOSIN	HEAD	HERMIT
HIERAR	HISTOG	HSININ	HYPERG
IFEQ	IFGE	IFGT	IFLE
IFLT	IFNE	INCREM	INSERT

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS		ENGLIS		ENGLIS		ENGLIS	
INTEGE		INTERA		INTERP		INTJO	
INVERT		ISETUP		ISOLAT		ITALIA	
ITERAT		JAPANE		KBIONE		KBIZER	
KBKONE		KBKZER		KEXION		KEXIZE	
KEXKON		KEXKZE		LABEL		LAGUER	
LAMBDA		LARFIT		LEGEND		LENGTH	
LIST		LOCAL		LOG		LOGE	
LOGIST		LOGNOR		LOGTEN		M	AD
M	AV	M	DA	M	V	M	X
M	X	M	XAX	M	XX	MADD	
MATCH		MAX		MAXIMU		MAXIMU	
MAXMIN		MDEFIN		MDIAGO		MEDIAN	
MEDIAN		MEIGEN		MERASE		MIDENT	
MIN		MINIMU		MINIMU		MINVER	
MKRONE		MLABEL		MMATVE		MMOVE	
MMULT		MMULTI		MOLWT		MORTHO	
MOVE		MPRINT		MPRINT	A	MPROPE	
MRAISE		MSCALA		MSUB		MSUBTR	
MTRANS		MTRIAN		MULT		MULTIN	
MULTIP		MVECDI		MVECMA		MZERO	
NCCHIS		NCF		NCPLOT		NCT	
NEDERL		NEGBIN		NEGEIN		NEGEXP	
NEW	PAGE	NHISTO		NICE	CPLOT	NICE	NCPLOT
NICE	NPLOT	NICE	PLOT	NO	LIST	NORMAL	
NORMLA		NORSK		NOTE		NOTE1	
NOTE2		NPLOT		NPRINT		NPRINT	A
NTABLE		NULL		OMIT		OMNITA	
ONEWAY		ORDER		PAGE	PLOT	PARETO	
PARPRO		PARSUM		PARTFU		PASCAL	
PERCEN		PERCEN		PERCEN		PERFOR	
PFATOM		PFTRAN		PLOT		PLOT	
POISSO		POLYFI		PORTUG		PRINT	
PRINT	A	PRINT	NOTE	PRODUC		PROMOT	
PROPOR		PROPOR		PUNCH		PUNCH	A
RAISE		RANDOM		RANGE		RANGE	
RANKS		READ		READ	A	READ	TAPE A
READ	TAPE Q	READ	UNIT A	READ	UNIT Q	RECIPR	
RECODE		REMOTE		REPEAT		REPLAC	
RESET		RESET	V	RESTOR		RETAIN	
REWIND	TAPE A	REWIND	UNIT A	RMS		ROUND	
ROW	SUM	ROWSUM		RPERCE		RPROPO	
SAMPLE	WITHOU	SAMPLE	WITHR	SAPROP		SCAN	
SCORRE		SDIFFE		SDIVDI		SEARCH	
SELECT		SEPARA		SET		SET	TAPE A
SET	UNIT A	SFIT		SHORTE		SI	
SIN		SIND		SINH		SININT	
SKIP	TAPE A	SKIP	UNIT A	SLOVEN		SMPROP	
SOLVE		SONEWA		SORT		SPACE	
SPLIT	PLOT	SPOLYF		SQRT		SQUARE	
SRANGE		SSTATI		SSTEM	LEAF	STATIS	

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS	ENGLIS	ENGLIS	ENGLIS
STATPL	STDDEV	STDDEV	STEM LEAF
STOP	STRUVE ONE	STRUVE ZERO	STWOWA
SUB	SUBTRA	SUM	SUM
SVENSK	T	TABLE	TAN
TAND	TANH	TAPE	TCHEBY
TERMIN	TITLE1	TITLE2	TITLE3
TITLE4	TITLEX	TITLEY	TWOPLO
TWOWAY	UCHEBY	UNIFOR	UNIT
VOCABU	WEIBUL	WIDTH	WRITE TAPE A
WRITE TAPE Q	WRITE UNIT A	WRITE UNIT Q	YUGOSL
ZEROS BJONE	ZEROS BJZERO		
COLUMN		442 ENGLIS COMMANDS	

ASTERISK INDICATES NO TRANSLATION OR COMMANDS ARE THE SAME.
DISTRIBUTION AND PROPERTY NAMES ARE PRINTED, BUT
NOT ALL COMBINATIONS ARE NECESSARILY VALID.
EACH COMMAND OF TABLE MAKING TWO-WORD COMMANDS IS PRINTED SEPARATELY.

A AFTER A COMMAND STANDS FOR A FORMAT OR UNIT QUALIFIER.
V AFTER A RESET COMMAND STANDS FOR A VARIABLE QUALIFIER.
Q AFTER A UNIT COMMAND STANDS FOR BOTH A UNIT AND A FORMAT QUALIFIER.

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS	ESPANO	ENGLIS	ESPANO
AADD	AADICI	AAVERA	AMEDIA
ABRIDG	ABREVI	ABRIDG A	ABREVI A
*ABS	ABS	*ABSOLU	ABSOLU
ACCURA	EXACTI	ACOALE	ADELCO
*ACOS	ACOS	ACOSD	ACOSG
*ACOSH	ACOSH	*ACOT	ACOT
ACOTD	ACOTG	*ACOTH	ACOTH
ADD	ADICIO	*ADEFIN	ADEFIN
*ADIV	ADIV	*ADIVID	ADIVID
AERASE	ABORRA	*ALABEL	ALABEL
AMOVE	AMOVER	*AMULT	AMULT
*AMULTI	AMULTI	*ANTILO	ANTILO
APRINT	AIMPRI	APRINT A	AIMPRI A
APROPE	APROPI	ARAISE	APOTEN
ASIN	ASEN	ASIND	ASENG
ASINH	ASENH	ASUB	ASUSTR
ASUBTR	ASUSTR	ATAN	ATANG
ATAND	ATANGG	ATANH	ATANGH
ATOMIC	PESOAT	*ATRANS	ATRANS
AVERAG	PROMED	*AVERAG	AVERAG
AZERO	ACERO	*BACKSP TAPE A	BACKSP TAPE A
BACKSP UNIT A	BACKSP UNIDAE	BEGIN	EMPEZA
*BERNOU	BERNOU	*BESIN	BESIN
*BESJN	BESJN	*BESKN	BESKN
*BESTCP	BESTCP	*BETA	BETA
*BINOMI	BINOMI	*BIONE	BIONE
*BIZERO	BIZERO	*BJONE	BJONE
*BJZERO	BJZERO	*BKONE	BKONE
*BKZERO	BKZERO	BOLDIS	BOLTZM
*BRIEF	BRIEF	*BYONE	BYONE
*BYZERO	BYZERO	CADD	CADICI
*CALCOM AXIS	CALCOM AXIS	*CALCOM FAST	CALCOM FAST
*CALCOM PAPER	CALCOM PAPER	*CALCOM PLOT	CALCOM PLOT
*CALCOM SIZE	CALCOM SIZE	*CALCOM SLOW	CALCOM SLOW
*CALCOM SPEED	CALCOM SPEED	*CALCOM TAPE	CALCOM TAPE
*CAUCHY	CAUCHY	*CDIVID	CDIVID
*CEIONE	CEIONE	*CEIZER	CEIZER
*CEKONE	CEKONE	*CEKZER	CEKZER
CENSOR	CENSUR	CENSOR EQ	CENSUR IG
CENSOR GE	CENSUR MAI	CENSOR GT	CENSUR MA
CENSOR LE	CENSUR MEI	CENSOR LT	CENSUR ME
CENSOR NE	CENSUR NOI	*CERF	CERF
*CGS	CGS	CHANGE	CAMBIA
*CHISQU	CHISQU	*CHOOSE	CHOOSE
*CIONE	CIONE	*CIZERO	CIZERO
*CKONE	CKONE	*CKZERO	CKZERO
CLOSE UP	COMPAC	*CMULTI	CMULTI
*CODE	CODE	*COMPAR	COMPAR
*CONTEN	CONTEN	*CONTIN	CONTIN
*CORREL	CORREL	*COS	COS

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS	ESPANO	ENGLIS	ESPANO
COSD	COSG	*COSH	COSH
*COSINT	COSINT	*COT	COT
COTD	COTG	*COTH	COTH
COUNT	CUENTA	*CPERCE	CPERCE
*CPLOT	CPLOT	*CPOLAR	CPOLAR
*CPROPO	CPROPO	*CREAD TAPE A	CREAD TAPE A
*CREAD TAPE Q	CREAD TAPE Q	CREAD UNIT A	CREAD UNIDAE
CREAD UNIT Q	CREAD UNIDAU	CRECTA	CCARTE
*CRT	CRT	*CSET TAPE A	CSET TAPE A
CSET UNIT A	CSET UNIDAE	CSUBTR	CSUSTR
CTOF	CENTAF	*CUMULA	CUMULA
*DANSK	DANSK	*DAYS	DAYS
*DEFINE	DEFINE	*DELETE	DELETE
DEMOTE	TRASLA	*DENSIT	DENSIT
*DESCRI	DESCRI	*DEUTSC	DEUTSC
*DEXPON	DEXPON	*DIFFER	DIFFER
*DIM	DIM	*DIMENS	DIMENS
*DISCRE	DISCRE	*DIV	DIV
*DIVDIF	DIVDIF	*DIVIDE	DIVIDE
*DUPLIC	DUPLIC	*EEXPIN	EEXPIN
*EINSTE	EINSTE	*EINTEG	EINTEG
ELLIPT FIRST	ELIPTI PRIMER	ELLIPT SECOND	ELIPTI SEGUND
*ENDFIL TAPE A	ENDFIL TAPE A	ENDFIL UNIT A	ENDFIL UNIDAE
*ENGLIS	ENGLIS	ERASE	BORRA
ERROR	ERF	*ESPANO	ESPANO
*EVALUA	EVALUA	EXCHAN	INTERC
EXECUT	REALIZ	*EXIONE	EXIONE
*EXIZER	EXIZER	*EXKONE	EXKONE
*EXKZER	EXKZER	*EXP	EXP
*EXPAND	EXPAND	*EXPINT	EXPINT
*EXPONE	EXPONE	*EXTREM	EXTREM
F	FSNEDE	F PROBAB	PROB FSNEDE
FINISH	TERMIN	FIT	ADJUST
FIXED	FIJA	*FLEXIB	FLEXIB
FLIP	VOLTEA	FLOATI	FLOTAN
*FORMAT A	FORMAT A	*FOURPL	FOURPL
FRACTI	PARTEF	*FRANCA	FRANCA
FREQUE	FRECUE	*FREQUE	FREQUE
FTOC	FAHRAC	*FULL	FULL
*GAMMA	GAMMA	*GAMMA	GAMMA
GAUSS QUADRA	INTEGR GAUSSI	*GENERA	GENERA
*GEOMET	GEOMET	*HALFNO	HALFNO
*HARMON	HARMON	*HCOSIN	HCOSIN
HEAD	ENCABE	HERMIT	POLHER
HIERAR	JERARQ	*HISTOG	HISTOG
*HSININ	HSININ	*HYPERG	HYPERG
IFEQ	SIIG	*IFGE	IFGE
*IFGT	IFGT	IFLE	SIMENI
IFLT	SIMEIG	IFNE	SINOIG
*INCREM	INCREM	*INSERT	INSERT

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS		ESPANO		ENGLIS		ESPANO	
INTEGE		PARTEE		*INTERA		INTERA	
*INTERP		INTERP		*INTJO		INTJO	
INVERT		INVIER		ISETUP		INICIA	
ISOLAT		AISLA		*ITALIA		ITALIA	
ITERAT		ITERA		*JAPANE		JAPANE	
*KBIONE		KBIONE		*KBIZER		KBIZER	
*KBKONE		KBKONE		*KBKZER		KBKZER	
*KEXION		KEXION		*KEXIZE		KEXIZE	
*KEXKON		KEXKON		*KEXKZE		KEXKZE	
*LABEL		LABEL		LAGUER		POLLAG	
*LAMBDA		LAMBDA		*LARFIT		LARFIT	
LEGEND		POLLE		*LENGTH		LENGTH	
LIST		LISTA		*LOCAL		LOCAL	
*LOG		LOG		LOGE		LOGNAT	
*LOGIST		LOGIST		*LOGNOR		LOGNOR	
LOGTEN		LOGDEC		*M	AD	M	AD
*M	AV	M	AV	*M	DA	M	DA
*M	V	M	V	*M	X	M	X
*M	X	M	X	*M	XAX	M	XAX
*M	XX	M	XX	MADD		MADICI	
MATCH		EXTRAE		*MAX		MAX	
MAXIMU		MAXIMO		*MAXIMU		MAXIMU	
*MAXMIN		MAXMIN		*MDEFIN		MDEFIN	
*MDIAGO		MDIAGO		*MEDIAN		MEDIAN	
*MEDIAN		MEDIAN		*MEIGEN		MEIGEN	
MERASE		MBORRA		*MIDENT		MIDENT	
*MIN		MIN		MINIMU		MINIMO	
*MINIMU		MINIMU		MINVER		MINVIE	
*MKRONE		MKRONE		*MLABEL		MLABEL	
MMATVE		MVECAM		MMOVE		MMOVER	
*MMULT		MMULT		*MMULTI		MMULTI	
MOLWT		PESOMO		MORTHO		MORTON	
MOVE		MOVER		MPRINT		MIMPRI	
MPRINT	A	MIMPRI	A	MPROPE		MPROPI	
MRAISE		MPOTEN		MSCALA		MPRODE	
MSUB		MSUSTR		MSUBTR		MSUSTR	
*MTRANS		MTRANS		*MTRIAN		MTRIAN	
*MULT		MULT		*MULTIN		MULTIN	
*MULTIP		MULTIP		MVECDI		MEXTRA	
MVECMA		MMATAV		MZERO		MCERO	
*NCCHIS		NCCHIS		*NCF		NCF	
*NCPLOT		NCPLOT		*NCT		NCT	
*NEDERL		NEDERL		*NEGBIN		NEGBIN	
*NEGEIN		NEGEIN		*NEGEXP		NEGEXP	
NEW	PAGE	NUEVA	PAGINA	*NHISTO		NHISTO	
*NICE	CPLOT	NICE	CPLOT	*NICE	NCPLOT	NICE	NCPLOT
*NICE	NPLOT	NICE	NPLOT	*NICE	PLOT	NICE	PLOT
NO	LIST	NO	LISTAR	*NORMAL		NORMAL	
NORMLA		NORMPO		*NORSK		NORSK	
NOTE		NOTA		NOTE1		NOTA1	

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS	ESPANO	ENGLIS	ESPANO
NOTE2	NOTA2	*NPLOT	NPLOT
NPRINT	NIMPRI	NPRINT A	NIMPRI A
*NTABLE	NTABLE	NULL	NULO
*OMIT	OMIT	*OMNITA	OMNITA
ONEWAY	ANAVSI	ORDER	ORDENA
PAGE PLOT	GRAFIC RED	PARETO	RAYLEI
PARPRO	PRODPA	PARSUM	SUMAPA
PARTFU	FUNCPA	*PASCAL	PASCAL
*PERCEN	PERCEN	*PERCEN	PERCEN
*PERCEN	PERCEN	PERFOR	REALIZ
*PFATOM	PFATOM	*PFTRAN	PFTRAN
PLOT	GRAFIC	PLOT	GRAFIC
*POISSO	POISSO	POLYFI	AJUSPO
*PORTUG	PORTUG	PRINT	IMPRIM
PRINT A	IMPRIM A	PRINT NOTE	IMPREM NOTA
*PRODUC	PRODUC	PROMOT	TRASAR
*PROPOR	PROPOR	*PROPOR	PROPOR
PUNCH	PERFOR	PUNCH A	PERFOR A
RAISE	POTENC	RANDOM	ALEATO
*RANGE	RANGE	*RANGE	RANGE
RANKS	RANGOS	READ	LEE
READ A	LEE A	*READ TAPE A	READ TAPE A
*READ TAPE Q	READ TAPE Q	READ UNIT A	READ UNIDAE
READ UNIT Q	READ UNIDAU	*RECIPR	RECIPR
*RECODE	RECODE	*REMOTE	REMOTE
REPEAT	REALIZ	*REPLAC	REPLAC
RESET	REDIME	RESET V	REDIME V
RESTOR	RESTAU	*RETAIN	RETAIN
*REWIND TAPE A	REWIND TAPE A	REWIND UNIT A	REWIND UNIDAE
RMS	RCM	ROUND	REDOND
ROW SUM	SUMA FILA	ROWSUM	SUMAFI
*RPERCE	RPERCE	*RPROPO	RPROPO
*SAMPLE WITHOU	SAMPLE WITHOU	*SAMPLE WITHR	SAMPLE WITHR
*SAPROP	SAPROP	SCAN	EXPLOR
*SCORRE	SCORRE	*SDIFFE	SDIFFE
*SDIVDI	SDIVDI	SEARCH	BUSCA
SELECT	SELECC	*SEPARA	SEPARA
SET	COLOCA	*SET TAPE A	SET TAPE A
SET UNIT A	SET UNIDAE	SFIT	SADJUS
SHORTE	ACORTA	*SI	SI
SIN	SEN	SIND	SENG
SINH	SENH	*SININT	SININT
*SKIP TAPE A	SKIP TAPE A	SKIP UNIT A	SKIP UNIDAE
*SLOVEN	SLOVEN	*SMPROP	SMPROP
SOLVE	RESUEL	SONEWA	SANAVS
SORT	CLASIF	SPACE	ESPACI
*SPLIT PLOT	SPLIT PLOT	SPOLYF	SAJUSP
SQRT	RAIZCU	SQUARE	CUADRA
*SRANGE	SRANGE	SSTATI	SANEST
SSTEM LEAF	STALLO HOJA	STATIS	ANESTA

LIST OF COMMANDS. ONLY THE FIRST SIX LETTERS ARE PRINTED.

ENGLIS	ESPANO	ENGLIS	ESPANO
*STATPL	STATPL	*STDDEV	STDDEV
*STDDEV	STDDEV	STEM LEAF	TALLO HOJA
*STOP	STOP	STRUVE ONE	STRUVE UNO
STRUVE ZERO	STRUVE CERO	STWOWA	SAOVDO
SUB	SUSTRA	SUBTRA	SUSTRA
SUM	SUMA	*SUM	SUM
*SVENSK	SVENSK	*T	T
*TABLE	TABLE	TAN	TANG
TAND	TANGG	TANH	TANGH
*TAPE	TAPE	TCHEBY	VCHEBI
*TERMIN	TERMIN	TITLE1	TITUL1
TITLE2	TITUL2	TITLE3	TITUL3
TITLE4	TITUL4	TITLEX	TITULX
TITLEY	TITULY	*TWOPLO	TWOPLO
TWOWAY	ANAVDO	UCHEBY	UCHEBI
*UNIFOR	UNIFOR	UNIT	UNIDAD
*VOCABU	VOCABU	*WEIBUL	WEIBUL
WIDTH	LINE	*WRITE TAPE A	WRITE TAPE A
*WRITE TAPE Q	WRITE TAPE Q	WRITE UNIT A	WRITE UNIDAE
WRITE UNIT Q	WRITE UNIDAU	*YUGOSL	YUGOSL
ZEROS BJONE	CEROS BJUNO	ZEROS BJZERO	CEROS BJCERO
COLUMN		442 ENGLIS AND	442 ESPANO COMMANDS

ASTERISK INDICATES NO TRANSLATION OR COMMANDS ARE THE SAME.
DISTRIBUTION AND PROPERTY NAMES ARE PRINTED, BUT
NOT ALL COMBINATIONS ARE NECESSARILY VALID.
EACH COMMAND OF TABLE MAKING TWO-WORD COMMANDS IS PRINTED SEPARATELY.

A AFTER A COMMAND STANDS FOR A FORMAT OR UNIT QUALIFIER.
V AFTER A RESET COMMAND STANDS FOR A VARIABLE QUALIFIER.
Q AFTER A UNIT COMMAND STANDS FOR BOTH A UNIT AND A FORMAT QUALIFIER.

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
WIDTH 80
VOCABULARY
ESPANOL
VOCABULARY
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
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RESULTS FROM DUPLICATING 2 TIMES THE VALUES IN A 5X3 ARRAY BEGINNING IN ROW 2 COL 3. RESULTS ARE STORED BEGINNING IN ROW 2 COL 6. COLS 3-5 WERE DEFINED BY GENERATE, SET AND ADD COMMANDS. COLS 6-8 WERE DEFINED BY DUPLICATE COMMAND.

COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1.2345679	20.000000	30.000000	0.	0.	0.
2.2345679	14.000000	24.000000	2.2345679	14.000000	24.000000
3.2345679	-24.000000	-14.000000	3.2345679	-24.000000	-14.000000
4.2345679	4.0000000	14.000000	4.2345679	4.0000000	14.000000
5.2345679	5.0000000	15.000000	5.2345679	5.0000000	15.000000
6.2345679	14.000000	24.000000	6.2345679	14.000000	24.000000
7.2345679	12.000000	22.000000	2.2345679	14.000000	24.000000
8.2345679	0.	10.000000	3.2345679	-24.000000	-14.000000
9.2345679	0.	10.000000	4.2345679	4.0000000	14.000000
10.234568	0.	10.000000	5.2345679	5.0000000	15.000000
11.234568	30.000000	40.000000	6.2345679	14.000000	24.000000
12.234568	5.0000000	15.000000			
13.234568	7.0000000	17.000000			
14.234568	8.0000000	18.000000			
15.000000	-25.000000	-15.000000			

****

THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.

0.

****

 RESULTS FROM COUNT COMMAND. COL 9 CONTAINS NO. OF VALUES IN COL 4. COL 10 CONTAINS THE NO. OF VALUES IN COL 6.
 THE COUNT BEGINS AT THE FIRST NON-ZERO VALUE STARTING AT NRMAX AND GOING TO ROW ONE.

COLUMN 4	COLUMN 6	COLUMN 9	COLUMN 10
20.000000	0.	15.000000	11.000000
14.000000	2.2345679	15.000000	11.000000
-24.000000	3.2345679	15.000000	11.000000
4.0000000	4.2345679	15.000000	11.000000
5.0000000	5.2345679	15.000000	11.000000
14.000000	6.2345679	15.000000	11.000000
12.000000	2.2345679	15.000000	11.000000
0.	3.2345679	15.000000	11.000000
0.	4.2345679	15.000000	11.000000
0.	5.2345679	15.000000	11.000000
30.000000	6.2345679	15.000000	11.000000
5.0000000		15.000000	11.000000
7.0000000		15.000000	11.000000
8.0000000		15.000000	11.000000
-25.000000		15.000000	11.000000

****

THE FOLLOWING TWO NUMBERS SHOULD BE 15. AND 11.

15.000000	11.000000

****

RESULTS FROM COUNT COMMAND. COL 9 CONTAINS NO. OF VALUES IN COL 4. COL 10 CONTAINS THE NO. OF VALUES IN COL 6.
THE COUNT BEGINS AT THE FIRST NON-ZERO VALUE STARTING AT NRMAX AND GOING TO ROW ONE.
RESULTS FROM CLOSE UP COMMAND. THE VALUE 14.0 IS REMOVED FROM COL 4.
THE VALUE 30.0 IS REMOVED FROM COLUMNS 4 AND 5, AND 15. FROM COLUMN 9.

OLD COL 4	NEW COL 4	OLD COL 5	NEW COL 5	OLD COL 9	NEW COL 9
20.000000	20.000000	30.000000	24.000000	15.000000	
14.000000	-24.000000	24.000000	-14.000000	15.000000	
-24.000000	4.0000000	-14.000000	14.000000	15.000000	
4.0000000	5.0000000	14.000000	15.000000	15.000000	
5.0000000	12.000000	15.000000	24.000000	15.000000	
14.000000	0.	24.000000	22.000000	15.000000	
12.000000	0.	22.000000	10.000000	15.000000	
0.	0.	10.000000	10.000000	15.000000	
0.	5.0000000	10.000000	10.000000	15.000000	
0.	7.0000000	10.000000	40.000000	15.000000	
30.000000	8.0000000	40.000000	15.000000	15.000000	
5.0000000	-25.000000	15.000000	17.000000	15.000000	
7.0000000		17.000000	18.000000	15.000000	
8.0000000		18.000000	-15.000000	15.000000	
-25.000000		-15.000000	0.	15.000000	

****

THE FOLLOWING VALUES SHOULD BE 58. 30. AND 225.0.

58.000000	30.000000	225.00000

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE NOS. START WITH 1.23456789 IN STEPS OF 1.0 THRU 15. STORE IN COL 3

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM     0 TO   15.

SET THE FOLLOWING NUMBERS IN COLUMN 4
20.0 14.0 -24.0 4. 5. 14. 12. 0.0 0.0 0.0 30. 5. 7. 8. -25.0
ADD THE CONSTANT 10. TO COLUMN 4 AND STORE RESULT IN COL 5
DUPLICATE 2 TIMES THE ARRAY IN ROW 2 OF COL 3 SIZE 5X3 STORE IN ROW 2 OF COL 6
TITLE1 RESULTS FROM DUPLICATING 2 TIMES THE VALUES IN A 5X3 ARRAY
TITLE2BEGINNING IN ROW 2 COL 3. RESULTS ARE STORED BEGINNING IN
TITLE3ROW 2 COL 6. COLS 3-5 WERE DEFINED BY GENERATE, SET AND ADD
TITLE4COMMANDS. COLS 6-8 WERE DEFINED BY DUPLICATE COMMAND.
PRINT COLUMNS 3, 4, 5, 6, 7 AND 8
MSUB A IN ROW 2 OF COL 3 SIZE 5X3 MINUS B IN R=2, C=6 SIZE 5X3 PUT IN R=2, C=9
MSUBTRACT A IN R=7, C=6 SIZE 5X3 MINUS B IN R=2, C=3 SIZE 5X3 PUT IN R=2, C=12
SMPROPERTIES OF MATRIX IN ROW 2 OF COL 9 SIZE 5X6 STORE PROPERTIES IN COL 15
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE SHOULD BE CLOSE TO OR EQUAL TO ZERO.
SPACE
ABRIDGE ROW 11 OF COLUMN 15
SPACE
NOTE ***************************************************************************
COUNT THE LENGTH OF COLUMN 4 AND VECTORIZE COUNT IN COLUMN 9
COUNT THE LENGTH OF COLUMN 6 AND VECTORIZE COUNT IN COLUMN 10
TITLE1 RESULTS FROM COUNT COMMAND. COL 9 CONTAINS NO. OF VALUES IN
TITLE2 COL 4. COL 10 CONTAINS THE NO. OF VALUES IN COL 6.
TITLE3 THE COUNT BEGINS AT THE FIRST NON-ZERO VALUE STARTING AT NR
TITLE4MAX AND GOING TO ROW ONE.
PRINT COLUMNS 4, 6, 9 AND 10
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING TWO NUMBERS SHOULD BE 15. AND 11.
SPACE
ABRIDGE ROW 1 OF COLUMNS 9 AND 10
SPACE
NOTE ***************************************************************************
MOVE THE VECTOR IN ROW 1 OF COL 4 SIZE 15X1, STORE IN ROW 1 OF COL 11
MOVE THE VECTOR IN ROW 1 OF COL 5 SIZE 15X1, STORE IN ROW 1 OF COL 12
MOVE THE VECTOR IN ROW 1 OF COL 9 SIZE 15X1, STORE IN ROW 1 OF COL 13
CLOSE UP ROWS HAVING THE VALUE 14.0 IN COLUMN 4
CLOSE UP ROWS HAVING THE VALUE 30.0 IN COLUMNS 4 AND 5
CLOSE UP ROWS HAVING THE VALUE 15.0 IN COLUMN 9
NEW PAGE
NOTE RESULTS FROM CLOSE UP COMMAND. THE VALUE 14.0 IS REMOVED FROM COL 4.
NOTE THE VALUE 30.0 IS REMOVED FROM COLUMNS 4 AND 5, AND 15. FROM COLUMN 9.
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
FORMAT C (18A3)
READ C FORMAT, 1 LINE INTO COLS 23***40

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   15 TO    1.

    1 DATA CARD(S) READ BUT NOT LISTED
FORMAT D (4X,3A3,6X,3A3,7X,3A3,5X,3A3,7X,3A3,6X,3A3)
RESET  NRMAX 1
NPRINT D FORMAT, COLS 23***40
RESET NRMAX 15

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    1 TO   15.

SPACE
NPRINT COLUMNS 11, 4, 12, 5, 13 AND 9
SUM COLUMN 11 STORE IN COLUMN 14
SUM COLUMN 12 STORE IN COLUMN 15
SUM COLUMN 13 STORE IN COLUMN 16
SUM COLUMN  4 STORE IN COLUMN 17
SUM COLUMN  5 STORE IN COLUMN 18
SUM COLUMN  9 STORE IN COLUMN 19
SUBTRACT  COLUMN 17 FROM COLUMN 14 STORE IN COLUMN 20
SUBTRACT  COLUMN 18 FROM COLUMN 15 STORE IN COLUMN 21
SUBTRACT  COLUMN 19 FROM COLUMN 16 STORE IN COLUMN 22
SPACE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES SHOULD BE 58. 30. AND 225.0.
SPACE
ABRIDGE ROW 1 OF COLUMNS 20, 21 AND 22
SPACE
NOTE ***************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

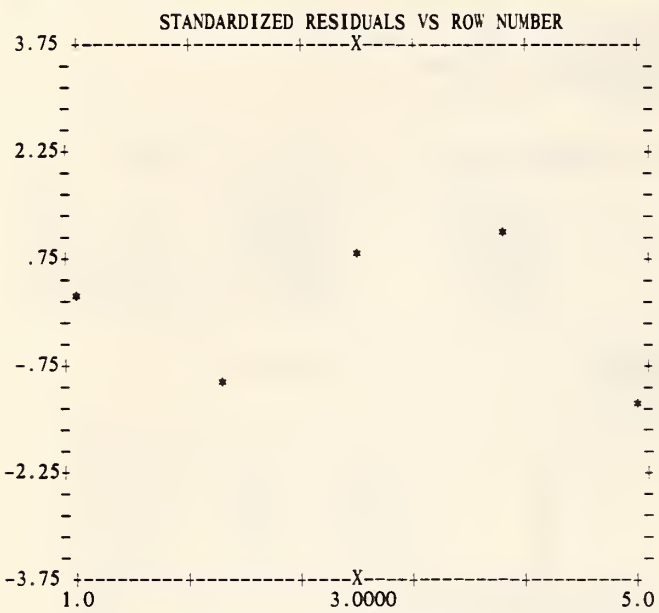
LEAST SQUARES FIT OF RESPONSE, COLUMN 37,
AS A LINEAR FUNCTION OF 2 INDEPENDENT VARIABLES IN COLUMNS 10, 11
USING 5 NON-ZERO WEIGHTS AND 0 ZERO WEIGHTS IN COLUMN 10

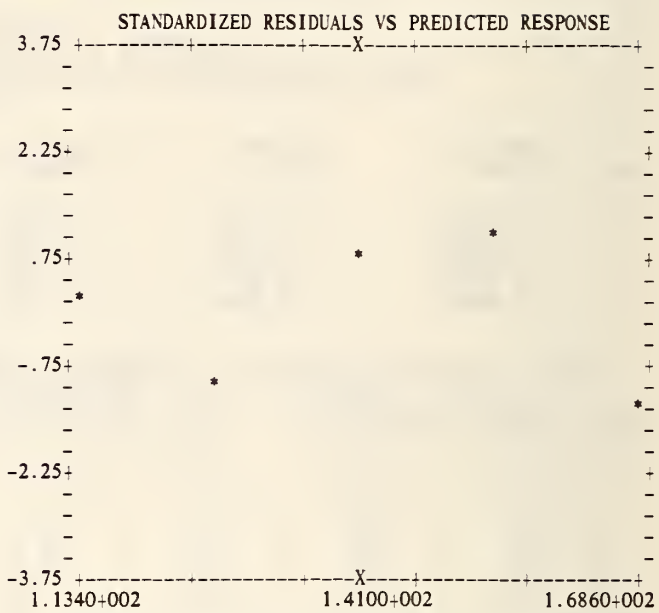
ROW	INDEP VAR. COLUMN 11	RESPONSE COLUMN 37	PREDICTED RESPONSE	STD. DEV. OF PRED. RESPONSE	RESIDUALS	STD. RES.	WEIGHTS
1	35.000000	114.00000	113.40000	2.5139610	.59999999	.29	1.000
2	45.000000	124.00000	127.20000	1.7776389	-3.2000000	-1.18	1.000
3	55.000000	143.00000	141.00000	1.4514361	2.0000000	.69	1.000
4	65.000000	158.00000	154.80000	1.7776389	3.2000000	1.18	1.000
5	75.000000	166.00000	168.60000	2.5139610	-2.6000000	-1.27	1.000

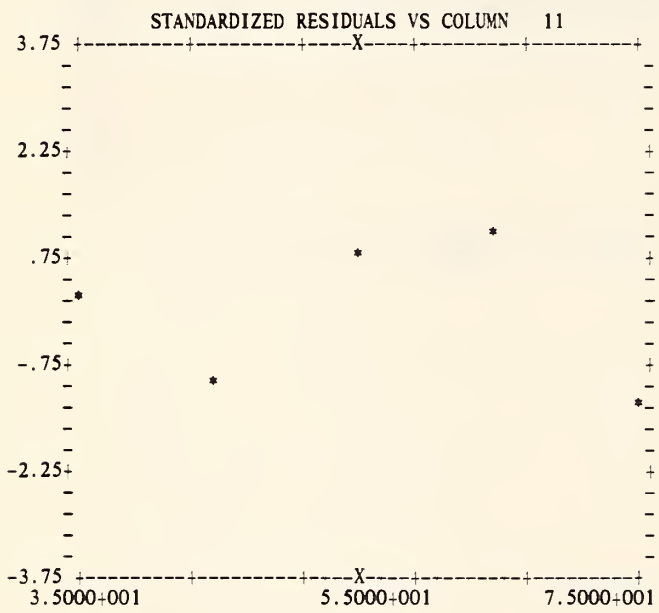
DIAGNOSTIC INFORMATION FOR IDENTIFYING INFLUENTIAL MEASUREMENTS.
I = ROW, FOR 5 LARGEST VALUES, T(I) = STANDARDIZED RESIDUAL,
H(I) = DIAGONAL OF HAT MATRIX, D(I) = COOK STATISTIC,
WSSD(I) = DANIEL-WOOD STATISTIC, V(I) = VAR(YHAT) / VAR(RESIDUAL).

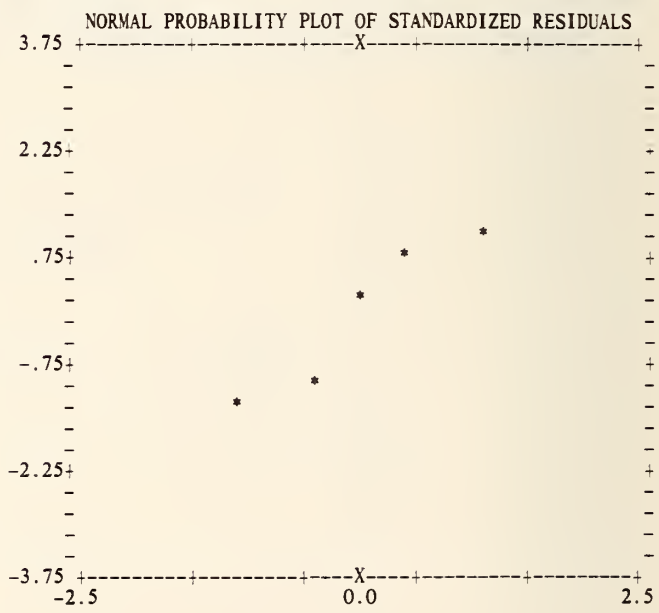
I	T(I)	I	H(I)	I	D(I)	I	WSSD(I)	I	V(I)
5	-1.27	1	.600	5	1.20	1	72.32	1	1.50
2	-1.18	5	.600	2	.30	5	72.32	5	1.50
4	1.18	2	.300	4	.30	2	18.08	2	.43
3	.69	4	.300	1	.06	4	18.08	4	.43
1	.29	3	.200	3	.06	3	.00	3	.25

THE DURBIN-WATSON STATISTIC IS D = 2.4227848


STANDARDIZED RESIDUALS VS ROW NUMBER
3.75
2.25
.75
-.75
-2.25
-3.75
1.0
3.0000
5.0


STANDARDIZED RESIDUALS VS PREDICTED RESPONSE
3.75
2.25
.75
-.75
-2.25
-3.75
1.1340+002
1.4100+002
1.6860+002


STANDARDIZED RESIDUALS VS COLUMN 11
3.75
2.25
.75
-.75
-2.25
-3.75
3.5000+001
5.5000+001
7.5000+001


NORMAL PROBABILITY PLOT OF STANDARDIZED RESIDUALS
3.75
2.25
.75
-.75
-2.25
-3.75
-2.5
0.0
2.5

LEAST SQUARES FIT OF RESPONSE, COLUMN 37,
AS A LINEAR FUNCTION OF 2 INDEPENDENT VARIABLES IN COLUMNS 10, 11
USING 5 NON-ZERO WEIGHTS AND 0 ZERO WEIGHTS IN COLUMN 10

SAMPLE VARIANCE-COVARIANCE MATRIX OF THE ESTIMATED COEFFICIENTS WITH CORRELATIONS ABOVE THE DIAGONAL.

COLUMN	10	11
10	33.969999	-.9685
11	-.57933332	.010533333

THERE ARE NO REPLICATIONS FOR A LACK OF FIT ANALYSIS OF VARIANCE.

ANALYSIS OF VARIANCE
-DEPENDENT ON ORDER INDEPENDENT VARIABLES ARE ENTERED, UNLESS VECTORS ARE ORTHOGONAL-

INDEP VAR.		SS=RED. DUE TO COEF.	CUM. RESIDUAL MS	D.F.	F(COEF=0)	P(F)	F(COEFS=0)	P(F)
COLUMN	10	99405.000	483.99999	4	9437.183	.000	4808.990	.000
COLUMN	11	1904.4000	10.533333	3	180.797	.001	180.797	.001
RESIDUAL		31.600000		3				
TOTAL		101341.00		5				

ESTIMATES FROM LEAST SQUARES FIT

INDEP VAR.		COEFFICIENT	S.D. OF COEFF.	RATIO	ACCURACY*
COLUMN	10	65.100000	5.8283788	11.17	7.83
COLUMN	11	1.3800000	.10263203	13.45	7.97

RESIDUAL STANDARD DEVIATION = 3.2455097
BASED ON DEGREES OF FREEDOM 5 - 2 = 3

*THE NUMBER OF CORRECTLY COMPUTED DIGITS IN EACH COEFFICIENT USUALLY DIFFERS BY LESS THAN 1 FROM THE NUMBER GIVEN HERE.

THE NUMBER OF ITERATIONS WAS 2. SCALING WAS NOT USED.
THE AVERAGE NUMBER OF DIGITS IN AGREEMENT BETWEEN INITIAL SOLUTION AND 1ST ITERATION IS 7.83.

****

THE EXAMPLE GIVEN ABOVE IS FROM G. W. SNEDECOR'S 'STATISTICAL METHODS',
(5TH ED., 1956), PAGES 122-126.

****

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

.00000	.00000	.00000	.00000	.00000	.00000

****

RESULTS FROM MORTHO

ORTHONORMAL VECTORS

ROW/COL	20	21
1	4.472136-001	-6.324555-001
2	4.472136-001	-3.162278-001
3	4.472136-001	-4.318716-010
4	4.472136-001	3.162278-001
5	4.472136-001	6.324555-001

TRANSFORMATION MATRIX

ROW/COL	25	26
1	.44721360	-1.7392527
2	0.	.031622776

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR .89 AND 2.0.

.89000019	2.0000000

****

SPLIT PLOT USING J. BARNES DATA.
ANALYSIS OF VARIANCE FOR SPLIT-PLOT EXPERIMENTAL DESIGN
MODEL IS Y(IJK) = MU + R(I) + W(J) + ETA(IJ) + S(K) +WS(JK) + E(IJK),
WHERE ETA AND E ARE RANDOM AND MU, W, S, AND WS ARE FIXED EFFECTS.

18 MEASUREMENTS (Y) IN COLUMN 2
2 REPLICATES (R) IN COLUMN 51
3 WHOLE-PLOTS (W) IN COLUMN 52
3 SPLIT-PLOTS (S) IN COLUMN 53

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F-RATIO	P(F)
(R) COLUMN 51	1	1.7422231	1.7422231		
(W) COLUMN 52	2	662.66779	331.33389	.005	.995
R X W INTERACTION	2	15.221115	7.6105574		
(S) COLUMN 53	2	2.6677791	1.3338895	.154	.860
W X S INTERACTION	4	23.395555	5.8488889	.676	.633
RESIDUAL	6	51.916665	8.6527774		
TOTAL	17	757.61112			

```
 BESTCP STATISTIC STUDY, PAGE 89 OF DANIEL AND WOOD.
C(P) STATISTICS FOR COLUMN    1  AS A LINEAR FUNCTION OF A CONSTANT AND
 FROM 1 UP TO  4 VARIABLES WITH  13 MEASUREMENTS WITH NONZERO WEIGHTS

VARIABLE  1 IS COLUMN   11 ,   VARIABLE  2 IS COLUMN   12 ,
VARIABLE  3 IS COLUMN   13 ,   VARIABLE  4 IS COLUMN   14

   REGRESSION WITH 1 VARIABLE

      C(P) STATISTIC  VARIABLES
           138.731        4
           142.486        2
           202.549        1
           315.154        3

   REGRESSIONS WITH  2 VARIABLES

                C(P) =   2.678
   VARIABLE      COEFFICIENT       F RATIO
       1          1.4683058        146.523
       2           .66225047       208.582

                C(P) =   5.496
   VARIABLE      COEFFICIENT       F RATIO
       1          1.4399583        108.224
       4          -.61395362       159.295

                C(P) =  22.373
   VARIABLE      COEFFICIENT       F RATIO
       3         -1.1998512         40.295
       4          -.72460013       100.357

                C(P) =  62.438
   VARIABLE      COEFFICIENT       F RATIO
       2           .73132958        36.683
       3         -1.0083862         11.816

                C(P) = 138.226
   VARIABLE      COEFFICIENT       F RATIO
       2           .31090473          .172
       4          -.45694190          .431

      C(P) STATISTIC  VARIABLES
           198.094       1  3

   REGRESSIONS WITH  3 VARIABLES

                C(P) =   3.018
   VARIABLE      COEFFICIENT       F RATIO
       1          1.4519380        154.008
       2           .41610947         5.026
       4          -.23654049         1.863

                C(P) =   3.041
   VARIABLE      COEFFICIENT       F RATIO
       1          1.6958901         68.716
       2           .65691487       220.547
       3           .25001752         1.832
```

BESTCP STATISTIC STUDY, PAGE 89 OF DANIEL AND WOOD.

C(P) = 3.497

VARIABLE	COEFFICIENT	F RATIO
1	1.0518541	22.113
3	-.41004334	4.236
4	-.64279614	208.240

C(P) = 7.337

VARIABLE	COEFFICIENT	F RATIO
2	-.92341541	12.427
3	-1.4479710	96.940
4	-1.5570444	41.654

REGRESSIONS WITH 4 VARIABLES

C(P) = 5.000

VARIABLE	COEFFICIENT	F RATIO
1	1.5510969	4.337
2	.51016177	.497
3	.10190346	.018
4	-.14406672	.041

14 REGRESSIONS 56 OPERATIONS

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SCAN  60   $    THIS WILL IGNORE ALL NUMERICS IN CARD COLS 61 AND BEYOND CARD  1
SET X IN COL 11                                                          CARD  2
35,45,55,65,75                                                           CARD  3

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    5.

SET Y IN COL 37                                                          CARD  4
114,124,143,158,166                                                      CARD  5
DEFINE 1.0 IN COLUMN 10                                                  CARD  6
SQUARE COL 11 AND STORE IN COL 12                                        CARD  7
MULTIPLY COL 11 BY COL 12 AND STORE IN COL 13                            CARD  8
SPOLYFIT Y COL 37 WT=1. DEG 1 X IN 11 STORE 20***23,1,24                 CARD  9
FIT Y IN 37 WT IN 10 2 VEC X IN 10,11 STORE 40***43,1,44                 CARD 10
MMOVE ROW 1 OF COL 40 SIZE 5X2 PUT IN ROW 1 OF COL 48
SUBTRACT COL 41 FROM COL 21 STORE IN COL 41                              CARD 11
SUBTRACT COL 42 FROM COL 22 STORE IN COL 42                              CARD 12
AVERAGE COL 41 STORE IN COL 41                                           CARD 13
AVERAGE COL 42 STORE IN COL 42                                           CARD 14
RESET NRMAX TO 16                                                        CARD 15

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    5 TO   16.

SUBTRACT COL 20 FROM COL 40 STORE IN COL 40                              CARD 16
AVERAGE COL 40 STORE IN COL 40                                           CARD 17
RESET NRMAX TO 12                                                        CARD 18

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   16 TO   12.

SUBTRACT COL 43 FROM COL 23 PUT IN COL 43                                CARD 19
AVERAGE COL 43 STORE IN COL 43                                           CARD 20
RESET NRMAX TO 8                                                         CARD 21

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   12 TO    8.

SUBTRACT COL 44 FROM COL 24 PUT IN COL 44                                CARD 22
AVERAGE COL 44 PUT IN COL 44                                             CARD 23
SUBTRACT COL 45 FROM COL 25 PUT IN COL 45                                CARD 24
AVERAGE COL 45 PUT IN COL 45                                             CARD 25
FORMAT D (1X,1P6E13.5)                                                   CARD 26
SCAN  ALL 80 COLUMNS OF EACH CARD
SPACE 2
NOTE ***************************************************************************
SPACE
NOTE THE EXAMPLE GIVEN ABOVE IS FROM G. W. SNEDECOR'S 'STATISTICAL METHODS',
NOTE (5TH ED., 1956), PAGES 122-126.
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE ***************************************************************************
NEW PAGE
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE D FORMAT, ROW 1 OF COLS 40***45
SPACE
NOTE ***************************************************************************
RESET NRMAX TO 5

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    8 TO    5.

SFIT Y IN 37 WT=1.0, 2 VECTORS IN COLS 10 AND 11, PUT IN COLS 50***53, 1, 54
MORTHO ROW 1 COL 10 SIZE 5X2 WTS=1.0 STORE ORTHO VEC IN 1,20 AND T IN 1,25
NOTE RESULTS FROM MORTHO
SPACE
NOTE  ORTHONORMAL VECTORS
SPACE
MPRINT MATRIX IN ROW 1 OF COL 20 SIZE 5X2
SPACE  2
NOTE  TRANSFORMATION MATRIX
SPACE
MPRINT MATRIX IN ROW 1 OF COL 25 SIZE 2X2
LARFIT COL 37 WTS=1. 2 VEC IN COLS 10, 11 PUT COEF IN COL 45 AND RES IN COL 46

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       THE OPTIMAL SOLUTION IS PROBABLY NOT UNIQUE.

SUBTRACT COL 45 FROM COL 48 PUT IN COL 45
SUBTRACT COL 46 FROM COL 49 PUT IN COL 46
AVERAGE COL 46 PUT IN COL 46
RESET NRMAX = 2

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    5 TO    2.

AVERAGE COL 45 PUT IN COL 45
SPACE 3
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR .89 AND 2.0.
SPACE
ABRIDGE ROW 1 OF COLS 45 AND 46
SPACE
NOTE ***************************************************************************
TITLE3 SPLIT PLOT USING J. BARNES DATA.
READ INTO COLS 1***8
78.1  77.9  1 0 0 1 0 0
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
75.2  77.0  1 0 0 1 0 0
74.0  73.3  0 1 0 1 0 0
78.0  79.6  0 1 0 1 0 0
77.5  79.2  0 0 1 1 0 0
77.6  79.5  0 0 1 1 0 0
77.6  88.5  1 0 0 0 1 0
74.0  82.1  1 0 0 0 1 0
75.2  83.0  0 1 0 0 1 0
77.5  88.1  0 1 0 0 1 0
78.0  89.0  0 0 1 0 1 0
78.1  86.3  0 0 1 0 1 0
78.0  73.2  1 0 0 0 0 1
77.5  72.3  1 0 0 0 0 1
77.6  72.9  0 1 0 0 0 1
78.1  70.6  0 1 0 0 0 1
75.2  71.6  0 0 1 0 0 1
74.0  67.5  0 0 1 0 0 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    2 TO   18.

SET REP NUMBER IN COLUMN 51
 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2
SET WHOLE PLOT TREATMENT NUMBER IN COLUMN 52
 1 1 1 1 1 1 2 2 2 2 2 2 3 3 3 3 3 3
SET SPLITPLOT TREATMENT NUMBER IN COLUMN 53
 1 1 2 2 3 3 1 1 2 2 3 3 1 1 2 2 3 3
SPLIT PLOT COL 2 PUT REP NOS IN COL 51 WHOLE PLOT NO IN COL 52 SPLIT PLOT NOS 53
TITLE3 BESTCP STATISTIC STUDY, PAGE 89 OF DANIEL AND WOOD.
READ DATA INTO COLUMNS 11, 12, 13, 14 AND 1
 7 26  6 60  78.5
 1 29 15 52  74.3
11 56  8 20 104.3
11 31  8 47  87.6
 7 52  6 33  95.9
11 55  9 22 109.2
 3 71 17  6 102.7
 1 31 22 44  72.5
 2 54 18 22  93.1
21 47  4 26 115.9
 1 40 23 34  83.8
11 66  9 12 113.3
10 68  8 12 109.4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   18 TO   13.

DEFINE 1.0 INTO COLUMN 10
BESTCP Y IN COL 1, WTS=1.0, FOR 5 VARIABLES IN COLS 10***14
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

DEGREE	ORDINATES	COEF
0.	149.00000	* 1.6716667+02
15.000000	137.00000	*-1.9983119+01
30.000000	128.00000	-3.4098809
45.000000	126.00000	5.4706860
60.000000	128.00000	-1.2916662
75.000000	135.00000	.24975916
90.000000	159.00000	.74999954
105.00000	178.00000	.30921129
120.00000	189.00000	.45833445
135.00000	191.00000	-.30401961
150.00000	189.00000	-.090117931
165.00000	187.00000	-.24252383
180.00000	178.00000	-.083333333
195.00000	170.00000	*-1.2779225+01
210.00000	177.00000	*-1.6624567+01
225.00000	183.00000	-.32322375
240.00000	181.00000	1.5155446
255.00000	179.00000	1.4616947
270.00000	179.00000	-2.5833335
285.00000	185.00000	.32216867
300.00000	182.00000	-.21650584
315.00000	176.00000	.67678118
330.00000	166.00000	-.45876074
345.00000	160.00000	-.63970299

ABOVE PROBLEM IS EXAMPLE FROM J.B. SCARBOROUGH,
NUMERICAL MATHEMATICAL ANALYSIS (2ND ED.,1950) PAGES 490-491.

****

VALUE IN THE NEXT ROW MUST BE EQUAL TO OR NEAR ZERO.

-8.735030-007

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
SET DATA IN COL 1
149 137 128 126 128 135 159 178 189 191
189 187 178 170 177 183 181 179 179 185
182 176 166 160

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO   24.

HARMONIC ANALYSIS OF POINTS COL 1 FOR 24 ORDINATES AND PUT RESULTS IN COL 2
GENERATE FROM 0. IN STEPS OF 15. THRU 345. AND PUT IN COL 3
HEAD 3/   DEGREE
HEAD 1/   ORDINATES
HEAD 2/   COEF
PRINT 3  1  2
SPACE
NOTE ABOVE PROBLEM IS EXAMPLE FROM J.B. SCARBOROUGH,
NOTE NUMERICAL MATHEMATICAL ANALYSIS (2ND ED.,1950) PAGES 490-491.
 $ READ FOLLOWING DATA INTO COL 11 DATA WILL NOT BE LISTED
NO LIST
 $''LIST'' COMMAND IS USED TO LIST THE FOLLOWING COMMANDS BUT DOES NOT
 $APPEAR ITSELF IN THIS PRINTOUT.
SUBTRACT COL 11 FROM COL 2 STORE IN COL 11
AVERAGE COL 11 STORE IN COL 11
SPACE 2
NOTE ********************************************************************************
SPACE
NOTE  VALUE IN THE NEXT ROW MUST BE EQUAL TO OR NEAR ZERO.
SPACE
FORMAT  A  (30X,1PE16.6)
ABRIDGE A FORMAT, ROW 1 OF COL 11
SPACE
NOTE ********************************************************************************
```

NATIONAL BUREAU OF STANDARDS. WASHINGTON, D. C. 20234
OMNITAB 80 VERSION 6.00 MARCH 2, 1981

MATRIX TO BE INVERTED.

2.	-1.	0.	0.	0.	0.	0.	0.	0.	0.
-1.	2.	-1.	0.	0.	0.	0.	0.	0.	0.
0.	-1.	2.	-1.	0.	0.	0.	0.	0.	0.
0.	0.	-1.	2.	-1.	0.	0.	0.	0.	0.
0.	0.	0.	-1.	2.	-1.	0.	0.	0.	0.
0.	0.	0.	0.	-1.	2.	-1.	0.	0.	0.
0.	0.	0.	0.	0.	-1.	2.	-1.	0.	0.
0.	0.	0.	0.	0.	0.	-1.	2.	-1.	0.
0.	0.	0.	0.	0.	0.	0.	-1.	2.	-1.
0.	0.	0.	0.	0.	0.	0.	0.	-1.	2.

INVERSE OF MATRIX.

.90909091	.81818181	.72727273	.63636363	.54545454	.45454545	.36363636	.27272727	.18181818	.09090909
.81818181	1.63636363	1.45454545	1.27272727	1.09090908	.90909091	.72727273	.54545454	.36363636	.18181818
.72727273	1.45454545	2.18181816	1.90909091	1.63636363	1.36363636	1.09090908	.81818181	.54545454	.27272727
.63636363	1.27272727	1.90909091	2.54545453	2.18181816	1.81818181	1.45454545	1.09090908	.72727273	.36363636
.54545454	1.09090908	1.63636363	2.18181816	2.72727272	2.27272725	1.81818181	1.36363636	.90909091	.45454545
.45454545	.90909091	1.36363636	1.81818181	2.27272725	2.72727272	2.18181816	1.63636363	1.09090908	.54545454
.36363636	.72727273	1.09090908	1.45454545	1.81818181	2.18181816	2.54545453	1.90909091	1.27272727	.63636363
.27272727	.54545454	.81818181	1.09090908	1.36363636	1.63636363	1.90909091	2.18181816	1.45454545	.72727273
.18181818	.36363636	.54545454	.72727273	.90909091	1.09090908	1.27272727	1.45454545	1.63636363	.81818181
.09090909	.18181818	.27272727	.36363636	.45454545	.54545454	.63636363	.72727273	.81818181	.90909091

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

****

SOLVE AX = Y

MATRIX A										X .	Y
2.	-1.	0.	0.	0.	0.	0.	0.	0.	0.	9.9999999-000	.5
-1.	2.	-1.	0.	0.	0.	0.	0.	0.	0.	1.9500000-001	1.0
0.	-1.	2.	-1.	0.	0.	0.	0.	0.	0.	2.8000000-001	1.5
0.	0.	-1.	2.	-1.	0.	0.	0.	0.	0.	3.5000000-001	2.0
0.	0.	0.	-1.	2.	-1.	0.	0.	0.	0.	4.0000000-001	2.5
0.	0.	0.	0.	-1.	2.	-1.	0.	0.	0.	4.2500000-001	3.0
0.	0.	0.	0.	0.	-1.	2.	-1.	0.	0.	4.2000000-001	3.5
0.	0.	0.	0.	0.	0.	-1.	2.	-1.	0.	3.8000000-001	4.0
0.	0.	0.	0.	0.	0.	0.	-1.	2.	-1.	3.0000000-001	4.5
0.	0.	0.	0.	0.	0.	0.	0.	-1.	2.	1.7500000-001	5.0

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

MATRIX TO BE INVERTED.

ROW/COL	2	3	4	5	6	7
1	27720.0	13860.0	9240.0	6930.0	5544.0	4620.0
2	13860.0	9240.0	6930.0	5544.0	4620.0	3960.0
3	9240.0	6930.0	5544.0	4620.0	3960.0	3465.0
4	6930.0	5544.0	4620.0	3960.0	3465.0	3080.0
5	5544.0	4620.0	3960.0	3465.0	3080.0	2772.0
6	4620.0	3960.0	3465.0	3080.0	2772.0	2520.0

THE ABOVE MATRIX IS 27720.0 TIMES THE HILBERT MATRIX OF ORDER 6.

INVERSE OF MATRIX.

ROW/COL	2	3	4	5	6	7
7	1.298701-003	-2.272727-002	1.212121-001	-2.727273-001	2.727273-001	-1.000000-001
8	-2.272727-002	5.303030-001	-3.181818+000	7.636364+000	-7.954545+000	3.000000+000
9	1.212121-001	-3.181818+000	2.036364+001	-5.090909+001	5.454545+001	-2.100000+001
10	-2.727273-001	7.636364+000	-5.090909+001	1.309091+002	-1.431818+002	5.600000+001
11	2.727273-001	-7.954545+000	5.454545+001	-1.431818+002	1.590909+002	-6.300000+001
12	-1.000000-001	3.000000+000	-2.100000+001	5.600000+001	-6.300000+001	2.520000+001

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.
HOWEVER IN INVERTING THE MATRIX A, SOME SIGNIFICANCE IS LOST.
IF DONE IN DOUBLE PRECISION OR ON MACHINE WHICH HAS MORE THAN 8
SIGNIFICANT DIGITS, BETTER RESULTS WILL BE OBTAINED.

1.0000044 1.0001724 1.0119752 .98724808 .98523353 1.0009356

****

SOLVE AX = Y

MATRIX A						X	Y
27720.	13860.	9240.	6930.	5544.	4620.	-7.7922078-003	1.
13860.	9240.	6930.	5544.	4620.	3960.	2.6515152-001	2.
9240.	6930.	5544.	4620.	3960.	3465.	-2.0606061+000	3.
6930.	5544.	4620.	3960.	3465.	3080.	6.0000000-000	4.
5544.	4620.	3960.	3465.	3080.	2772.	-7.2727273-000	5.
4620.	3960.	3465.	3080.	2772.	2520.	3.1000000+000	6.

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
HOWEVER IN INVERTING THE MATRIX A, SOME SIGNIFICANCE IS LOST.
IF DONE IN DOUBLE PRECISION OR ON MACHINE WHICH HAS MORE THAN 8
SIGNIFICANT DIGITS, BETTER RESULTS WILL BE OBTAINED.

* 7.4212749-05

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ MATRIX DATA IN COLS 1, 2, 3, 4, 5, 6, 7, 8, 9 AND 10
 2. -1.  0.  0.  0.  0.  0.  0.  0.
-1.  2. -1.  0.  0.  0.  0.  0.  0.
 0. -1.  2. -1.  0.  0.  0.  0.  0.
 0.  0. -1.  2. -1.  0.  0.  0.  0.
 0.  0.  0. -1.  2. -1.  0.  0.  0.
 0.  0.  0.  0. -1.  2. -1.  0.  0.
 0.  0.  0.  0.  0. -1.  2. -1.  0.
 0.  0.  0.  0.  0.  0. -1.  2. -1.
 0.  0.  0.  0.  0.  0.  0. -1.  2.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   10.

MINVERT MATRIX A IN ROW 1 COL 1 SIZE 10X10 PUT INVERT MATRIX B IN ROW 1 COL 11
 ++++ SMALLEST ERROR BOUND ON INVERTED MATRIX IS  .2-005
NEW PAGE
FORMAT D (10F12.0)
NOTE  MATRIX TO BE INVERTED.
SPACE
MPRINT D FORMAT, MATRIX A IN ROW 1 OF COL 1 SIZE 10X10
SPACE 2
NOTE  INVERSE OF MATRIX.
SPACE
FORMAT B (10F12.8)
MPRINT B FORMAT, MATRIX B IN ROW 1 OF COL 11 SIZE 10X10
MMULT A IN R=1 C=1 SIZE 10X10 BY B IN R=1 C=11 SIZE 10X10 PUT IN R=1 C=21
1/SUM COL 21 STORE IN COL 21
2/ INCREMENT INSTRUCTION 1 BY 1 AND 1
REPEAT 1 THRU 2, 10 TIMES
SPACE  2
NOTE1*************************************************************
NOTE2*********************************************
PRINT NOTE
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.
SPACE
FORMAT C (5X,10F10.2)
ABRIDGE C FORMAT, ROW 1 OF COLS 21***30
SPACE
PRINT NOTE
GENERATE Y FROM .5 IN STEPS OF .5 THRU 5. PUT IN COL 12
SOLVE AX=Y, A IN ROW 1 OF COL 1 SIZE 10X10 Y IN COL 12 STORE X IN COL 11
 ++++ SMALLEST ERROR BOUND ON INVERTED MATRIX IS  .2-005
NEW PAGE
NOTE                                          SOLVE  AX = Y
SPACE
NOTE                     MATRIX A                            X         Y
SPACE
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
FORMAT A(10F5.0,1PE15.7,0PF5.1)
APRINT A FORMAT, ARRAY IN ROW 1 OF COL 1 SIZE 10X12
M(AV) MULT MATRIX A IN ROW 1 COL 1 SIZE 10X10 BY VECTOR IN COL 11 PUT IN COL 13
SUBTRACT COL 13 FROM COL 12 STORE IN COL 13
AVERAGE COL 13 STORE IN COL 13
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COL 10
SPACE
NOTE ***************************************************************************
RESET NRMAX TO 0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM   10 TO    0.

READ MATRIX DATA STARTING IN FIRST ROW OF 2, 3, 4, 5, 6 AND 7
27720.  13860.  9240.  6930.  5544.  4620.
13860.   9240.  6930.  5544.  4620.  3960.
9240.   6930.  5544.  4620.  3960.  3465.
6930.   5544.  4620.  3960.  3465.  3080.
5544.   4620.  3960.  3465.  3080.  2772.
4620.   3960.  3465.  3080.  2772.  2520.

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    6.

INVERT MATRIX A IN ROW 1 OF COL 2 SIZE 6X6 STORE IN MATRIX B IN ROW 7 OF COL 2
 ++++ SMALLEST ERROR BOUND ON INVERTED MATRIX IS  .7+001
SET IN COL 9 THE FOLLOWING DATA
1.    2.    3.    4.    5.    6.
NEW PAGE
FIXED PRINT DATA WITH 1 DECIMAL DIGIT
NOTE  MATRIX TO BE INVERTED.
SPACE
MPRINT MATRIX A IN ROW 1 OF COL 2 SIZE 6X6
SPACE  2
NOTE THE ABOVE MATRIX IS 27720.0 TIMES THE HILBERT MATRIX OF ORDER 6.
SPACE 2
NOTE  INVERSE OF MATRIX.
SPACE
FLEXIBLE PRINT WITH FULL SIGNIFICANT DIGITS
MPRINT MATRIX B IN ROW 7 OF COL 2 SIZE 6X6
MMULT MATRIX IN R=1 C=2 SIZE 6X6 BY MATRIX IN R=7 C=2 SIZE 6X6 PUT IN R=1 C=15
1/ SUM COL 15 STORE IN COL 15
2/ INCREMENT STATEMENT 1 BY 1 AND 1
REPEAT 1 THRU 2, 6 TIMES
SPACE  2
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE2******************************
PRINT NOTE
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ONE.
NOTE HOWEVER IN INVERTING THE MATRIX A, SOME SIGNIFICANCE IS LOST.
NOTE IF DONE IN DOUBLE PRECISION OR ON MACHINE WHICH HAS MORE THAN 8
NOTE SIGNIFICANT DIGITS, BETTER RESULTS WILL BE OBTAINED.
SPACE
ABRIDGE ROW 1 OF COLS 15 *** 20
SPACE
PRINT NOTE
SOLVE AX=Y, A IN ROW 1 OF COL 2 SIZE 6X6 Y IN COL 9 STORE X IN COL 8
 ++++ SMALLEST ERROR BOUND ON INVERTED MATRIX IS  .7+001
NEW PAGE
NOTE                                          SOLVE  AX = Y
SPACE
NOTE                    ,   MATRIX A                  X            Y
SPACE
FORMAT E(6F7.0,1PE15.7,0PF5.0)
APRINT E FORMAT, ARRAY IN ROW 1 OF COL 2 SIZE 6X8
M(AV) MULT MATRIX A IN ROW 1 OF COL 2 SIZE 6X6 BY VECTOR IN COL 8 PUT IN COL 10
SUBTRACT COL 10 FROM COL 9 STORE IN COL 10
AVERAGE COL 10  STORE IN COL 10
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
NOTE HOWEVER IN INVERTING THE MATRIX A, SOME SIGNIFICANCE IS LOST.
NOTE IF DONE IN DOUBLE PRECISION OR ON MACHINE WHICH HAS MORE THAN 8
NOTE SIGNIFICANT DIGITS, BETTER RESULTS WILL BE OBTAINED.
SPACE
ABRIDGE ROW 1 OF COL 10
SPACE
NOTE ***************************************************************************
```

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```
THIS IS A TEST ON THE BRANCH COMMANDS.
THUS THE OUTPUT MUST BE AS FOLLOWS.

********************************************************************************

BECAUSE THE IFGT CONDITION IS TRUE, REPEAT MODE IS TERMINATED
AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
 THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO 25.
          25.0

********************************************************************************


********************************************************************************

BECAUSE THE IFGE CONDITION IS TRUE, REPEAT MODE IS TERMINATED
AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
 THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO 25.
          25.0

********************************************************************************


********************************************************************************

BECAUSE THE IFLT CONDITION IS TRUE, REPEAT MODE IS TERMINATED
AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
 THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO 25.
          25.0

********************************************************************************


********************************************************************************

BECAUSE THE IFLE CONDITION IS TRUE, REPEAT MODE IS TERMINATED
AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
 THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO 25.
          25.0

********************************************************************************


********************************************************************************

BECAUSE THE COMPARE CONDITION IS TRUE, REPEAT MODE IS TERMINATED
AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
 THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO 25.
          25.0

********************************************************************************
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE X FROM 0.0 IN STEPS OF 10.0 THRU 50. IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    6.

ADD COL 1 TO 0.0 STORE IN COL 2
FORMAT F (50H  THE FOLLOWING VALUE MUST BE NEAR OR EQUAL TO 25./10X,F5.1)
1/ AVERAGE COL 2 STORE IN COL 10
2/ IFGT IF COL 10 IS GREATER THAN 27.0 STOP REPEAT MODE
3/ NULL OTHERWISE CONTINUE
4/ ABRIDGE F FORMAT, ROW 1 OF COL 10
5/ ADD 10.0 TO COL 2 STORE IN COL 2
10/ ADD 0.0 TO COL 1 STORE IN COL 2
NEW PAGE
NOTE THIS IS A TEST ON THE BRANCH COMMANDS.
NOTE THUS THE OUTPUT MUST BE AS FOLLOWS.
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE BECAUSE THE IFGT CONDITION IS TRUE, REPEAT MODE IS TERMINATED
NOTE AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
REPEAT INSTRUCTION 10 THRU 10, 1 TIME
REPEAT INSTRUCTIONS 1 THRU 5, 3 TIMES
SPACE
NOTE ***************************************************************************
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE BECAUSE THE IFGE CONDITION IS TRUE, REPEAT MODE IS TERMINATED
NOTE AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
2/IFGE  IF COL 10 IS GREATER THAN OR EQUAL TO 30.0 STOP REPEAT MODE
REPEAT INSTRUCTION 10 THRU 10, 1 TIME
REPEAT INSTRUCTIONS 1 THRU 5, 3 TIMES
SPACE
NOTE ***************************************************************************
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE BECAUSE THE IFLT CONDITION IS TRUE, REPEAT MODE IS TERMINATED
NOTE AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
2/IFLT  IF 27.0 IS LESS THAN ALL VALUES OF COL 10 STOP REPEAT MODE
REPEAT INSTRUCTION 10 THRU 10, 1 TIME
REPEAT INSTRUCTIONS 1 THRU 5, 3 TIMES
SPACE
NOTE ***************************************************************************
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE BECAUSE THE IFLE CONDITION IS TRUE, REPEAT MODE IS TERMINATED
NOTE AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
2/IFLE  IF 30.0 IS LESS THAN OR EQUAL TO ALL VALUES IN COL 10 STOP REPEAT MODE
REPEAT INSTRUCTION 10 THRU 10, 1 TIME
REPEAT INSTRUCTIONS 1 THRU 5, 3 TIMES
SPACE
NOTE ***************************************************************************
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE BECAUSE THE COMPARE CONDITION IS TRUE, REPEAT MODE IS TERMINATED
NOTE AND THE FOLLOWING STATEMENT IS PRINTED ONLY ONCE.
2/ COMPARE COL 10 WITH VALUE 35. RELATIVE ERROR OF  91E-3
REPEAT INSTRUCTION 10 THRU 10, 1 TIME
REPEAT INSTRUCTIONS 1 THRU 5, 3 TIMES
SPACE
NOTE ***************************************************************************
```

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OMNITAB 80 TEST F6 ARRAY AND MATRIX INSTRUCTIONS. (10.1), (10.2), (11.1), (11.3) PAGE 1
THE FOLLOWING IS AN EXAMPLE OF THE MKRONECKER COMMAND. MATRIX A WAS DEFINED BY MDEFINE. MATRIX B WAS DEFINED BY THE MDIAGONAL, MADD, AND AERASE COMMANDS. MATRIX C WAS DEFINED BY THE MKRONECKER COMMAND.

MATRIX A		MATRIX B		MATRIX C			
2.0000000	2.0000000	3.0000000	2.0000000	6.0000000	4.0000000	6.0000000	4.0000000
2.0000000	2.0000000	2.0000000		4.0000000	0.	4.0000000	0.
0.	0.	0.		6.0000000	4.0000000	6.0000000	4.0000000
0.	0.	0.		4.0000000	0.	4.0000000	0.

ARRAYS

A		B		D=A*B		E=-2*B	
2.00	2.00	3.00	2.00	6.00	4.00	-6.00	-4.00
2.00	2.00	2.00	.00	4.00	.00	-4.00	.00

ARRAYS

F=D+E		G=A**2		H=-2*A		I=G/H	
.00	.00	4.00	4.00	-4.00	-4.00	-1.00	-1.00
.00	.00	4.00	4.00	-4.00	-4.00	-1.00	-1.00

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
MDEFINE EVERY ELEMENT OF MATRIX A IN ROW 1 COL 1 SIZE 2X2 WITH THE VALUE OF 2.0
MDIAGONAL THE DIAGONAL OF MATRIX B IN ROW 1 OF COL 3, SIZE 2X2, IS SET = 1.0
MADD ADD MAT A IN R=1 C=1 SIZE 2X2 TO MATRIX B R=1 C=3 SIZE 2X2 PUT IN R=1 C=3
AERASE ERASE ALL ELEMENTS OF MATRIX B IN ROW 2 OF COL 4 SIZE 1X1
MKRONE KRONECKER PROD OF A R=1 C=1 SIZE 2X2 BY B R=1 C=3 SIZE 2X2 INTO C R=1 C=5
RESET NRMAX TO 4

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    4.

TITLE1 THE FOLLOWING IS AN EXAMPLE OF THE MKRONECKER COMMAND. MATR
TITLE2IX A WAS DEFINED BY MDEFINE.  MATRIX B WAS DEFINED BY THE
TITLE3 MDIAGONAL, MADD, AND AERASE COMMANDS. MATRIX C WAS DEFINED
TITLE4BY THE MKRONECKER COMMAND.
HEAD COL  1/   MATRIX A
HEAD COL  2/
HEAD COL  3/   MATRIX B
HEAD COL  4/
HEAD COL  5/   MATRIX C
HEAD COL  6/
HEAD COL  7/
HEAD COL  8/
PRINT COLS 1***8
AMULT MULTIPLY ARRAY IN A R=1 C=1 SIZE 2X2 BY ARRAY IN B R=1 C=3 PUT IN R=1 C=9
MSCALAR MULTIPLY MATRIX B R=1 C=3 SIZE 2X2 BY THE SCALER = -2.0 PUT IN R=1 C=11
AADD ADD ARRAY IN R=1 C=9 SIZE 2X2 TO ARRAY IN R=1 C=11 SIZE 2X2 PUT IN R=1 C=13
ARAISE EVERY TERM OF ARRAY IN R=1 C=1 SIZE 2X2 BY THE POWER 2.0 PUT IN R=1 C=15
MSCALAR MULTIPLY MATRIX R=1 C=1 SIZE 2X2 BY THE SCALER = -2.0 PUT IN R=1 C=17
ADIVIDE DIVIDE ARRAY IN R=1 C=15 SIZE 2X2 BY ARRAY IN R=1 C=17 PUT IN R=1 C=19
AMULTIPLY ARRAY B ROW 1 COL 3 SIZE 2X2 BY THE VALUE 2.0 PUT IN ROW 1 COL 21
ADEFINE EVERY TERM OF ARRAY J IN ROW 1 COL 23 SIZE 2X2 IS SET = 1.0
ADIV DIVIDE ARRAY E IN R=1 C=11 SIZE 2X2 BY ARRAY J IN R=1 C=21 PUT IN R=1 C=25
SPACE 2
RESET NRMAX EQUAL TO 2

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    4 TO    2.

NOTE ARRAYS
SPACE
NOTE     A                   B                   D=A*B               E=-2*B
SPACE
FORMAT C (8F10.2)
NPRINT C FORMAT, COLUMNS 1, 2, 3, 4, 9, 10, 11 AND 12
SPACE 2
NOTE ARRAYS
SPACE
NOTE      F=D-E              G=A**2              H=-2*A               I=G/H
SPACE
FORMAT B (8F10.2)
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NPRINT B FORMAT, COLUMNS 13***20
ROWSUM COLUMNS 13***26 AND STORE IN COLUMN 27
SET THE FOLLOWING VALUES IN COLUMN 28
8.0 3.0
SUBTRACT COLUMN 27 FROM COLUMN 28 AND STORE IN COLUMN 28
AVERAGE COLUMN 28 AND STORE IN COLUMN 27
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1  COLUMN 27
SPACE
NOTE ***************************************************************************
```

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OMNITAB 80 TEST F7 MATRIX INSTRUCTIONS M(AD), M(DA) AND M(V'A). (11.4) PAGE 1
THE FOLLOWING IS AN EXAMPLE OF M(AD) M(DA) AND M(V'A).

MATRIX A

ROW/COL	1	2	3
1	1.00	6.00	3.00
2	2.00	3.00	2.00
3	3.00	-1.00	1.00

MATRIX B DIAGONAL OF MATRIX B

ROW/COL	4	5	6	7
1	3.00	.00	.00	3.00
2	.00	-2.00	.00	-2.00
3	.00	.00	1.00	1.00

MATRIX C=MATRIX A TIMES THE DIAGONAL OF MATRIX B. COMMAND IS M(AD).

ROW/COL	8	9	10
1	3.00	-12.00	3.00
2	6.00	-6.00	2.00
3	9.00	2.00	1.00

MATRIX D=DIAGONAL OF MATRIX B TIMES MATRIX A. COMMAND IS M(DA).

ROW/COL	11	12	13
1	3.00	18.00	9.00
2	-4.00	-6.00	-4.00
3	3.00	-1.00	1.00

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

.00

****

VECTOR V		MATRIX A		VECTOR V TIMES MATRIX A		
1.00	1.00	6.00	3.00	-1.00	3.00	1.00
-1.00	2.00	3.00	2.00	.00	.00	.00
.00	3.00	-1.00	1.00	.00	.00	.00

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

.00

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ THE FOLLOWING DATA INTO COLUMNS 1***7
1.0  6.0  3.0   3.0   0.0   0.0   3.0
2.0  3.0  2.0   0.0  -2.0   0.0  -2.0
3.0 -1.0  1.0   0.0   0.0   1.0   1.0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    3.

M(AD) POST MULT A IN R=1 C=1 SIZE 3X3 WITH D WHOSE DIAG IS IN COL 7 PUT R=1 C= 8
M(DA) PRE MULT A IN R=1 C=1 SIZE 3X3 WITH D WHOSE DIAG IS IN COL 7 PUT R=1 C= 11
TITLE1 THE FOLLOWING IS AN EXAMPLE OF M(AD) M(DA) AND M(V'A).
NEW PAGE
SPACE
NOTE MATRIX A
FIXED PRINT DATA WIHT 2 DECIMAL DIGITS
MPRINT MATRIX IN ROW 1 OF COL 1 SIZE 3X3
SPACE  2
NOTE MATRIX B                                                  DIAGONAL OF MATRIX B
MPRINT MATRIX IN ROW 1 OF COL 4 SIZE 3X4
SPACE   2
NOTE MATRIX C=MATRIX A TIMES THE DIAGONAL OF MATRIX B. COMMAND IS M(AD).
MPRINT MATRIX C IN ROW 1 OF COL 8 SIZE 3X3
SPACE 2
NOTE MATRIX D=DIAGONAL OF MATRIX B TIMES MATRIX A. COMMAND IS M(DA).
MPRINT MATRIX D IN ROW 1 OF COL 11 SIZE 3X3
MMULT MULTIPLY A IN R=1 C=1 SIZE 3X3 BY B IN R=1 C=4 SIZE 3X3 PUT IN R=1 C=14
MMULTIPLY B IN R=1 C=4 SIZE 3X3 BY A IN R=1 C=1 SIZE 3X3 PUT IN R=1 C=17
MSUB MATRIX IN R=1 C=8 SIZE 3X3 MINUS MATRIX IN R=1 C=14 SIZE 3X3 PUT IN 1,20
MSUB MATRIX IN R=1 C=11 SIZE 3X3 MINUS MATRIX IN R=1 C=17 SIZE 3X3 PUT IN 1,23
ROWSUM COLUMNS 20***25 AND STORE IN COLUMN 26
AVERAGE COLUMN 26 AND STORE IN COLUMN 26
SPACE  2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 26
SPACE
NOTE ********************************************************************************
SET THE FOLLOWING VALUES IN COLUMN 27
1.0  -1.0  0.0
M(V'A) PRE MULT A IN R=1 C=1 SIZE 3X3 BY TRANS OF V IN COL 27 PUT IN R=1 C=28
SPACE
NOTE VECTOR V         MATRIX A          VECTOR V TIMES MATRIX A
FORMAT C (F8.2,6F8.2)
NPRINT C FORMAT, COLUMNS 27, 1, 2, 3, 28, 29 AND 30
SPACE
ROWSUM COLUMNS 28, 29 AND 30 AND STORE IN COLUMN 31
SUB  3.0 FROM COLUMN 31 AND STORE IN COLUMN 32
SPACE  2
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NOTE **************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1  OF COLUMN 32
SPACE
NOTE **************************************************************************
```

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THE FOLLOWING IS AN EXAMPLE OF M(XAX') AND M(X'AX).

MATRIX A

1.00	3.00	
2.00	-4.00	
.00	.00	

MATRIX X

-2.00	.00		
-1.00	5.00		
3.00	1.00		

MATRIX X'

-2.00	-2.00	-1.00	3.00
.00	.00	5.00	1.00
.00	-2.00	.00	.00

MATRIX B=XAX'
(X IS 3 BY 2, A IS 2 BY 2)

4.0000000	-28.000000	-12.000000
-18.000000	-124.00000	4.0000000
-10.000000	20.000000	20.000000

MATRIX C=X'AX
(X IS 2 BY 3, A IS 2 BY 2)

10.000000	-10.000000	8.0000000
0.	-100.00000	-20.000000
10.000000	-30.000000	4.0000000

****

THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.

0.

****

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
DIM DIMENSION WORKSHEET SIZE 3 ROWS BY 26 COLUMNS
READ MATRIX A INTO COLS 13 AND 14, MATRIX X INTO 15***17, X TRANSPOSE IN 18***20
1.0  3.0  -2.0  0.0   -2.0   -2.0  -1.0  3.0
2.0 -4.0  -1.0  5.0    0.0    0.0   5.0  1.0
0.0  0.0   3.0  1.0    0.0   -2.0   0.0  0.0

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO    3.

M(XAX') PREMULT A (1,13) SIZE 2X2 BY X (1,15) SIZE 3X2 POST MULT BY X' STORE 1,1
M(X'AX) PREMULT A (1,13) SIZE 2X2 BY X' (1,15) SIZE 2X3 POST MULT BY X STORE 1,4
MMULT X IN ROW 1 COL 15 SIZE 3X2 BY A ROW 1 COL 13 SIZE 2X2 PUT IN ROW 1 COL 21
MMULT XA IN R=1 C=21 SIZE 3X2 BY TRANS OF X IN R=1 C=18 SIZE 2X3 PUT IN R=1 C=21
MMULT TRANS OF X IN R=1 C=18 SIZE 3X2 BY A IN R=1 C=13 SIZE 2X2 PUT IN R=1 C=24
MMULT X'A IN R=1 C=24 SIZE 3X2 BY X IN R=1 C=15 SIZE 2X3 PUT IN R=1 C=24
MSCALAR MULTIPLY THE ARRAY IN ROW 1 COL 21 SIZE 3X6 BY -1.0 PUT IN ROW 1 COL 7
TITLE1 THE FOLLOWING IS AN EXAMPLE OF M(XAX') AND M(X'AX).
NEW PAGE
SPACE
NOTE MATRIX A        MATRIX X                MATRIX X'
SPACE
FORMAT D (8F8.2)
NPRINT D FORMAT, COLUMNS 13***20
SPACE
NOTE MATRIX B=XAX'                                   MATRIX C=X'AX
NOTE (X IS 3 BY 2, A IS 2 BY 2)                      (X IS 2 BY 3, A IS 2 BY 2)
SPACE  2
NPRINT COLUMNS 1***6
DIMENSION NROW=3 NCOL=12
ROWSUM THE ENTIRE WORKSHEET AND PUT IN COLUMN 1
AVERAGE COLUMN 1 AND STORE IN COLUMN 1
SPACE  2
NOTE ***************************************************************************
SPACE
NOTE THE FOLLOWING VALUE MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLUMN 1
SPACE
NOTE ***************************************************************************
```

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CENTIGRADE FAHRENHEIT FAHR TO CENT CONVERSION FORMULAS

COLUMN 1	COLUMN 11	COLUMN 12	COLUMN 14	COLUMN 24
-10.000000	14.000000	-9.9999996	14.000000	-9.9999996
-5.0000000	23.000000	-4.9999997	23.000000	-4.9999997
0.	32.000000	0.	32.000000	0.
5.0000000	41.000000	4.9999997	41.000000	4.9999997
10.000000	50.000000	9.9999996	50.000000	9.9999996
15.000000	59.000000	15.000000	59.000000	15.000000
20.000000	67.999999	19.999999	67.999999	19.999999
25.000000	76.999999	24.999999	76.999999	24.999999
30.000000	85.999999	29.999999	85.999999	29.999999
35.000000	94.999999	35.000000	94.999999	34.999999
40.000000	104.00000	40.000000	104.00000	39.999999
45.000000	113.00000	45.000000	113.00000	44.999999
50.000000	122.00000	50.000000	122.00000	49.999999
60.000000	140.00000	59.999999	140.00000	59.999999
70.000000	158.00000	69.999999	158.00000	69.999998
80.000000	176.00000	79.999999	176.00000	79.999998
90.000000	194.00000	89.999999	194.00000	89.999998
100.00000	212.00000	99.999999	212.00000	99.999998

****

THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.

*-5.3644180-07 0. *-8.5433324-07

****

ELEM. NO.	ATOMIC WT.	ELEMENT
5.	10.81000	BORON
10.	20.17900	NEON
15.	30.97376	PHOSPHORUS
20.	40.08000	CALCIUM
25.	54.93800	MANGANESE
30.	65.38000	ZINC
35.	79.90400	BROMINE
40.	91.22000	ZIRCONIUM
45.	102.90550	RHODIUM
50.	118.69000	TIN
55.	132.90540	CESIUM
60.	144.24000	NEODYMIUM
65.	158.92540	TEBIUM
70.	173.04000	YTTERBIUM
75.	186.20000	RHENIUM
80.	200.59000	MERCURY
85.	210.00000	ASTATINE
90.	232.03810	THORIUM
95.	243.00000	AMERICIUM
100.	253.00000	FERMIUM

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
GENERATE FROM -10. IN STEPS OF 5. THRU 50. AND STEPS OF 10. THRU 100. IN COL 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO   18.

CTOF CONVERT CELSIUS IN COL 1 TO FAHRENHEIT AND PUT IN COL 11
FTOC CONVERT FAHRENHEIT IN COL 11 TO CELSIUS AND PUT IN COL 12
SUBTRACT COL 1 FROM COL 12 STORE IN COL 13
MULTIPLY COL 1 BY 1.8 MULT BY 1.0 ADD 32. STORE IN COL 14
DIV 5. BY 9. STORE IN COLUMN 8
SUBTRACT 32.0 FROM COL 11 MULT BY COL 8 ADD 0.0 STORE IN COL 24
SUBTRACT COL 1 FROM COL 24 STORE IN COL 25
TITLE1   CENTIGRADE     FAHRENHEIT    FAHR TO CENT      CONVERSION
TITLE2 FORMULAS
PRINT COLS 1, 11, 12, 14 AND 24
SUBTRACT COL 11 FROM COL 14 STORE IN COL 15
AVERAGE COL 15 STORE IN COL 15
AVERAGE COL 13 STORE IN COL 13
AVERAGE COL 25 STORE IN COL 25
SPACE  2
NOTE ********************************************************************************
SPACE
NOTE THE FOLLOWING VALUES MUST BE EQUAL TO OR NEAR ZERO.
SPACE
ABRIDGE ROW 1 OF COLS 13, 15 AND 25
SPACE
NOTE ********************************************************************************
ERASE

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM   18 TO    0.

ATOMIC MASSES OF ALL ELEMENTS STORE RESULTS IN COL 61

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    0 TO  103.

GENERATE FROM 1. IN STEPS OF 1. THRU *NRMAX* IN COL 2
SEPARATE COL 61 EVERY 5TH ROW START WITH ROW 5 STORE IN COL 3
SEPARATE COL  2 EVERY 5TH ROW START WITH ROW 5 STORE IN COL 4
RESET NRMAX TO 20

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM  103 TO   20.

FORMAT E (4A3)
READ E FORMAT,  NEXT 20 LINES IN COLS 5, 6, 7 AND 8
   20 DATA CARD(S) READ BUT NOT LISTED
TITLE1
TITLE2
```

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
NEW PAGE
NOTE ELEM. NO.    ATOMIC WT.    ELEMENT
SPACE
FORMAT D (2X,F5.0,3X,F12.5,5X,4A3)
NPRINT D FORMAT, COLS 4, 3, 5, 6, 7 AND 8
```

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	CENTIMETER-GRAM-SEC CGS	SYSTEME-INTERNATIONALE SI	PHYSICAL CONSTANTS
PI	3.141593+000	3.141593+000	PI
E	3.521976+000	3.521976+000	BASE OF NATURAL LOGS
C	2.997925+010	2.997925+008	SPEED OF LIGHT IN VACUUM
Q	1.602100-020	1.602100-019	ELEMENTARY CHARGE
N	6.022520+023	6.022520+023	AVOGADRO CONSTANT
ME	9.109100-028	9.109100-031	ELECTRON REST MASS
MP	1.672520-024	1.672520-027	PROTON REST MASS
F	9.648700+003	9.648700+004	FARADAY CONSTANT
H	6.625600-027	6.625600-034	PLANCK CONSTANT
ALPHA	7.297200-003	7.297200-003	FINE STRUCTURE CONSTANT
QME	1.758796+007	1.758796+011	CHARGE TO MASS RATIO FOR ELECTRON
RINF	1.097373+005	1.097373+007	RYDBERG CONSTANT
GAMMA	2.675190+004	2.675190+008	GYROMAGNETIC RATIO OF PROTON (CORRECTED FOR H2O)
MUB	9.273200-021	9.273200-024	BOHR MAGNETON
R	8.314300+007	8.314300+000	GAS CONSTANT
K	1.380540-016	1.380540-023	BOLTZMANN CONSTANT
CONE	3.741500-005	3.741500-016	FIRST RADIATION CONSTANT
CTWO	1.438790+000	1.438790-002	SECOND RADIATION CONSTANT
SIGMA	5.669700-005	5.669700-008	STEPHAN-BOLTZMANN CONSTANT
G	6.670000-008	6.670000-011	GRAVITATIONAL CONSTANT

LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

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CGS USE PHYSICAL CONSTANTS IN CGS (CENTIMETER-GRAM-SECOND) SYSTEM
RESET NRMAX TO 1

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
        NRMAX HAS BEEN RESET FROM    0 TO    1.

ADD *PI*     TO 0.0 STORE IN  3
ADD *E*      TO 0.0 STORE IN  4
ADD *C*      TO 0.0 STORE IN  5
ADD *Q*      TO 0.0 STORE IN  6
ADD *N*      TO 0.0 STORE IN  7
ADD *ME*     TO 0.0 STORE IN  8
ADD *MP*     TO 0.0 STORE IN  9
ADD *F*      TO 0.0 STORE IN 10
ADD *H*      TO 0.0 STORE IN 11
ADD *ALPHA*  TO 0.0 STORE IN 12
ADD *QME*    TO 0.0 STORE IN 13
ADD *RINF*   TO 0.0 STORE IN 14
ADD *GAMMA*  TO 0.0 STORE IN 15
ADD *MUB*    TO 0.0 STORE IN 16
ADD *R*      TO 0.0 STORE IN 17
ADD *K*      TO 0.0 STORE IN 18
ADD *CONE*   TO 0.0 STORE IN 19
ADD *CTWO*   TO 0.0 STORE IN 20
ADD *SIGMA*  TO 0.0 STORE IN 21
ADD *G*      TO 0.0 STORE IN 22
MTRANSPOSE VECTOR IN ROW 1 OF COL 3 SIZE 1X20 PUT IN ROW 1 OF COL 1
SI USE PHYSICAL CONSTANTS IN SYSTEME INTERNATIONAL
ADD *PI*   TO  0.0  STORE  IN 3
ADD *E*    TO  0.0  STORE IN 4
ADD *C*    TO  0.0  STORE IN 5
ADD *Q*    TO  0.0  STORE IN 6
ADD *N*    TO  0.0  STORE IN 7
ADD *ME*   TO  0.0  STORE IN 8
ADD *MP*   TO  0.0  STORE IN 9
ADD *F*    TO  0.0  STORE IN 10
ADD *H*    TO  0.0  STORE IN 11
ADD *ALPHA* TO 0.0 STORE IN 12
ADD *QME*    TO 0.0 STORE IN 13
ADD *RINF*   TO 0.0 STORE IN 14
ADD *GAMMA*  TO 0.0 STORE IN 15
ADD *MUB*    TO 0.0 STORE IN 16
ADD *R*      TO 0.0 STORE IN 17
ADD *K*      TO 0.0 STORE IN 18
ADD *CONE*   TO 0.0 STORE IN 19
ADD *CTWO*   TO 0.0 STORE IN 20
ADD *SIGMA*  TO 0.0 STORE IN 21
ADD *G*      TO 0.0 STORE IN 22
MTRANSPOSE VECTOR IN ROW 1 OF COL 3 SIZE 1X20 PUT IN ROW 1 OF COL 2
FORMAT F (2A3,4X,16A3)
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LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS

```
READ F FORMAT, 20 LINES INTO COLS 3 *** 20

     * INFORMATIVE DIAGNOSTIC FOR THE ABOVE INSTRUCTION -
       NRMAX HAS BEEN RESET FROM    1 TO   20.

   20 DATA CARD(S) READ BUT NOT LISTED
FORMAT B (5X,2A3,5X,1PE15.6,8X,E15.6,10X,16A3)
TITLE1              CENTIMETER-GRAM-SEC   SYSTEME-INTERNATIONALE
TITLE2         PHYSICAL CONSTANTS
TITLE3                      CGS                      SI
PRINT B   COLS  3,4  1,2   5***20
STOP
```

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Index Of OMNITAB Commands Used

* Command is used in more than three test problems; only first three uses are listed.

NBS-114A (REV. 2-8C)

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET (See instructions)	1. PUBLICATION OR REPORT NO. TN 1147	2. Performing Organ. Report No.	3. Publication Date November 1981

4. TITLE AND SUBTITLE

Test Problems and Results for OMNITAB 80

5. AUTHOR(S)

Sally T. Peavy and Shirley G. Bremer

6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions)

NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20234

7. Contract/Grant No.

8. Type of Report & Period Covered

Final

9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP)

same as no. 6

10. SUPPLEMENTARY NOTES

Supersedes Technical Note 552

☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

The lack of test problems and results for many computer software packages is a great hindrance to both the systems programmer and the general user. In this publication a set of 69 test problems and results for the OMNITAB 80 system is provided to assist individuals in checking the installation of the OMNITAB 80 system on their particular computer. The general user will also find these descriptive examples instructive in the use of the OMNITAB 80 system.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

Accuracy; ANS FORTRAN; computer system installation; examples; OMNITAB 80; software; test problems.

13. AVAILABILITY

☒ Unlimited

☐ For Official Distribution. Do Not Release to NTIS

☒ Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

☐ Order From National Technical Information Service (NTIS), Springfield, VA. 22161

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