

SERIES 80



TABLE OF CONTENTS

1.	LEAST-SQUARES FIT	1
	Performs a least-squares curve fit to various functions.	
2.	PROBABILITY DISTRIBUTION COMPARISONS	11
	Produces a comparison of probability distributions.	
3.	PROBABILITY OF CHI-SQUARE VALUES	17
	Computes the 'exact' probability of a chi-square value with specified degrees of freedom.	
4.	EXPECTED VALUE OF PERFECT INFORMATION	22
	Computes the expected value of perfect information.	
5.	CHI-SQUARE TEST	31
	Applies a chi-square test to several sample proportions.	
6.	EXACT PROBABILITY OF AN F-RATIO WITH DEGREES OF FREEDOM .	38
	Computes the exact probability of an F-ratio with degrees of freedom.	
7.	BINOMIAL, POISSON AND HYPERGEOMETRIC PROBABILITIES . . .	44
	Computes Binomial, Poisson or Hypergeometric probability.	
8.	FISHER'S EXACT PROBABILITY TEST	51
	Analyzes discrete data from two independent small samples which fall into one of two mutually exclusive classes.	
9.	SUBJECTIVE PROBABILITY DISTRIBUTION	57
	Determines a subjective probability distribution given the minimum, maximum and most probable values.	

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PROGRAM DESCRIPTION I

Program Title Least-Squares Fit

File Name C U R F I T

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 11,950

Program Description: This program performs a least squares curve fit to the

- following functions:
1. $Y = A + B(X)$
 2. $Y = A \exp (B * X)$
 3. $Y = A (X^B)$
 4. $Y = A + B/X$
 5. $Y = 1/(A + B * X)$
 6. $Y = X/(A + B * X)$
 7. $Y = A + B * \text{Log}(X)$

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PROGRAM DESCRIPTION II

Sample Problem

Press Key #1 to enter new data

Number of data pairs : 7

X,Y values for each data pair

Pair 1: 8.32,12.78
 Pair 2: 8.34,12.53
 Pair 3: 8.36,12.08
 Pair 4: 8.38,11.57
 Pair 5: 8.40,11.19
 Pair 6: 8.42,10.91
 Pair 7: 8.44,10.73

Press Key #6 for results

SOLUTION:

LOAD "CURFIT".

RUN.

Enter input data as prompted.

#	INDEX	A	B
1	.9829	1.6552E+002	-.1835E+002
2	.9858	5.9328E+006	-.1568E+001
3	.9849	1.7115E+013	-.1317E+002
4	.9830	-.1420E+003	1.2883E+003
5	.9878	-.1038E+001	1.3417E-001
6	.9879	-.9415E+001	1.2095E+000
7	.9818	3.3964E+002	-.1542E+003

STANDARD ERROR ESTIMATES
 # REGRESSION INTERCEPT SLOPE(B)

1	1.15E-001	9.08E+000	1.08E+000
2	8.91E-003	2.03E+000	8.42E-002
3	9.20E-003	4.73E+000	7.31E-001
4	1.14E-001	9.04E+000	7.57E+001
5	7.06E-004	5.59E-002	6.67E-003
6	7.04E-004	4.67E-001	5.57E-002
7	1.18E-001	2.00E+001	9.39E+000

6 HYPERBOLIC (Y=X/(A+B*X))
 THE RESULTS ARE AS FOLLOWS:
 (OF A LEAST-SQUARES FIT OF ITS
 LINEAR TRANSFORM.)

X-ACT	Y-ACT	Y-CALC	PCT DIF
8.32	12.78	12.85	-.50
8.34	12.53	12.42	.80
8.36	12.08	12.02	.50
8.38	11.57	11.64	-.60
8.40	11.19	11.29	-.80
8.42	10.91	10.96	-.40
8.44	10.73	10.65	.70

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PROGRAM DESCRIPTION III

Operating Limits and Warnings Maximum of 200 data pairs.

Reference(s)

Variables:

Name	Description	Length	Comments
N	Number of data pairs		
X()	X value in data pair		
Y()	Y value in data pair		
C()	Index of determination		
T(,1)	Regression		
T(,2)	Intercept		
T(,3)	Slope		
Y1()	Calculated Y value		
D	Percentage difference		

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USER INSTRUCTIONS

STEP**INSTRUCTIONS**

- 1 LOAD "CURFIT" and press RUN.
- 2 Enter input data as prompted.
- 3 Results will be printed.

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PROGRAM LISTING

Listing

Comments

```

10 OPTION BASE 1
20 DIM S(6),F1$[40],F2$[40],F3$
   [40],F4$[40],F5$[40],F6$[40]
   ,F7$[40],B$[40]
30 SHORT S1,S2,T(7,3),A,B,A(7),
   B(7),C(7),V(200),U(200),X(20
   0),Y(200),P,Q,Z,Y,D,Y1(200),
   Y1,Y2
40 INTEGER F(7),N,M,F9
50 CLEAR @ DISP "USE KEY#1 TO E
   NTER NEW DATA      KEY#2 TO E
   NTER DATA FROM TAPE"
60 ON KEY# 1,"NEW" GOTO 80 @ ON
   KEY# 2,"OLD" GOTO 2010
70 KEY LABEL @ GOTO 70
80 GOSUB 480 @ GOSUB 490
90 PRINT "THIS PROGRAM FITS THE
   FOLLOWING CURVE TYPES TO EN
   TERED DATA."
100 F1$="1 LINEAR (Y=A+(B*X))" @
   F2$="2 N EXPONENTIAL (Y=A*X
   P(B*X))"
110 F3$="3 POWER (Y=A+(X^B))" @
   F4$="4 HYPERBOLIC (Y=A+(B/X)
   )" @ F5$="5 HYPERBOLIC (Y=1/
   (A+B*X))"
120 F6$="6 HYPERBOLIC (Y=X/(A+B*
   X))" @ F7$="7 LOGARITHMIC (Y
   =A+B*LOG(X))"
130 PRINT F1$,F2$,F3$,F4$,F5$,F6
   $,F7$
140 F9=1 @ GOTO 690
150 ON KEY# 1,"NEW" GOSUB 270
160 ON KEY# 2,"OLD" GOSUB 2010
170 ON KEY# 3,"CHANGE" GOSUB 290
180 ON KEY# 4,"COMPUTE" GOTO 690
190 ON KEY# 5,"ADD" GOSUB 350
200 ON KEY# 6,"SUB" GOSUB 380
210 OFF KEY# 7
220 ON KEY# 8,"END" GOTO 2150
230 CLEAR @ DISP "USE KEY#  TO"
   @ DISP "1      CREATE NEW DATA
   PAIRS      2      INPUT DATA
   FROM TAPE"
240 DISP "3      CHANGE VALUE OF D
   ATA PAIRS  4      COMPUTE NEW V
   ALUES      5      ADD PAIRS
   "
250 DISP "6      SUBTRACT PAIRS
   8      END THE PROGR
   AM"
260 KEY LABEL @ GOTO 260
270 GOSUB 480 @ GOSUB 490
280 RETURN
290 CLEAR @ DISP "ENTER THE NUMB
   ER OF THE DATA  PAIR TO BE
   CHANGED THEN THE NEW"
300 DISP "PAIR (ENTER 0 TO EXIT)
   "
310 DISP "DATA PAIR";@ INPUT I

```

Initialize

Display curve fit types

Data pair change routine

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

<pre> 320 IF I=0 THEN RETURN 330 DISP "X(";VAL\$(I);"),Y(";VAL \$(I);")" @ INPUT X(I),Y(I) 340 GOTO 300 350 CLEAR @ DISP "ENTER NUMBER O F NEW ENTRIES";@ INPUT M1 360 M=N+1 @ N=N+M1 @ GOSUB 500 370 RETURN 380 M1=0 390 DISP "ENTER NUMBER OF THE DA TA DATA PAIR TO BE DELETE D (<0 TO EXIT)";@ INPUT M 400 IF M=0 THEN RETURN 410 IF M=N THEN N=N-1 @ M1=M1+1 @ GOTO 450 420 FOR I=M TO N-1 430 X(I)=X(I+1) @ Y(I)=Y(I+1) 440 NEXT I 450 DISP VAL\$(M1);" VALUES CHANG ED SUBTRACT 1" 460 DISP " FROM EACH DATA PAIR N UMBER BEGINNING WITH DA TA PAIR";VAL\$(M+1) 470 N=N-1 @ GOTO 390 480 CLEAR @ DISP "ENTER NUMBER O F DATA PAIRS";@ INPUT N @ RET URN 490 M=1 500 CLEAR @ DISP "ENTER VALUES F OR EACH DATA PAIR (X,Y) WHEN THE NUMBER OF THE " 510 DISP "PAIR APPEARS." 520 FOR I=M TO N 530 DISP I;@ INPUT X(I),Y(I) 540 NEXT I 550 CLEAR @ DISP "DO YOU WISH TO SAVE THIS DATA";@ INPUT A\$ 560 IF A\$[1,1]="Y" THEN DISP "EN TER NAME OF FILE IN WHICH YO U WANT TO STORE THE DATA" EL SE 650 570 ON ERROR GOTO 660 580 INPUT A\$ 590 CREATE A\$,CEIL((2*N*8+8)/256) 600 ASSIGN# 1 TO A\$ 610 PRINT# 1 ; N 620 FOR I=1 TO N 630 PRINT# 1 ; X(I),Y(I) 640 NEXT I 650 OFF ERROR @ RETURN 660 CLEAR @ DISP "YOU HAVE MADE N TAPE STORE ERROR # "; ERRN 670 DISP "CHECK OWNER'S MANUAL P .305-306 FOR THE ERROR" 680 INPUT A\$ @ GOTO 590 690 FOR I=1 TO 7 @ F(I)=1 @ NEXT I @ CLEAR @ DISP 700 DISP " LEAST SQUARES CURVE S FIT # INDEX A B DETER" @ DI SP </pre>	<pre> Data pair add routine Data pair delete routine Enter initial data pairs Save data option Error message </pre>
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PROGRAM LISTING

Listing

Comments

```

710 FOR I=1 TO 7
720 FOR K=1 TO 6 @ S(K)=0 @ NEXT
    K
730 FOR J=1 TO N
740 IF I=1 OR I=4 OR I=7 THEN V(
    J)=Y(J)
750 IF I#2 AND I#3 THEN 780
760 IF Y(J)<=0 THEN GOSUB 2130 @
    GOTO 1070
770 V(J)=LOG(Y(J))
780 IF I#5 AND I#6 THEN 810
790 IF Y(J)=0 THEN GOSUB 2130 @
    GOTO 1070
800 V(J)=1/Y(J)
810 S(5)=S(5)+V(J)^2
820 S(3)=S(3)+V(J) @ NEXT J
830 FOR J=1 TO N
840 IF I=1 OR I=2 OR I=5 THEN U(
    J)=X(J)
850 IF I#3 AND I#7 THEN 880
860 IF X(J)<=0 THEN GOSUB 2130 @
    GOTO 1070
870 U(J)=LOG(X(J))
880 IF I#4 AND I#6 THEN 910
890 IF X(J)=0 THEN GOSUB 2130 @
    GOTO 760
900 U(J)=1/X(J)
910 S(1)=S(1)+U(J)
920 S(2)=S(2)+U(J)^2
930 S(4)=S(4)+U(J)*V(J) @ NEXT J
940 B=(N*S(4)-S(1)*S(3))/(N*S(2)
    -S(1)^2)
950 A=(S(3)-B*S(1))/N
960 S1=S(5)-S(3)^2/N
970 S2=B^2*(S(2)-S(1)^2/N)
980 C(I)=S2/S1
990 T(I,1)=SQR((S1-S2)/(N-2))
1000 T(I,2)=T(I,1)*SQR(S(2)/(N*(
    S(2)-S(1)^2/N))
1010 T(I,3)=T(I,1)/SQR(S(2)-S(1)
    ^2/N)
1020 IF I=1 OR I=4 OR I=5 OR I=7
    THEN A(I)=A @ B(I)=B @ GOT
    O 1060
1030 IF I#6 THEN A(I)=EXP(A) @ T
    (I,2)=EXP(T(I,2)) @ B(I)=B
    @ GOTO 1060
1040 A(6)=B @ B(6)=A @ Z=T(6,2)
1050 T(6,2)=T(6,3) @ T(6,3)=Z
1060 DISP USING "D,X,D.4D,X,D.4D
    E,X,D.4DE" ; I,C(I),A(I),B(
    I)
1070 NEXT I
1080 IF F9 THEN DISP @ DISP "***
    * PRESS CONT TO CONTINUE **
    *" @ PAUSE
1090 IF F9 THEN CLEAR @ DISP "DO
    YOU WANT A PRINTOUT OF THE
    LEAST SQUARE CURVES FIT"
    ;ELSE 1110

```

Calculation routines

Print option

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

1100 INPUT A$@ IF A$[1,1]="Y" TH
    EN F9=0 @ CRT IS 2 @ GOTO 6
    90
1110 CRT IS 1 @ F9=1
1120 CLEAR @ DISP @ DISP "      ST
    ANDARD ERROR ESTIMATES"
1130 DISP "# REGRESSION INTERCEP
    T SLOPE(B)" @ DISP
1140 FOR I=1 TO 7
1150 IF F(I)=0 THEN DISP I;"COUL
    D NOT BE FIT" ELSE DISP USI
    NG "D,3(X,D.2DE)" ; I,T(I,1
    ),T(I,2),T(I,3)
1160 NEXT I
1170 IF F9 THEN DISP @ DISP "***
    * PRESS CONT TO CONTINUE **
    *" @ PAUSE
1180 IF F9 THEN DISP "DO YOU WAN
    T A PRINTOUT OF THE STAND
    ARD ERROR ESTIMATES";ELSE 1
    200
1190 INPUT A$@ IF A$[1,1]="Y" TH
    EN CRT IS 2 @ F9=0 @ GOTO 1
    120
1200 CRT IS 1 @ F9=1
1210 Y1,Y2=Y(1)
1220 FOR J=2 TO N
1230 IF Y1>Y(J) THEN Y1=Y(J)
1240 IF Y2<Y(J) THEN Y2=Y(J)
1250 NEXT J
1260 FOR K=1 TO N-1 @ M=K
1270 FOR J=K+1 TO N
1280 IF X(M)>X(J) THEN M=J
1290 NEXT J
1300 IF M#K THEN P=X(M) @ Q=Y(M)
    @ X(M)=X(K) @ Y(M)=Y(K) @
    Y(K)=Q @ X(K)=P
1310 NEXT K
1320 CLEAR @ DISP "TO GAIN DETAI
    LS FOR EACH CURVE USE:"
1330 DISP "KEY#1  LINEAR (1)
           KEY#2  N EXPONEN
           TIAL (2)  KEY#3  POWE
           R (3)"
1340 DISP "KEY#4  TO CONTINUE
           KEY#5  HYPERBOLI
           C (4)   KEY#6  HYPE
           RBOLIC (5)"
1350 DISP "KEY#7  HYPERBOLIC (6)
           KEY#8  LOGARITHM
           IC(7)"
1360 ON KEY# 1,"1 LIN" GOSUB 155
    0
1370 ON KEY# 2,"2 N/EXP" GOSUB 1
    600
1380 ON KEY# 3,"3 POWER" GOSUB 1
    650
1390 ON KEY# 4,"CONT" GOTO 1450
1400 ON KEY# 5,"4 HYPER" GOSUB 1
    700

```

Display standard error estimates

Print option

Choose detail

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PROGRAM LISTING

Listing

Comments

```

1410 ON KEY# 6,"5 HYPER" GOSUB 1
      750
1420 ON KEY# 7,"6 HYPER" GOSUB 1
      800
1430 ON KEY# 8,"7 LOG" GOSUB 186
      0
1440 KEY LABEL @ GOTO 1440
1450 GOTO 150
1460 CLEAR @ DISP "DO YOU WANT A
      PRINTOUT OF THE      CURVE D
      ETAIL";@ INPUT A$
1470 IF A$E1,1J#"Y" THEN RETURN
1480 PRINT B$ @ PRINT "THE RESUL
      TS ARE AS FOLLOWS:"
1490 IF I#1 THEN PRINT "OF A LEA
      ST-SQUARES FIT OF ITS      LIN
      EAR TRANSFORM"
1500 PRINT "  X-ACT      Y-ACT      Y-
      CALC PCT DIF"
1510 FOR J=1 TO N
1520 F9=0 @ CRT IS 2 @ GOSUB 197
      0
1530 NEXT J
1540 F9=1 @ CRT IS 1 @ RETURN
1550 IF F(1) THEN I=1 @ B$=F1$ E
      LSE DISP "COULDN'T FIT" @ R
      ETURN
1560 FOR J=1 TO N
1570 GOSUB 1910 @ GOSUB 1970
1580 NEXT J
1590 GOSUB 1460 @ RETURN
1600 IF F(2) THEN I=2 @ B$=F2$ E
      LSE GOTO 2140
1610 FOR J=1 TO N @ GOSUB 1910
1620 Y1(J)=A(2)*EXP(B(2)*X(J))
1630 GOSUB 1970 @ NEXT J
1640 GOSUB 1460 @ RETURN
1650 IF F(3) THEN I=3 @ B$=F3$ E
      LSE GOTO 2140
1660 FOR J=1 TO N @ GOSUB 1910
1670 Y1(J)=A(3)*X(J)^B(3)
1680 GOSUB 1970 @ NEXT J
1690 GOSUB 1460 @ RETURN
1700 IF F(4) THEN I=4 @ B$=F4$ E
      LSE GOTO 2140
1710 FOR J=1 TO N @ GOSUB 1910
1720 Y1(J)=A(4)+B(4)/X(J)
1730 GOSUB 1970 @ NEXT J
1740 GOSUB 1460 @ RETURN
1750 IF F(5) THEN I=5 @ B$=F5$ E
      LSE GOTO 2140
1760 FOR J=1 TO N
1770 GOSUB 1910 @ Y1(J)=1/Y1(J)
1780 GOSUB 1970 @ NEXT J
1790 GOSUB 1460 @ RETURN
1800 IF F(6) THEN I=6 @ B$=F6$ E
      LSE GOTO 2140
1810 FOR J=1 TO N
1820 GOSUB 1910 @ Y1(J)=1/Y1(J)
1830 Y1(J)=X(J)*Y1(J) @ GOSUB 19
      70

```

Curve detail print option

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PROGRAM LISTING

Listing

Comments

```

1840 NEXT J
1850 GOSUB 1460 @ RETURN
1860 IF F(7) THEN I=7 @ B$=F7$ E
      LSE GOTO 2140
1870 FOR J=1 TO N @ GOSUB 1910
1880 Y1(J)=A(7)+B(7)*LOG(X(J))
1890 GOSUB 1970 @ NEXT J
1900 GOSUB 1460 @ RETURN
1910 IF J=1 OR RMD(J,8)=0 THEN C
      LEAR @ DISP B$ ELSE 1960
1920 DISP "THE RESULTS ARE AS FO
      LLOWS:"
1930 IF I#1 THEN DISP "(OF A LEA
      ST-SQUARES FIT OF ITS LINE
      AR TRANSFORM.)"
1940 DISP "  X-ACT  Y-ACT  Y-C
      ALC PCT DIF"
1950 IF I=2 OR I=3 OR I=4 OR I=7
      THEN RETURN
1960 Y1(J)=A(I)+B(I)*X(J) @ RETU
      RN
1970 D=Y(J)-Y1(J) @ D=.1*SGN(D)*
      INT(1000*ABS(D/Y1(J)))
1980 DISP USING "3(40.20,X),40.2
      D" ; X(J),Y(J),Y1(J),D
1990 IF (J=N OR RMD(J,7)=0) AND
      F9 THEN DISP "**** PRESS CO
      NT TO CONTINUE ****" @ PAUS
      E
2000 RETURN
2010 CLEAR @ DISP "ENTER NAME OF
      DATA FILE";@ INPUT A$
2020 ON ERROR GOTO 2090
2030 ASSIGN# 1 TO A$
2040 READ# 1 ; N
2050 FOR I=1 TO N
2060 READ# 1 ; X(I),Y(I)
2070 NEXT I
2080 OFF ERROR @ GOTO 90
2090 DISP "YOU HAVE MADE A FILE
      INPUT      ERROR. YOU USED
      FILE NAME ";A$
2100 DISP "PLEASE CHECK THIS NAM
      E ON THE  FOLLOWING  LIST:
      " @ WAIT 2000
2110 CAT @ DISP "PRESS CONT TO C
      ONTINUE" @ PAUSE
2120 GOTO 2010
2130 DISP VAL$(I);" CAN'T FIT" @
      F(I)=0 @ RETURN
2140 DISP "COULDN'T FIT" @ RETUR
      N
2150 CLEAR @ DISP USING "6/,K" ;
      "PROGRAM TERMINATED"
2160 END

```

Display results

Enter name of data file

Error message

'No fit' message

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Probability Distribution Comparisons

File Name B I N O P O

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 4,495

Program Description: This program produces comparisons of probability distributions. It compares the exact binomial probabilities with approximations given by the normal and Poisson distributions. The output will show the probability of J-occurrences in N trials.

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PROGRAM DESCRIPTION II**Sample Problem**

Number of trials: 1000

Probability : .002

SOLUTION:

LOAD "BINOP0".
RUN.

Enter input data as prompted.

N= 1000

P= .002

J	EXACT	NORMAL	POISSON
0	.1351	.1058	.1353
1	.2707	.2175	.2707
2	.2709	.2766	.2707
3	.1806	.2175	.1804
4	.0902	.1058	.0902
5	.0360	.0318	.0361
6	.0120	.0059	.0120
7	.0034	.0007	.0034
8	.0008	.0001	.0009
9	.0002	0.0000	.0002
10	0.0000	0.0000	0.0000

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PROGRAM DESCRIPTION III**Operating Limits and Warnings****Reference(s)****Variables:**

Name	Description	Length	Comments
N	Number of trials		
P	Probability		
J	Number of occurrences in N trials		
T(J)	Binomial probability		
L(J)	Normal probability		
Q(J)	Poisson probability		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP	INSTRUCTIONS
------	--------------

- | | |
|---|---------------------------------------|
| 1 | LOAD "BINOPO" and press RUN. |
| 2 | Enter input data as prompted. |
| 3 | Results will be displayed. |
| 4 | Select change option, or end program. |

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 DIM T(100),L(100),Q(100)
20 DEF FNO(X) = 1-1/(1+A1*X+A2*
  X^2+A3*X^3+A4*X^4+A5*X^5)^8
30 A1=.141128 @ A2=.0886403
40 A3=.0274335
50 A4=-.00039446
60 A5=.00328975 @ F9=0
70 GOSUB 180 @ GOSUB 190
80 GOSUB 210
90 ON KEY# 1,"END" GOTO 530
100 ON KEY# 2,"#TRIALS" GOSUB 18
  0
110 ON KEY# 3,"PROBAB" GOSUB 190
120 ON KEY# 4,"COMPUTE" GOSUB 21
  0
130 ON KEY# 8,"PRINT" GOSUB 410
140 CLEAR @ DISP "USE KEY#1 TO E
  ND THE PROGRAM, KEY#2 TO C
  HANGE THE NUMBER OF TRIALS
  "
150 DISP "KEY#3 TO CHANGE THE PR
  OBABILITY,KEY#4 TO COMPUTE T
  HE NEW TRIALS,"
160 DISP "AND KEY#8 FOR A PRINTO
  UT OF THE LAST SET OF TRIAL
  S."
170 KEY LABEL @ GOTO 170
180 CLEAR @ DISP "ENTER NUMBER O
  F TRIALS";@ INPUT N@ RETURN
190 CLEAR @ DISP "ENTER THE PROB
  ABILITY";@ INPUT P@ WAIT 500
  @ CLEAR @ DISP "CALCULATING
  --"
200 DISP "PLEASE BE PATIENT!!" @
  RETURN
210 Y=0 @ M=N*P @ S=SQR(M*(1-P))
220 R=(1-P)^N @ V=EXP(-M)
230 FOR J=0 TO N
240 IF J#0 THEN R=R*P*(N-J+1)/J/
  (1-P)
250 T(J)=INT(R*10000+.5)/10000
260 H=(J-.5-M)/S @ K=(J+.5-M)/S
270 C=1/SQR(2)
280 IF H<0 THEN F=.5-.5*(FNO(-H*
  C)) ELSE F=.5+.5*(FNO(H*C))
290 IF K<0 THEN G=.5-.5*(FNO(-K*
  C)) ELSE G=.5+.5*(FNO(K*C))
300 L(J)=.0001*INT(10000*(G-F)+.
  5)
310 IF J#0 THEN V=V*M/J
320 Q(J)=.0001*INT(10000*V+.5)
330 IF T(J)>0 OR L(J)>0 OR Q(J)>
  0 THEN 360
340 IF Y=0 THEN 390
350 N1=J @ GOTO 430
360 IF J=0 THEN Y=1 @ GOTO 390
370 IF Y=1 THEN 390
380 T(J),L(J),Q(J)=0
390 NEXT J
400 RETURN

```

Initialize

Key labels

Data entry

Calculations

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

410 CRT IS 2 @ F9=1 @ GOSUB 430
420 CRT IS 1 @ F9=0 @ RETURN
430 CLEAR @ DISP @ DISP "N=";N,"
    P=";P @ DISP
440 DISP "J    EXACT    NORMAL
    POISSON"
450 FOR J=0 TO N1
460 DISP USING "3D,X,D.4D,3X,D.4
    D,5X,D.4D" ; J,T(J),L(J),Q(J
    )
470 IF F9 OR J=0 THEN 510
480 IF RMD(J,8)=0 OR J=N1 THEN D
    ISP @ DISP "*** PRESS CONT T
    O CONTINUE ***" @ PAUSE ELSE
    510
490 IF J#N1 THEN CLEAR @ DISP @
    DISP "N=";N,"P=";P @ DISP EL
    SE 510
500 DISP "J    EXACT    NORMAL
    POISSON"
510 NEXT J
520 RETURN
530 END

```

Display results

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Probability of Chi-Square Values

File Name C H I S Q

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 1,339

Program Description: This program will compute the 'exact' probability of an entered chi-square value with specified degrees of freedom.

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II**Sample Problem**

Chi-square value : 5

Degrees of freedom: 1

SOLUTION:

LOAD "CHISQ".
RUN.

Enter input data as prompted.

EXACT PROBABILITY OF CHI-SQUARE
=5 WITH 1 D.F.

IS .024

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III

Operating Limits and Warnings Zero not allowed for chi-square value or degrees of freedom.

Reference(s)**Variables:**

Name	Description	Length	Comments
G1	Chi-square value		
M	Degrees of freedom		
P	'Exact' probability		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP	INSTRUCTIONS
-------------	---------------------

- | | |
|---|--------------------------------------|
| 1 | LOAD "CHISQ" and press RUN. |
| 2 | Enter input data as prompted. |
| 3 | Results will be displayed. |
| 4 | Select change option or end program. |

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

<pre> 10 CLEAR @ DISP "ENTER THE CHI- SQUARE VALUE AND DEGREES OF FREEDOM" @ INPUT G1,M 20 IF G1*M=0 THEN DISP "YOU HAV E ERRED, REEENTER VALUES WIT H NO 0'S" @ INPUT G1,M@ GOTO 20 30 GOSUB 140 40 ON KEY# 1,"CHI-SQR" GOSUB 26 0 50 ON KEY# 2,"DEG/FRE" GOSUB 27 0 60 ON KEY# 3,"PRINT" GOSUB 280 70 ON KEY# 4,"COMPUTE" GOTO 140 80 ON KEY# 8,"END" GOTO 290 90 CLEAR @ DISP "USE KEY#1 TO C HANGE CHI-SQUARE VALUE" 100 DISP "USE KEY#2 TO CHANGE TH E DEGREES OF FREEDOM." 110 DISP "USE KEY#3 TO PRINT THE RESULTS USE KEY#4 TO COMPU TE THE VALUES" 120 DISP "USE KEY#5 TO END THE P ROGRAM." 130 KEY LABEL @ GOTO 130 140 N=1000 @ G=G1/M @ P,F9=1 150 IF G<1 THEN A=N @ B=M @ F=1/ G ELSE A=M @ B=N @ F=G 160 A1=2/(9*A) @ B1=2/(9*B) 170 Z=ABS((1-B1)*F^.333333-1+A1) @ Z=Z/SQR(B1*F^.666667+A1) 180 IF B<4 THEN Z=Z*(1+.08*Z^4/B ^3) 190 P=(1+Z*(.196854+Z*(.115194+Z *(.000344+Z*.019527))))^4 200 P=.5/P @ IF G<1 THEN P=1-P 210 CLEAR @ DISP USING "4/" 220 DISP "EXACT PROBABILITY OF C HI-SQUARE =" ; VAL\$(G1) ; " WITH " ; VAL\$(M) ; " D.F." 230 DISP @ DISP " IS " ; INT(10 0000*P)/100000 240 IF F9 THEN DISP @ DISP "*** PRESS CONT TO CONTINUE ***" @ PAUSE 250 CRT IS 1 @ F9=1 @ GOTO 40 260 CLEAR @ DISP "ENTER NEW CHI- SQUARE VALUE";@ INPUT G1@ RE TURN 270 CLEAR @ DISP "ENTER NEW DEGR EES OF FREEDOM";@ INPUT M@ R ETURN 280 CRT IS 2 @ F9=0 @ GOTO 210 290 CLEAR @ DISP "PROGRAM ENDED" 300 END </pre>	<pre> Data entry Error message Display softkey functions Calculations Display results Change routine data entry </pre>
---	---

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Expected Value of Perfect Information

File Name E V P I

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 10,637

Program Description: This program computes the expected value of perfect information. It assumes that the variable of interest is normally distributed and that the payoff has a linear relationship to the variable of interest. The expected value of perfect information is the sum of the products of all possible losses multiplied by the probabilities of those losses.

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II**Sample Problem**

Breakeven value	:	50
Slope of payoff line	:	40000
Mean value of variable	:	66
Standard deviation estimate of value of variable	:	20
Standard deviation	:	0

SOLUTION:

LOAD "EVPI".
RUN.

Enter input data as prompted.

```
BREAKEVEN VALUE 50
SLOPE OF PAYOFF LINE 40000
MEAN VALUE 66
STANDARD DEVIATION 20
EXPECTED VALUE OF PERFECT
INFORMATION 96160
```

SERIES 80 USERS' LIBRARY
PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
B	Breakeven value		
K	Slope of payoff line		
M	Mean value of variable		
S	Standard deviation of estimate (also used as actual loss value)		
N	Actual/standard deviation flag		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "EVPI" and press RUN.
2	Enter input data as prompted.
3	Results will be displayed.
4	Select option to change data or end program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 OPTION BASE 1
20 DIM X(100),G(401)
30 F9=1
40 GOSUB 210 @ GOSUB 220
50 GOSUB 230 @ GOSUB 240
60 GOSUB 270 @ GOSUB 290
70 ON KEY# 1,"BRK/VAL" GOSUB 21
  0
80 ON KEY# 2,"SLOPE" GOSUB 220
90 ON KEY# 3,"MEAN" GOSUB 230
100 ON KEY# 4,"COMPUTE" GOSUB 29
  0
110 ON KEY# 5,"END" GOTO 1450
120 ON KEY# 6,"ST/DEV" GOSUB 240
130 ON KEY# 7,"FLAG" GOSUB 270
140 ON KEY# 8,"PRINT" GOSUB 620
150 CLEAR @ DISP "USE SPECIAL KE
  YS TO:          #1 CHANGE
  THE BREAKEVEN VALUE"
160 DISP "#2 CHANGE THE SLOPE OF
  PAYOFF      #3 CHANGE THE MEAN
  VALUE"
170 DISP "#4 TO COMPUTE VALUE
      #5 TO END THE PROG
  RAM"
180 DISP "#6 TO CHANGE THE STAND
  ARD          DEVIATION" @ DI
  SP "#7 TO CHANGE THE FLAG ON
  ST/DEV"
190 DISP "#8 FOR A PRINTOUT"
200 KEY LABEL @ GOTO 200
210 CLEAR @ DISP "ENTER THE BREA
  KEVEN VALUE OF THEVARIABLE";
  @ INPUT B@ RETURN
220 CLEAR @ DISP "ENTER THE SLOP
  E OF THE PAYOFF  LINE";@ IN
  PUT K@ RETURN
230 CLEAR @ DISP "ENTER THE MEAN
  VALUE OF THE      VARIABLE";
  @ INPUT M@ RETURN
240 CLEAR @ DISP "ENTER EITHER T
  HE STANDARD      DEVIATION
  OF ESTIMATE OF VALUE"
250 DISP "OF VARIABLE OR THE PRO
  BABILITY  OF ACTUAL VALUE ON
  THE LOSS SIDE"
260 DISP "OF THE BREAKEVEN";@ IN
  PUT S@ S1=S @ RETURN
270 CLEAR @ DISP "ENTER 0 IF YOU
  CHOOSE STANDARD  DEVIATION
  OR 1 IF YOU ARE USING"
280 DISP "ACTUAL VALUE";@ INPUT
  N@ N1=N @ RETURN
290 RESTORE @ S=S1 @ N=N1
300 IF N=0 THEN 340
310 IF K<=0 THEN S=1-S
320 GOSUB 460 @ S=ABS((B-M)/U)
330 GOTO 350
340 GOSUB 460
350 IF K<0 THEN U=(B-M)/S ELSE U
  =(M-B)/S

```

Define soft keys

Data entry

Computation subroutine

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

360 GOSUB 550 @ E=ABS(K*S*L)
370 CLEAR @ DISP USING "2/"
380 DISP "BREAKEVEN VALUE";B
390 DISP "SLOPE OF PAYOFF LINE";
  K
400 DISP "MEAN VALUE";M
410 DISP "STANDARD DEVIATION";S
420 DISP "EXPECTED VALUE OF PERF
  ECT INFORMATION";E
430 DISP USING "2/"
440 IF F9 THEN DISP "*** PRESS C
  ONT TO CONTINUE ***" @ PAUSE
450 RETURN
460 FOR N=1 TO 50
470 READ X1
480 X(N)=-X1 @ X(101-N)=X1
490 NEXT N
500 IF S<=.005 THEN U=X(1)-100*(
  .005-S)*(X(2)-X(1)) @ RETURN
510 IF S>=.995 THEN U=X(100)+100
  *(S-.995)*(X(100)-X(99)) @ R
  ETURN
520 N=INT(100*S+.5)
530 U=X(N)+(X(N-1)-X(N))*(100*S-
  N+.5)
540 RETURN
550 FOR N=1 TO 401
560 READ G(N)
570 NEXT N
580 U1=ABS(U) @ U2=INT(U1*100)
590 L=G(U2+1)+(G(U2+2)-G(U2+1))*
  (100*U1-U2)
600 IF U<0 THEN L=L+U1
610 RETURN
620 CRT IS 2 @ F9=0 @ GOSUB 370
630 CRT IS 1 @ F9=1 @ RETURN
640 REM ***ENTER THE DATA STMTS
  HERE***
650 DATA 2.57583,2.17009,1.95996
  ,1.81191,1.6954
660 DATA 1.5081,1.5141,1.43953,1
  .3722,1.31058
670 DATA 1.25357,1.20036,1.15035
  ,1.10306,1.05812
680 DATA 1.01522,.974114,.934589
  ,.896473,.859617
690 DATA .823894,.789192,.755415
  ,.722479,.690309
700 DATA .658338,.628006,.59776,
  .568051,.538836
710 DATA .510074,.481727,.453762
  ,.426148,.398855
720 DATA .371856,.345125,.318639
  ,.292375,.266311
730 DATA .240426,.214702,.189113
  ,.163658,.138304
735 DATA .113038,.0878448,.06270
  78,.03760833,.0125335
740 DATA .3938,.394,.389,.3841,.
  3793,.3744,.3697,.3649,.3602
  ,.3556

```

Display results

Print subroutine

Data statements

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

750 DATA .3509,.3464,.3418,.3373
    .3328,.3284,.324,.3197,.315
    4,.3111
760 DATA .3069,.3027,.2986,.2944
    .2904,.2863,.2824,.2784,.27
    45,.2706
770 DATA .2668,.263,.2592,.2555,
    .2518,.2481,.2445,.2409,.237
    4,.2339
780 DATA .2304,.227,.2236,.2203,
    .2169,.2137,.2104,.2072,.204
    .2009
790 DATA .1978,.1947,.1917,.1887
    .1857,.1828,.1799,.1771,.17
    42,.1714
800 DATA .1687,.1659,.1633,.1606
    .158,.1554,.1528,.1503,.147
    8,.1453
810 DATA .1429,.1405,.1381,.1358
    .1334,.1312,.1289,.1267,.12
    45,.1223
820 DATA .1202,.1181,.116,.114,.
    112,.11,.108,.1061,.1042,.10
    23
830 DATA .1004,.0986,.0968,.095,
    .0933,.0916,.0899,.0882,.086
    5,.0849
840 DATA .08332,.08174,.08019,.0
    7866,.07716,.07568,.07422,.0
    7279
850 DATA .07138,.06999
860 DATA .06862,.06727,.06595,.0
    6465,.06336,.0621,.06086,.05
    964
870 DATA .05844,.05726
880 DATA .0561,.05496,.05384,.05
    274,.05165,.05059,.04954,.04
    851
890 DATA .0475,.0465
900 DATA .04553,.04457,.04363,.0
    427,.04179,.0409,.04002,.039
    16
910 DATA .03831,.03748
920 DATA .03667,.03587,.03508,.0
    3431,.03356,.03281,.03208,.0
    3137
930 DATA .03067,.02998
940 DATA .02931,.02865,.028,.027
    36,.02674,.02612,.02552,.024
    94
950 DATA .02436,.0238
960 DATA .02324,.0227,.02217,.02
    165,.02114,.02064,.02015,.01
    967
970 DATA .0192,.01874
980 DATA .01829,.01785,.01742,.0
    1699,.01658,.01617,.01578,.0
    1539
990 DATA .01501,.01464
1000 DATA .01428,.01392,.01357,.
    01323,.0129,.01257,.01226,.
    01195

```

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

1010 DATA .01164, .01134
1020 DATA .01105, .01077, .01049, .
      .01022, .00996, .0097, .00944, .
      .0092
1030 DATA .00896, .00872
1040 DATA .008491, .008266, .00804
      .6, .007832, .007623, .007418, .
      .007219
1050 DATA .007024, .006835, .00664
      .9
1060 DATA .006468, .006292, .00612
      ., .005952, .005788, .005628, .0
      .05472
1070 DATA .00532, .005172, .005028
1080 DATA .004887, .00475, .004616
      ., .004486, .004358, .004235, .0
      .04114
1090 DATA .003996, .003882, .00377
1100 DATA .003662, .003556, .00345
      .3, .003352, .003255, .003159, .
      .003067
1110 DATA .002977, .002889, .00280
      .4
1120 DATA .00272, .00264, .002561,
      .002484, .00241, .002337, .002
      .267
1130 DATA .002199, .002132, .00206
      .7
1140 DATA .002004, .001943, .00188
      .3, .001826, .001769, .001715, .
      .001662
1150 DATA .00161, .00156, .001511
1160 DATA .001464, .001418, .00137
      .3, .00133, .001288, .001247, .0
      .01207
1170 DATA .001169, .001132, .00109
      .5
1180 DATA .00106, .001026, .000993
      ., .000961, .00093, .000899, .00
      .087
1190 DATA .000841, .000814, .00078
      .7
1200 DATA .0007611, .0007359, .000
      .7115, .0006879, .000665, .0006
      .423
1210 DATA .0006213, .0006004, .000
      .5802, .0005606
1220 DATA .0005417, .0005233, .000
      .5055, .0004883, .0004716, .000
      .4555
1230 DATA .0004398, .0004247, .000
      .4101, .0003959
1240 DATA .0003822, .0003689, .000
      .356, .0003436, .0003316, .0003
      .199
1250 DATA .0003087, .0002978, .000
      .2873, .0002771
1260 DATA .0002673, .0002577, .000
      .2485, .0002396, .0002311, .000
      .2227

```

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

1270 DATA .0002147,.000207,.0001
      995,.0001922
1280 DATA .0001852,.0001785,.000
      172,.0001657,.0001596,.0001
      537
1290 DATA .000148,.0001426,.0001
      373,.0001322
1300 DATA .0001273,.0001225,.000
      1179,.0001135,.0001093,.000
      1051
1310 DATA .0001012,.0000973,.000
      0936,.0000901
1320 DATA .00008666,.00008335,.0
      00008016,.00007709,.00007413
      ,.00007127
1330 DATA .00006852,.00006587,.0
      0006331,.00006085
1340 DATA .00005848,.0000562,.00
      0054,.00005188,.00004984,.0
      0004788
1350 DATA .00004599,.00004417,.0
      0004242,.00004073
1360 DATA .00003911,.00003755,.0
      0003605,.0000346,.00003321,
      .00003188
1370 DATA .00003059,.00002935,.0
      0002816,.00002702
1380 DATA .00002592,.00002486,.0
      0002385,.00002287,.00002193
      ,.00002103
1390 DATA .00002016,.00001933,.0
      0001853,.00001776
1400 DATA .00001702,.00001632,.0
      0001563,.00001498,.00001435
      ,.00001375
1410 DATA .00001317,.00001262,.0
      0001208,.00001157
1420 DATA .00001108,.00001061,.0
      0001016,.00000972,.00000931
      ,.00000891
1430 DATA .00000852,.00000816,.0
      0000781,.00000747
1440 DATA .00000714
1450 CLEAR @ DISP "END OF PROGRA
      M" @ END

```

End of program

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Chi-Square Test

File Name S E V P R O

Contributor's Name

Company *(if applicable)*

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 5,663

Program Description: This program applies a chi-square test to several sample proportions. It determines the probability that the test portions variance is due to chance alone.

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II**Sample Problem**

Number of samples = 4

Sample size, number of successes

Sample #1: 1217,45

Sample #2: 948,49

Sample #3: 1165,33

Sample #4: 1121,44

SOLUTION:

LOAD "SEVPRO".

RUN.

Enter input data as prompted.

**CHI-SQUARE TEST OF SEVERAL
PROPORTIONS**

SAMPLE	SUCCS/TOTAL	PCT SUCC
1	45/ 1217	3.6980
2	49/ 948	5.1690
3	33/ 1165	2.8330
4	44/ 1121	3.9250

CHI-SQUARED = 7.81992615347
CORRESPONDING NORMAL DEVIATE =
1.65455516541

BEING EXCEEDED BY CHANCE ALONE
IS .06

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III**Operating Limits and Warnings****Reference(s)****Variables:**

Name	Description	Length	Comments
M	Number of samples		
N(I)	Sample size		
Z(I)	Number of successes per sample		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP**INSTRUCTIONS**

- 1 LOAD "SEVPRO" and press RUN.
- 2 Enter input data as prompted.
- 3 Results will be displayed.
- 4 Select option to change data or end program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 OPTION BASE 1
20 DIM X(49),Z(100),N(100)
30 DEF FND(V) = X(V)-X(V-1)
40 X(1)=5000000 @ X(2)=5398280
   @ X(3)=5792600 @ X(4)=617911
   0
50 X(5)=6554220 @ X(6)=6914620
   @ X(7)=7257470 @ X(8)=758036
   0
60 X(9)=7881450 @ X(10)=8159400
   @ X(11)=8413450 @ X(12)=864
   3340
70 X(13)=8849300 @ X(14)=903200
   0 @ X(15)=9192430
80 X(16)=9331930 @ X(17)=945201
   0 @ X(18)=9554350
90 X(19)=9640700 @ X(20)=971283
   0 @ X(21)=9772500
100 X(22)=9821360 @ X(23)=986097
   0 @ X(24)=9892760
110 X(25)=9918030 @ X(26)=993790
   0 @ X(27)=9953390
120 X(28)=9965330 @ X(29)=997445
   0 @ X(30)=9981340
130 X(31)=9986500 @ X(32)=999032
   0 @ X(33)=9993130
140 X(34)=9995170 @ X(35)=999663
   0 @ X(36)=9997670
150 X(37)=9998410 @ X(38)=999892
   0 @ X(39)=9999280
160 X(40)=9999520 @ X(41)=999683
   @ X(42)=999793 @ X(43)=9999
   987
170 X(44)=9999920 @ X(45)=999995
   0 @ X(46)=9999970
180 X(47)=9999980 @ X(48)=999999
   0 @ X(49)=9999995
190 N9=0 @ Z9,F9=1 @ GOSUB 310
200 GOSUB 440 @ GOSUB 500
210 ON KEY# 1,"ADD/SAM" GOSUB 31
   0
220 ON KEY# 2,"SIZ/SUC" GOSUB 32
   0
230 ON KEY# 3,"PRINT" GOSUB 750
240 ON KEY# 4,"COMPUTE" GOSUB 50
   0
250 ON KEY# 8,"END" GOTO 770
260 CLEAR @ DISP "USE KEY#1 TO C
   HANGE THE NUMBER
   OF SAMPLES"
270 DISP "USE KEY#2 TO CHANGE SI
   ZE AND SUCCESS
   DATA FOR A SAMP
   LE"
280 DISP "USE KEY#3 FOR A PRINTO
   UT OF RESULTS"
290 DISP "USE KEY#4 TO COMPUTE V
   ALUES USE KEY#5 TO END T
   HE PROGRAM"
300 KEY LABEL @ GOTO 300

```

Data statements

Label soft keys

Display soft key functions

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

310 CLEAR @ DISP "ENTER THE NUMB
ER OF SAMPLES YOU HAVE";@ IN
PUT M@ RETURN
320 CLEAR @ DISP "ENTER NUMBER O
F SAMPLES YOU WISHTO CHANGE"
;@ INPUT N9
330 DISP "ENTER FIRST SAMPLE #"
@ INPUT Z9
340 IF Z9+N9-1>M THEN M=Z9+N9-1
350 IF N9>1 THEN DISP "ARE THESE
SAMPLES SEQUENTIAL";@ INPUT
A$ ELSE N8=Z9 @ A$C1,1]="Y"
@ GOTO 410
360 IF A$C1,1]="Y" THEN N8=Z9+N9
-1 @ GOTO 410
370 DISP "ENTER THE SAMPLE NUMBE
R EACH TIME A QUESTION MA
RK APPEARS"
380 Z9(1)=Z9 @ DISP "BEGINNING W
ITH THE SECOND SAMPLE"
390 FOR J=2 TO N9 @ INPUT Z9(J)@
NEXT J
400 N8=N9 @ Z9=1
410 FOR I=Z9 TO N8
420 IF A$C1,1]"Y" THEN I=Z9(I)
@ I1=I
430 GOTO 460
440 A$C1,1]="Y"
450 FOR I=1 TO M
460 DISP "ENTER SAMPLE SIZE, NUMB
ER OF SUCCESSES FOR SAMP
LE ";VAL$(I);@ INPUT N(I),Z(
I)
470 IF A$C1,1]"Y" THEN I=I1
480 NEXT I
490 RETURN
500 S1,S2,S3=0
510 FOR I=1 TO M
520 S1=S1+N(I) @ S2=S2+Z(I)
530 S3=S3+Z(I)^2/N(I)
540 NEXT I
550 A=(S3-S2^2/S1)/(M-1)
560 B=S2/S1*(1-S2/S1)
570 C2=(M-1)*A/B @ F=M-1
580 B1=((C2/F)^(1/3)-(1-2/(9*F))
)/SQR(2/(9*F))
590 IF B1<-4.5 THEN B2=0 @ GOTO
640
600 IF B1>=4.5 THEN B2=1 @ GOTO
640
610 Z=10*ABS(B1) @ K=INT(Z)
620 D1=Z-K @ Q=X(K)+D1*FND(K+1)+
D1*(D1-1)/2*(FND(K+2)-FND(K+
1)) @ Q=.001*INT(.5+.0001*Q)
630 IF B1<0 THEN B2=1-Q ELSE B2=
Q
640 CLEAR @ DISP USING "2/"
650 DISP "CHI-SQUARE TEST OF SEV
ERAL PROPORTIONS" @ DIS
P

```

Data entry

Calculation subroutine

Display results

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

660 DISP "SAMPLE      SUCCS/TOTAL
      PCT SUCC" @ DISP
670 FOR I=1 TO M
680 DISP USING "X,3D,5X,5D,A,5D,
      3X,2D.4D" ; I,Z(I),"/",N(I),
      .001*INT(.5+100000*Z(I)/N(I)
      )
690 IF F9 AND (RMD(I,7)=0 OR I=M
      ) THEN DISP @ DISP "*** PRES
      S CONT TO CONTINUE ***" @ PA
      USE
700 NEXT I @ DISP
710 DISP "CHI-SQUARED = ";VAL$(C
      2) @ DISP "CORRESPONDING NOR
      MAL DEVIATE = ";B1
720 DISP @ DISP "BEING EXCEEDED
      BY CHANCE ALONE  IS ";VAL$(1
      -B2) @ DISP
730 IF F9 THEN DISP "*** PRESS C
      ONT TO CONTINUE ***" @ PAUSE
740 RETURN
750 CRT IS 2 @ F9=0 @ GOSUB 640
760 CRT IS 1 @ F9=1 @ RETURN
770 CLEAR @ DISP "END OF PROGRAM
      " @ END

```

Print option

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Exact Probability of an F-Ratio with Degrees of Freedom

File Name F V A L U E

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 1,516

Program Description: This program computes the exact probability of an F-value with degrees of freedom ($\frac{M}{N}$).

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II**Sample Problem**

F-value : 6.7
Numerator : 5
Denominator: 11

SOLUTION:

LOAD "FVALUE".
RUN.

Enter input data as prompted.

THE EXACT PROBABILITY OF F= 6.7
WITH (5,11) D.F.

IS .00464

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III

Operating Limits and Warnings There is a discontinuity in the approximation used in this program. It will not affect values in the critical range.

Reference(s)**Variables:**

Name	Description	Length	Comments
G	F-value		
M	Numerator (D.F)		
N	Denominator (D.F)		
P	Probability		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "FVALUE" and press RUN.
2	Enter input values as prompted.
3	Results will be displayed.
4	Select change option, or terminate program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 F9=1
20 CLEAR @ DISP "THERE IS A DIS
  CONTINUITY IN THE APPROXIMAT
  ION USED IN THIS"
30 DISP "PROGRAM; HOWEVER, IT W
  ILL NOT AFFECT VALUES IN T
  HE CRITICAL RANGE."
40 DISP USING "2/" @ DISP "ENTE
  R F-VALUE, NUMERATOR D.F.,
  AND DENOMINATOR D.F.";
50 INPUT G,M,N @ P=1 @ GOSUB 220
60 ON KEY# 1,"F-VALUE" GOSUB 17
  0
70 ON KEY# 2,"NUMER" GOSUB 180
80 ON KEY# 3,"DENOM" GOSUB 190
90 ON KEY# 4,"COMPUTE" GOSUB 22
  0
100 ON KEY# 7,"END" GOTO 360
110 ON KEY# 8,"PRINT" GOSUB 200
120 CLEAR @ DISP "USE KEY# TO "
130 DISP " 1      CHANGE F-VALUES
        2      CHANGE THE
        DENOMINATOR "
140 DISP " 3      CHANGE THE NUM
        ERATOR      4      TO COMPUTE
        NEW VALUES "
150 DISP " 7      TO TERMINATE TH
        E PROGRAM  8      TO PRINT VA
        LUES"
160 KEY LABEL @ GOTO 160
170 CLEAR @ DISP "ENTER NEW F-VA
  LUE" @ INPUT G @ RETURN
180 CLEAR @ DISP "ENTER NEW NUME
  RATOR D.F." @ INPUT M @ RETUR
  N
190 CLEAR @ DISP "ENTER NEW DEMO
  NINATOR D.F." @ INPUT N @ RETU
  RN
200 CRT IS 2 @ F9=0 @ GOSUB 290
210 F9=1 @ CRT IS 1 @ RETURN
220 IF G*M*N=0 THEN DISP "YOU HA
  VE ERRED, REENTER VALUES" @
  GOTO 40
230 IF G<1 THEN A=N @ B=M @ F=1/
  G ELSE A=M @ B=N @ F=G
240 A1=2/(9*A) @ B1=2/(9*B)
250 Z=ABS((1-B1)*F^.333333-1+A1)
  @ Z=Z/SQR(B1*F^.666667+A1)
260 IF B<4 THEN Z=Z*(1+.08*Z^4/B
  ^3)
270 P=(1+Z*(.196854+Z*(.115194+Z
  *(.000344+Z*.019527))))^4
280 P=.5/P @ IF G<1 THEN P=1-P
290 CLEAR @ DISP USING "3/"
300 DISP "THE EXACT PROBABILITY
  OF F= ";VAL$(G)
310 DISP "WITH (";VAL$(M);",";VA
  L$(N);") D.F."
320 DISP USING "2/" @ DISP "IS "
  ;INT(100000*P)/100000

```

Data entry

Variable change subroutine

Print subroutine

Compute subroutine

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```
330 DISP USING "2/"
340 IF F9 THEN DISP "*** PRESS C
    ONT TO CONTINUE ***" @ PAUSE
350 CLEAR @ RETURN
360 END
```


SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Binomial, Poisson and Hypergeometric Probabilities

File Name P R O B

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 3,566

Program Description: This program computes Binomial, Poisson and Hypergeometric probabilities for user entered data.

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II**Sample Problem**

Which distribution are you using: H
Lot size : 1000
Number of defectives in lot : 10
Sample size : 100
Number of defectives in sample : 2

SOLUTION:

LOAD "PROB".
RUN.

Enter input data as prompted.

PROBABILITIES ARE:

EXACTLY X	X OR LESS	X OR MORE
-----	-----	-----
.19447	.93076	.26370

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
A\$	Type of probability		
N	Lot size		
K	Number of defectives per lot		
N1	Sample size		
X	Number of defectives per sample		
P2	Proportion of defectives per lot		
M	Number of expected defectives per sample		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP**INSTRUCTIONS**

- 1 LOAD "PROB" and press RUN.
- 2 Enter input values as prompted.
- 3 Results will be displayed.
- 4 Select option to change data or to end program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 DEF FND(Z) = INT(10^5*Z+.5)/
  10^5
20 DIM B$(113),C$(32)
30 M,P2,K=-1 @ F9=1
40 B$="USE KEY#      TO
      1      CHANGE THE
      NUMBER OF      DEFECT
      IVES IN"
50 B$(89)="THE      SA
      MPLE" @ C$="      2      CHANGE
      THE SAMPLE SIZE"
60 GOSUB 250 @ GOTO 330
70 ON KEY# 1,"#DEF/SA" GOSUB 30
  0 @ ON KEY# 2,"SAMP/SZ" GOSU
  B 290
80 IF A$(1,1)="H" THEN ON KEY#
  3,"LOTSIZE" GOSUB 270 @ ON K
  EY# 5,"#DEF/LT" GOSUB 280 EL
  SE 110
90 ON KEY# 4,"COMPUTE" GOTO 380
  @ CLEAR @ DISP B$ @ DISP C$
100 DISP "      5      CHANGE # OF
      DEFECTIVES      IN LOT"
  @ GOTO 180
110 IF A$(1,1)="B" THEN ON KEY#
  3,"PRO/DEF" GOSUB 310 @ OFF
  KEY# 5 ELSE 140
120 ON KEY# 4,"COMPUTE" GOTO 500
130 CLEAR @ DISP B$ @ DISP C$ @
  DISP "      3      CHANGE PROPO
      RTION OF      DEFECTIV
      ES IN LOT"
140 IF A$(1,1)="P" THEN OFF KEY#
  5 @ ON KEY# 2,"EX/DE/S" GOS
  UB 320 ELSE 180
150 ON KEY# 4,"COMPUTE" GOTO 580
  @ ON KEY# 3,"PRINT" GOSUB 8
  00 @ CLEAR @ DISP B$
160 DISP "      2      CHANGE THE E
      XPECTED      NUMBER O
      F DEFECTIVES"
170 DISP "      IN THE SAMPL
      E      3      PRINT TH
      E RESULTS"
180 DISP "      4      COMPUTE VALU
      ES      6      CHANGE P
      ROBABILITY      TYPE
      "
190 DISP "      7      END THE PROG
      RAM"
200 ON KEY# 6,"PROB/TY" GOSUB 82
  0
210 OFF KEY# 8
220 IF A$(1,1)="#P" THEN DISP "
      8      PRINT THE RESULTS" @
      ON KEY# 8,"PRINT" GOSUB 800
230 ON KEY# 7,"END" GOTO 830
240 KEY LABEL @ GOTO 240
250 CLEAR @ DISP "WHICH DISTRIBU
      TION ARE YOU USINGHYPERGEOME
      TRIC(H), BINOMIAL(B), OR POI
      SSON(P)";

```

Label and define soft key functions

Data entry

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

260 INPUT A$@ RETURN
270 CLEAR @ DISP "ENTER LOT SIZE
";@ INPUT N@ RETURN
280 CLEAR @ DISP "ENTER NUMBER O
F DEFECTIVES IN LOT";@ INP
UT K@ RETURN
290 CLEAR @ DISP "ENTER SAMPLE S
IZE";@ INPUT N1@ RETURN
300 CLEAR @ DISP "ENTER NUMBER O
F DEFECTIVES IN SAMPLE";@
INPUT X@ RETURN
310 CLEAR @ DISP "ENTER PROPORTI
ON OF DEFECTIVES IN LOT";@
INPUT P2@ RETURN
320 CLEAR @ DISP "ENTER NUMBER O
F EXPECTED DEFECTIVES
IN SAMPLE";@ INPUT M@ RETUR
N
330 IF A$[1,1]="H" THEN GOTO 380
340 IF A$[1,1]="B" THEN GOTO 500
350 IF A$[1,1]="P" THEN GOTO 580
360 DISP "YOU MISENTERED YOUR CH
OICE OF PROBABILITIES- TRY
AGAIN "
370 WAIT 5000 @ GOSUB 250 @ GOTO
330
380 IF K=-1 THEN GOSUB 270 @ GOS
UB 280 @ GOSUB 290 @ GOSUB 3
00
390 N(1)=N-K @ N(2)=N-N1
400 N(3)=N @ N(5)=K @ N(6)=N1
410 S1=0
420 FOR L=0 TO X
430 N(4)=N-K-N1+L @ N(7)=K-L
440 N(8)=N1-L @ N(9)=L
450 T=9 @ GOSUB 650
460 P1=S1 @ P=F(1)+F(2)-F(3)-F(4
)+F(5)+F(6)-F(7)-F(8)-F(9)
470 P=EXP(P) @ S1=S1+P
480 NEXT L
490 GOSUB 730 @ GOTO 70
500 IF P2=-1 THEN GOSUB 290 @ GO
SUB 310 @ GOSUB 300
510 N=N1 @ S1=0
520 FOR L=0 TO X
530 N(1)=N @ N(2)=N-L @ N(3)=L
540 T=3 @ GOSUB 650
550 P1=S1 @ P=EXP(F(1)-F(2)-F(3)
+L*LOG(P2)+(N-L)*LOG(1-P2))
560 S1=S1+P @ NEXT L
570 GOSUB 730 @ GOTO 70
580 IF M=-1 THEN GOSUB 320 @ GOS
UB 300
590 S1=0
600 FOR L=0 TO X
610 N(1)=L @ T=1 @ GOSUB 650
620 P1=S1 @ P=EXP(L*LOG(M)-M-F(1
)) @ S1=S1+P
630 NEXT L
640 GOSUB 730 @ GOTO 70

```

Error display

Calculation subroutine

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

650 FOR I=1 TO T
660 IF N(I)>=10 THEN F(I)=.91893
    9+(N(I)+.5)*LOG(N(I))-N(I)+1
    /(12*N(I)) @ GOTO 710
670 IF N(I)<=1 THEN F(I)=0 @ GOT
    O 710
680 K9=1
690 FOR J=2 TO N(I) @ K9=K9*J @
    NEXT J
700 F(I)=LOG(K9)
710 NEXT I
720 RETURN
730 CLEAR @ DISP USING "2/"
740 DISP "PROBABILITIES ARE:"
750 DISP @ DISP "EXACTLY X  X OR
    LESS  X OR MORE -----"
    -----"
760 DISP USING "/",X,2(D.50,3X),D
    .50" ; FND(P),FND(S1),FND(1-
    P1)
770 DISP USING "2/"
780 IF F9 THEN DISP "*** PRESS C
    ONT TO CONTINUE ***" @ PAUSE
790 RETURN
800 CRT IS 2 @ F9=0 @ GOSUB 730
810 CRT IS 1 @ F9=1 @ RETURN
820 M,P2,K=-1 @ GOSUB 250 @ GOTO
    330
830 CLEAR @ DISP "PROGRAM ENDED"
    @ END

```

Display results

Printer option

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Fisher's Exact Probability Test

File Name F I S H E R

Contributor's Name

Company *(if applicable)*

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 1,665

Program Description: This program analyzes discrete data from two independent small random samples which fall into one or the other of two mutually exclusive classes. The result is the probability of occurrence by chance of the distribution under examination.

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II**Sample Problem**

Frequency--Cell A: 10
 Cell B: 0
 Cell C: 4
 Cell D: 5

SOLUTION:

LOAD "FISHER".
 RUN.

Enter input values as prompted.

SUMMARY TABLE

+-----+-----+	
10 0	10
+-----+-----+	
4 5	9
+-----+-----+	
14 5	19

P= .01084

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III**Operating Limits and Warnings**

Reference(s) Siegal, Sidney, NON-PARAMETRIC STATISTICS, McGraw-Hill,
New York, 1956, page 96.

Variables:

Name	Description	Length	Comments
A	Cell A frequency		
B	Cell B frequency		
C	Cell C frequency		
D	Cell D frequency		
P	Change probability		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP**INSTRUCTIONS**

- 1 LOAD "FISHER" and press RUN.
- 2 Enter the cell frequency amounts.
- 3 Results will be displayed.
- 4 Select option to change frequency amounts, or to end program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 DIM A$(23)
20 A$="+-----+-----+"
30 DEF FNA(Y)
40 FOR I=1 TO Y @ X=X*I @ NEXT
   I
50 FNA=X
60 FN END
70 F9=1
80 GOSUB 230 @ GOSUB 240
90 GOSUB 250 @ GOSUB 260
100 GOSUB 270
110 ON KEY# 1,"CELL A" GOSUB 230
120 ON KEY# 2,"CELL B" GOSUB 240
130 ON KEY# 3,"CELL C" GOSUB 250
140 ON KEY# 4,"CELL D" GOSUB 260
150 ON KEY# 5,"COMPUTE" GOSUB 27
   0
160 ON KEY# 6,"PRINT" GOSUB 480
170 ON KEY# 8,"END" GOTO 500
180 CLEAR @ DISP "USE KEY# TO CH
   ANGE FREQUENCY IN"
190 DISP USING "4(5X,A,10X,6A,10
   X)"; "1","CELL A","2","CELL
   B","3","CELL C","4","CELL D
   "
200 DISP "KEY#5 COMPUTES VALUES"
210 DISP "KEY#6 PRINTS THE RESUL
   TS","KEY#8 ENDS THE PROGRAM"
220 KEY LABEL @ GOTO 220
230 CLEAR @ DISP "ENTER THE FREQ
   UENCY IN CELL A";@ INPUT A@
   RETURN
240 CLEAR @ DISP "ENTER THE FREQ
   UENCY IN CELL B";@ INPUT B@
   RETURN
250 CLEAR @ DISP "ENTER THE FREQ
   UENCY IN CELL C";@ INPUT C@
   RETURN
260 CLEAR @ DISP "ENTER THE FREQ
   UENCY IN CELL D";@ INPUT D@
   RETURN
270 N=A+B+C+D @ D1,D2,D3,D4,D5,N
   1,N2,N3,N4,N5=1
280 X=N1 @ N1=FNA(A+B)
290 X=N2 @ N2=FNA(C+D)
300 X=N3 @ N3=FNA(A+C)
310 X=N4 @ N4=FNA(B+D)
320 X=D1 @ D1=FNA(N)
330 X=D2 @ D2=FNA(A)
340 X=D3 @ D3=FNA(B)
350 X=D4 @ D4=FNA(C)
360 X=D5 @ D5=FNA(D)
370 CLEAR @ DISP @ DISP "
   SUMMARY TABLE"
380 DISP "-----"
390 DISP @ DISP A$ @ DISP USING
   400 ; A,B,A+B
400 IMAGE 5X,DD,8X,DD,8X,DD/
410 DISP A$ @ DISP USING 400 ; C
   ,D,C+D

```

Define soft key functions

Data entry

Computation subroutine

Display results

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```
420 DISP A$ @ DISP USING 400 ; A
    +C,B+D,N
430 P=N1*N2*N3*N4
440 P=P/(D1*D2*D3*D4*D5)
450 DISP USING "/",3A,3X,2D.5D" ;
    "P=",P @ DISP
460 IF F9 THEN DISP "*** PRESS C
    ONT TO CONTINUE ***" @ PAUSE
470 RETURN
480 CRT IS 2 @ F9=0 @ GOSUB 270
490 CRT IS 1 @ F9=1 @ RETURN
500 CLEAR @ DISP "PROGRAM TERMIN
    ATED"
510 END
```

Printer option

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Subjective Probability Distribution

File Name S U B D I S

Contributor's Name

Company (*if applicable*)

Address

City

State/Country

Zip Code/Mail Code

Machine Size: 16K ☒ 32K ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 7,710

Program Description: This program allows the user to determine a subjective probability distribution which represents his state of knowledge about some random variable. Three values are provided:

- A. The minimum possible value,
- B. The maximum possible value, and
- C. The most likely value (the mode).

This program fits a truncated, modified Weibull distribution to the three values and prints an initial histogram showing the relative likelihood that the true value is contained in an interval.

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II

Sample Problem

Minimum possible value: 15

Maximum possible value: 43

Most likely value : 31

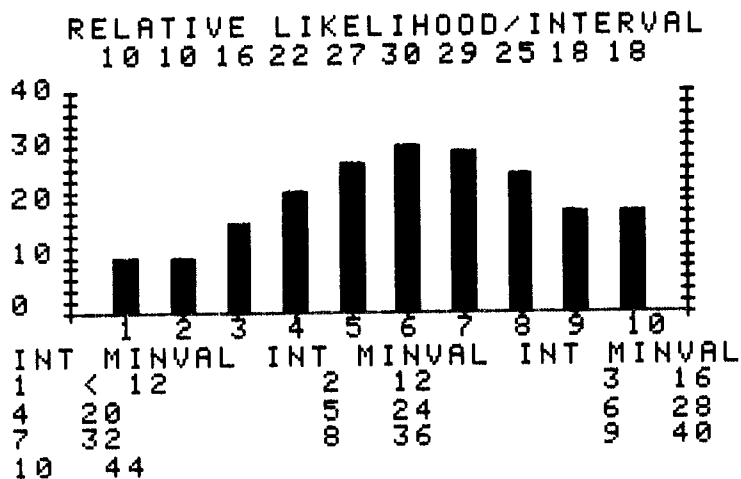
To duplicate the following printout, press 'CONT' on first printout of histogram.

SOLUTION:

LOAD "SUBDIS".

RUN.

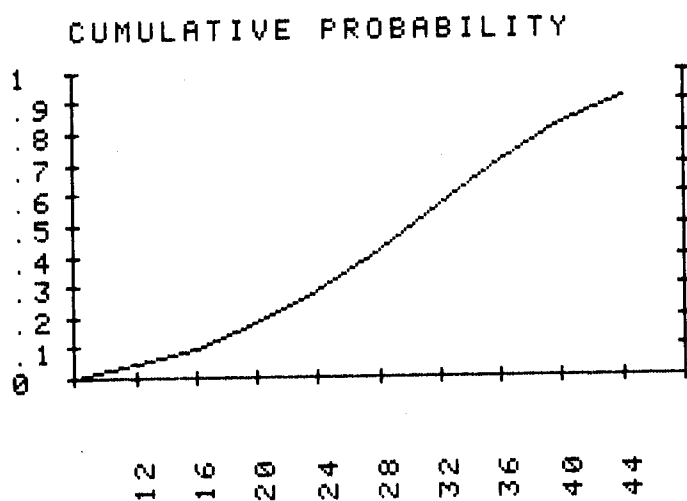
Enter input values as prompted.



SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION II

FROM	TO	PROBABILITY MASS
BELOW	12.00	.049
12.00	15.99	.049
16.00	19.99	.078
20.00	23.99	.107
24.00	27.99	.132
28.00	31.99	.146
32.00	35.99	.141
36.00	39.99	.122
40.00	43.99	.088
44.00	& ABOVE	.088



SERIES 80 USERS' LIBRARY
PROGRAM DESCRIPTION III

Operating Limits and Warnings Minimum ≥ 1 , Maximum < 1000 , Max-Min > 1 ,
and Min $<$ Mode $<$ Max.

Reference(s)

Variables:

Name	Description	Length	Comments
Z(1)	Minimum value		
Z(2)	Maximum value		
MØ	Most likely value		
Z1	Interval to change		
Z2	Change amount		

SERIES 80 USERS' LIBRARY
USER INSTRUCTIONS

STEP**INSTRUCTIONS**

- 1 LOAD "SUBDIS" and press RUN.
- 2 Enter input data as prompted.
- 3 Histogram will be generated. (May take up to 5 minutes.)
- 4 Further results will be displayed.
- 5 Select option to change data or to end program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

10 DIM C(13),D(13),H(13),L(13),
   X(13),F(13)
20 F9=1 @ GOSUB 140 @ GOSUB 150
30 GOSUB 160 @ GOSUB 170
40 ON KEY# 1,"NEW/MIN" GOSUB 14
   0
50 ON KEY# 2,"NEW/MAX" GOSUB 15
   0
60 ON KEY# 3,"NEW/VAR" GOSUB 16
   0
70 ON KEY# 4,"COMPUTE" GOSUB 17
   0
80 ON KEY# 8,"END" GOTO 1900
90 CLEAR @ DISP "USE KEY#1 TO C
   HANGE THE MINIMUM
   VALUE."
100 DISP "      KEY#2 TO CHANGE TH
   E MAXIMUM          VALUE."
110 DISP "      KEY#3 TO CHANGE TH
   E MOST             LIKELY V
   ALUE OF THE"
115 DISP "      VARIABLE."
120 DISP "      KEY#4 TO COMPUTE T
   HE VALUES        KEY#5 TO END T
   HE PROGRAM"
130 KEY LABEL @ GOTO 130
140 CLEAR @ DISP "ENTER MINIMUM
   POSSIBLE VALUE    (>=1)";@ I
   NPUT Z(1)@ RETURN
150 CLEAR @ DISP "ENTER MAXIMUM
   POSSIBLE VALUE    (<10000)";
   @ INPUT Z(2)@ RETURN
160 CLEAR @ DISP "ENTER MOST LIK
   ELY VALUE OF      VARIABLE(M
   IN<X<MAX)";@ INPUT M0@ RETUR
   N
170 M9=M0 @ IF Z(1)>=M0 OR M0>=Z
   (2) THEN DISP "MOST LIKELY V
   ALUE OUTSIDE RANGE OF VALUES
   ." ELSE 190
180 IF Z(1)<1 THEN DISP "MINIMUM
   VALUE TOO SMALL, ENTER VALU
   E >=1" @ INPUT Z(1)
190 IF Z(2)>9999 THEN DISP "MAXI
   MIUM VALUE TOO LARGE, ENTER
   VALUE <10000" @ INPUT Z(2)
200 M3=Z(2)-Z(1)
210 IF M3<=1 THEN DISP "MINIMUM
   AND MAXIMUM VALUES TOO CLOS
   E, INCREASE INTERVAL" ELSE 2
   30
220 DISP "ENTER NEW MIN,MAX";@ I
   NPUT Z(1),Z(2)@ GOTO 170
230 CLEAR @ DISP USING "6/" @ DI
   SP "      COMPUTING VALUES"
240 IF M3<=10 THEN M4=10*M3 @ GO
   SUB 1260 @ M6=M5/10
250 IF M3>10 AND M3<=100 THEN M4
   =M3 @ GOSUB 1260 @ M6=M5
260 IF M3>100 AND M3<=1000 THEN
   M4=M3/10 @ GOSUB 1260 @ M6=1
   0*M5

```

Label and define soft key functions

Data entry

Computation subroutine

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

270 IF M3>1000 THEN M4=M3/100 @
    GOSUB 1260 @ M6=100*M5
280 L(1),H(1),L(2)=M6*INT(Z(1)/M
    6) @ H(2)=L(2)+M6-.01
290 FOR I=3 TO 13
300 L(I)=L(I-1)+M6 @ H(I)=L(I)+M
    6-.01 @ IF H(I)>=Z(2) THEN 3
    20
310 NEXT I
320 M8=I+1 @ L(M8),H(M8)=L(I)+M6
    @ N0=2 @ P(1)=.1 @ P(2)=.9
    @ GOSUB 1300
330 IF F0<0 THEN 380
340 FOR I=2 TO M8
350 C(I)=1-EXP(-L0/(L0+1)*ABS((L
    (I)-S0)/(M9-S0))^(L0+1))
360 NEXT I
370 GOTO 410
380 FOR I=2 TO M8
390 C(I)=EXP(-L0/(L0+1)*ABS((L(I
    )-S0)/(M9-S0))^(L0+1))
400 NEXT I
410 X(1)=C(2) @ N3,X(2)=C(3)-C(2
    )
420 FOR I=3 TO M8-1
430 X(I)=C(I+1)-C(I) @ IF X(I)>=
    N3 THEN N3=X(I)
440 NEXT I
450 X(M8)=1-C(M8)
460 IF X(1)>X(2) THEN X(1)=X(2)
470 IF X(M8)>X(M8-1) THEN X(M8)
    =X(M8-1)
480 FOR I=1 TO M8 @ X(I)=INT(30/
    N3*X(I)) @ NEXT I
490 CLEAR @ DISP "A HISTOGRAM FO
    LLOWS WHICH YOU WILL BE AS
    KED TO CHANGE TO YOUR"
500 DISP "LIKING. THIS HISTOGRAM
    IS SHOWN IN INTERVALS OF RE
    LATIVE LIKELI-"
510 DISP "HOOD. TO CHANGE THE V
    ALUE OF ANY INTERVAL PRESS
    SPECIAL KEY#3"
520 DISP "AND ENTER THE INTERVAL
    AND THE AMOUNT OF CHANGE (
    +/-X). THE"
530 DISP "RELATIVE AMOUNTS OF VA
    LUES ARE DISPLAYED OVER THE
    BARS. USE"
540 DISP "KEY#4 TO CONTINUE WHEN
    YOU ARE SATISFIED WITH THE
    HISTOGRAM."
550 DISP @ DISP "*** PRESS CONT
    TO CONTINUE ***" @ PAUSE
560 CLEAR @ GCLEAR @ SCALE -10,(
    M8+2)*10,-40,60
570 XAXIS 0,10,0,(M8+1)*10
580 YAXIS 0,2,0,40
590 YAXIS (M8+1)*10,2,0,40
600 MOVE 0,50 @ LABEL "RELATIVE
    LIKELIHOOD/INTERVAL"

```

Display histogram instructions

Histogram generation

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

610 MOVE -10,0 @ LABEL "0"
620 FOR I=9 TO 39 STEP 10
630 MOVE -10,I @ LABEL VAL$(I+1)
640 NEXT I
650 FOR I=1 TO M8
660 MOVE I*10-1,-5 @ LABEL VAL$(
I) @ NEXT I
670 MOVE -10,-10 @ LABEL "INT MI
NVAL INT MINVAL INT MINVAL"
@ J=-15
680 FOR I=1 TO M8 STEP 3
690 MOVE -10,J @ IF I=1 THEN LAB
EL "1 < "&VAL$(L(1)) ELSE L
ABEL VAL$(I)&" "&VAL$(L(I))
700 IF I+1<=M8 THEN MOVE 45,J @
LABEL VAL$(I+1)&" "&VAL$(L(
I+1))
710 IF I+2<=M8 THEN MOVE 95,J @
LABEL VAL$(I+2)&" "&VAL$(L(
I+2))
720 J=J-5 @ NEXT I
730 FOR I=10 TO M8*10 STEP 10
740 MOVE I-4,45 @ LABEL VAL$(X(I
/10))
750 FOR J=0 TO X(I/10) STEP .5
760 MOVE I-2,J @ IDRAW 4,0
770 NEXT J
780 NEXT I
790 MOVE 60,-40 @ LABEL "CHANGE
CONT"
800 ON KEY# 3 GOSUB 1710
810 ON KEY# 4 GOTO 830
820 GOTO 820
830 N7=0 @ NORMAL @ CLEAR
840 DISP "DO YOU WANT A COPY OF
THE HISTOGRAM";@ INPUT
Z9$
850 IF Z9$[1,1]="Y" THEN GRAPH @
COPY @ NORMAL
860 FOR I=1 TO M8
870 N7=N7+X(I) @ NEXT I
880 FOR I=1 TO M8
890 D(I)=X(I)/N7 @ NEXT I
900 CLEAR
910 DISP "FROM TO PROBAB
ILITY MASS"
920 DISP USING "5A,4X,4D.2D,4X,D
.3D" ; "BELOW",L(1),D(1)
930 FOR I=2 TO M8-1
940 DISP USING "4D.2D,2X,4D.2D,4
X,D.3D" ; L(I),H(I),D(I)
950 NEXT I
960 DISP USING "4D.2D,2X,7A,4X,D
.3D" ; L(M8),"& ABOVE",D(M8)
970 IF F9 THEN DISP "*** PRESS C
ONT TO CONTINUE ***" @ PAUSE
ELSE 1000
980 DISP "DO YOU WANT A COPY OF
THE PROBABILITY MASS";
@ INPUT Z9$

```

Print option

Display probability mass results

Print option

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```

990 IF Z9$[1,1]="Y" THEN CRT IS
    2 @ F9=0 @ GOTO 910
1000 F9=1 @ CRT IS 1
1010 F(1)=0
1020 FOR I=2 TO M8
1030 F(I)=F(I-1)+D(I-1) @ NEXT I
1040 GCLEAR @ SCALE -10,(M8+1)*1
    0,-.5,1.3
1050 CLEAR @ DISP "CUMULATIVE PR
    OBABILITY GRAPH    FOLLOWS.
    USE KEY#3 TO GET A COPY"
1060 DISP "USE KEY #4 TO CONTINU
    E" @ DISP USING "3/,K" ; "*"
    ** PRESS CONT TO CONTINUE *
    **" @ PAUSE
1070 XAXIS 0,10,0,M8*10
1080 YAXIS 0,.1,0,1
1090 YAXIS M8*10,.1,0,1
1100 MOVE 0,1.1 @ LABEL "CUMULAT
    IVE PROBABILITY"
1110 FOR I=0 TO 1 STEP .1
1120 MOVE -10,I-.05 @ LABEL VAL$
    (I) @ NEXT I
1130 LDIR -90
1140 FOR I=1 TO M8-1
1150 MOVE I*10+3,-.4 @ LABEL VAL
    $(L(I+1)) @ NEXT I
1160 MOVE 0,0
1170 FOR I=1 TO M8
1180 PLOT (I-1)*10,F(I)
1190 NEXT I
1200 LDIR 0 @ MOVE M8/5*10+30,-.
    5 @ LABEL " COPY    CONT"
1210 ON KEY# 3 GOSUB 1240
1220 ON KEY# 4 GOTO 1250
1230 GOTO 1230
1240 COPY @ RETURN
1250 GCLEAR @ CLEAR @ RETURN
1260 IF M4<20 THEN M5=2 @ RETURN
1270 IF M4<30 THEN M5=4 @ RETURN
1280 IF M4<50 THEN M5=5 @ RETURN
1290 M5=10 @ RETURN
1300 S1,S2=.01*ABS(Z(N0)-Z(1))
1310 N1,C1=0 @ R0=-10000000000
1320 IF ABS(M0-Z(1))<=ABS(M0-Z(N
    0)) THEN S0=Z(1)-S1 @ F0=1
    @ GOTO 1350
1330 S0=Z(N0)+S1 @ F0=-1
1340 FOR I=1 TO N0 @ P(I)=1-P(I)
    @ NEXT I
1350 FOR I=1 TO N0
1360 Q(I)=P(I)*(1-P(I)) @ C1=C1+
    P(I)^2/Q(I)
1370 NEXT I
1380 M1=M0-S0
1390 FOR I=1 TO N0
1400 V(I)=ABS((Z(I)-S0)/M1)
1410 NEXT I
1420 N1=N1+1
1430 GOSUB 1510

```

Cumulative probability graph
generation

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PROGRAM LISTING

Listing

Comments

```

1440 IF R1<R0 THEN 1480
1450 R0=R1 @ L4=L0 @ S0=S0-S1*F0
1460 S1=S1+S2 @ S2=S1-S2
1470 IF N1<11 THEN 1380
1480 S0=S0+S2*F0 @ L0=L4
1490 M0=(M0-S0)*F0 @ F0=F0/M0
1500 RETURN
1510 L2=.2 @ R1=-10000000000 @ L
    1=.1
1520 L0,R2,N2=0 @ GOTO 1540
1530 L1=.2 @ R1=C2
1540 L3=L1+1 @ C3=0
1550 FOR I=1 TO N0
1560 C2=EXP(L3*LOG(V(I)))*(L1/L3
    ) @ C3=C3+(P(I)-1+EXP(-C2))
    ^2/Q(I)
1570 NEXT I
1580 N2=N2+1 @ C2=1-C3/C1
1590 IF L1=.1 THEN 1530
1600 IF C2<R1 THEN 1660
1610 R1=C2 @ IF R2>0 THEN 1640
1620 L0=L2 @ L1=L1+L2 @ L2=L1-L2
1630 GOTO 1650
1640 L0=L1 @ L1=L1+L2
1650 IF N2<25 THEN 1540
1660 IF R2>0 THEN RETURN
1670 IF L2#L0 THEN L2=L2-L0
1680 L2,L0,R2=L2/4 @ L1=L0+L2/2
1690 R1=-10000000000 @ L0=L1
1700 GOTO 1540
1710 GCLEAR -36 @ MOVE -10,-40
1720 LABEL "INTERVAL" @ IMOVE 40
    ,0
1730 INPUT Z1 @ IMOVE 15,0
1740 LABEL "+/- AMOUNT" @ IMOVE
    55,0
1750 INPUT Z2 @ IF Z2<0 THEN J=-.
    5 @ PEN -1 ELSE J=.5
1760 IF X(Z1)+Z2-J>0 THEN 1790
1770 GCLEAR -31 @ MOVE -10,-35
1780 LABEL "ERROR-LIKELIHOOD<0 R
    EENTER" @ PEN 1 @ GOTO 1710
1790 FOR I=X(Z1) TO X(Z1)+Z2-J S
    TEP J
1800 MOVE Z1*10-2,I @ IDRAW 4,0
1810 NEXT I
1820 MOVE Z1*10-4,45 @ PEN -1
1830 LABEL VAL$(X(Z1)) @ PEN 1
1840 X(Z1)=X(Z1)+Z2
1850 MOVE Z1*10-4,45
1860 LABEL VAL$(X(Z1))
1870 GCLEAR -31 @ MOVE 60,-40
1880 LABEL "CHANGE CONT"
1890 RETURN
1900 CLEAR @ DISP "END OF PROGRA
    M" @ END

```

Interval change subroutine

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