

Bic Micro Metal

La Pen B-Roller  
Roller

Roll of 2	H <sub>i</sub>	St	N <sub>h</sub> roll of 5
✓	3	4	5
	2	W	

S1 Mi error

S2 St error ST .002

S1 .0753901 rms = .06468  
3.486 ratio  
.2653885

S2 .021611

S3 ~~to~~ .024259 ratio  
1.12

$\bar{\mu}$   
.0367 = rms  
.0346 = rms

```

DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70

```

(Stein & Bay) Feb 2, 99

U's are 2 PC's Game involving products of PC's.  
My In PC is best.

```

P = 0: Q = 0: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0
FOR J = 1 TO 18
READ A(X, 2), A(X, 3), A(X, 4), A(X, 5)
'PRINT A(X, 2), A(X, 3), A(X, 4), A(X, 5)
V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000: T = A(X, 5)
P = P + LOG(Z): Q = Q + LOG(1 - Z)
U = Z
SS1 = SS1 + T * (V * LOG(U) + (1 - V) * LOG(1 - U))
U = W
SS2 = SS2 + T * (V * LOG(U) + (1 - V) * LOG(1 - U))
U = 0 * Z + .26539
SS3 = SS3 + T * (V * LOG(U) + (1 - V) * LOG(1 - U))
U = V
SS4 = SS4 + T * (V * LOG(U) + (1 - V) * LOG(1 - U))
NEXT
P = EXP(P / 18): Q = EXP(Q / 18)
'PRINT P, Q, 1 / (1 - P - Q)
PRINT
PRINT SS1: "Simple Mean"
PRINT SS3: "My Best"
PRINT SS2: "Stein"
PRINT SS4: "Apostereori"

```

Use various constants to get distrib. estimators.  
 $\hat{M} = .105Z + .895W = .275$   
 $(.105 + .895 = 1.)$



2.1.99

SMFT

STEINS.BAS

STEINS.BAS

*M: 1000*

*mem. for  
program  
50000*

```

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DATA 1,346,400,290,367
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DATA 4,222,333,277,275
DATA 5,273,311,273,418
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DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70

```

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

NEXT

X = 132: Y = 368: C = 1: D = 1

30 FOR J = 1 TO 18

*← C & D were not reinitialized: By.*

Z = A(J, 3) \* .045 *randomizer = M: 95*

C = C \* (X + Z) / (X + Y + 45): D = D \* (Y + (45 - Z)) / (X + Y + 45)

NEXT

C = C ^ (1 / 18): D = D ^ (1 / 18)

X = (C / (1 - C - D) - 1) / 2: Y = (D / (1 - C - D) - 1) / 2

PRINT X, Y

INPUT H

GOTO 30

'STEIN'.BAS

Very n to STEIN S. Bas

```

DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
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DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70

```

```

FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT
R = 500
30 X = R * .2165: Y = R - X: C = 1: D = 1
40 FOR J = 1 TO 18
Z = A(J, 3) * .045
C = C * (X + Z) / (X + Y + 45): D = D * (Y + (45 - Z)) / (X + Y + 45)
NEXT
C = C ^ (1 / 18): D = D ^ (1 / 18)
X = ((C * (1 - C - D)) - 1) / 2: Y = ((D / (1 - C - D)) - 1) / 2
PRINT X, Y, X + Y, X / (X + Y)
INPUT R
GOTO 30

```

→ 25 print "30:J" X, Y

If I make Goto 30 → Go to 40 and I input 2 error times, it  
 quickly converges  $X = 2.370157$ ,  $Y = 8.579965$ ;  $(R) = 10.94612$ ,  $\frac{X}{X+Y} = .216593$ .  
 Now if I remain Go to 30, and input  $R = 10.946$ ; I get  $X = 15.77664$ ,  $Y = 47.28235$ !  
 OH! I forgot to normalize C, D.

'STEIN7.BAS

```

DIM A(20,5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
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DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70

```

```

FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT
R = 450: U = .265
30 X = R * U: Y = (1 - U) * R
A = X + 1: B = Y + 1: E = A + B
G = (E * LOG(E) - A * LOG(A) - B * LOG(B) + 1 / 2 * LOG(E / A / B / 2 / 3.1415926#)) * 18
FOR J = 1 TO 18
Z = .045 * A(J, 3): H = X + Z: L = Y + 45 - Z: F = H + L
G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
NEXT
PRINT R, U, G
INPUT R, U
GOTO 30

```

*should be " " for EC) - which is what I want.  
 " " " " for factorials (!).  
 " " " " for TC)*

*This program has a peak at U = .25, but G ↑ by 46 when R is doubled.*

*So no upper bound for G!*

u =	n = 1
.25574	1
.29737	1.2
.321	1.3

*one way: E = A + B, A = X, B = Y, E = A + B*

$$G = -B(\ln B + \ln(E+B)) + \frac{1}{2} \ln\left(\frac{E}{4\pi \cdot 2.77}\right) \times 18$$

*So*

2.7.99, SMAT STEIN

STEIN7.BAS

SEING.BAS

```

DIN A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
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```

This looks like an UnBuggy version of the program that I  
 caught: For  $K=18$ ,  $G(\text{final})$  is by about 6 for each  
 Doubling of  $R$ .

This  $E$  value of "6" is  $\propto K$ , so for  $K=9$  it is  
 $\frac{1}{2}$  as much.

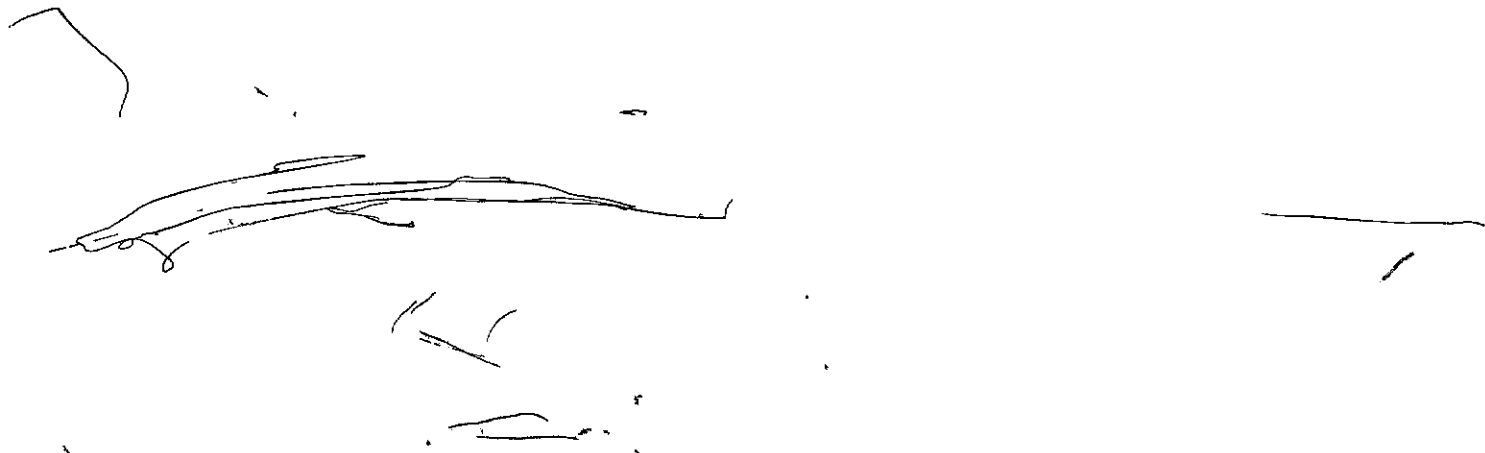
The expression for  $G$  of line 46, checks out as  $\ln$  of  $f$ .  
 Normalized factor of  $\int_0^1 t^x (1-t)^y dt$ . (I did t. S to check on various  $x, y$  values)

```

10 FOR J = 1 TO 18
  READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
  NEXT
20 K = 18
  R = 450: U = .265
  30 X = R * U: Y = (1 - U) * R
  A = X: B = Y: E = A + B
40 G = (E * LOG(E) - A * LOG(A) - B * LOG(B) + LOG(E + 1) + 1 / 2 * LOG(E / A / B / 2 / 3.14159265)) * K
  FOR J = 1 TO K
50 Z = .045 * A(J, 3): H = X + Z: L = Y + 45 - Z: F = H + L
60 G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
  NEXT
  PRINT R, U, G
  INPUT R, U
  GOTO 30

```

STG ✓  
 ST 7 is now  
 normal check  
 ST 12 is correct?  
 ST 9 is correct  
 ok ok  
 10 "  
 11 "  
 (5) 7, 9, 10, 11  
 (2):



'ST42.BAS

```

DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
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DATA 14,264,222,254,538
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DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70

```

```

FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT

```

```

PRINT
G = 0: K = 18: N = 210 ' ← N was varied as an "input"
FOR J = 1 TO K
U = .001 * A(J, 3)
A = U: B = (1 - U)
G = G + (A * LOG(A) + B * LOG(B)) * N
G = G + 1 / 2 * LOG(A * B * 6.28318 * N) - LOG(N + 1)

```

```

NEXT
PRINT N, G, rounded
U = .265 0.3889 : U = .265 3889
A = U: B = (1 - U)
G1 = (A * LOG(A) + B * LOG(B)) * K * N
G1 = G1 + 1 / 2 * LOG(A * B * 6.28318 * K * N) - LOG(K * N + 1)
PRINT G1, G - G1

```

ST42  
Stein 46  
50  
63  
64  
67  
68  
71



DEFDBL A-Z

'STEIN46.BAS

= S T 46. Bas

```
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
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DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
```

```
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT
K = 18
U = .2653889: N = 45
FOR JJ = 0 TO 22: R = 1 * 2 ^ (JJ)
30 X = R * U: Y = (1 - U) * R
A = X: B = Y: E = A + B
G = E * LOG(E) - A * LOG(A) - B * LOG(B) + LOG(E + 1)
G = (G + 1 / 2 * LOG(E / A / B / 2 / 3.141592654)) * K
FOR J = 1 TO K
Z = N * A(J, 3) / 1000: H = X + Z: L = Y + N - Z: F = H + L
G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
G = G + 1 / 2 * LOG(H * L * 2 * 3.141592654 / F) - LOG(F + 1)
NEXT J
PRINT U, R, G
NEXT JJ
```



PRINT  
DEFDBL A-Z

'STEIN50.BAS

```
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
```

```
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT
K = 18
U = .2653889: N = 45
FOR JJ = 0 TO 11: R = .81 * 2 ^ (JJ / 1)
30 X = R * U: Y = (1 - U) * R
A = X: B = Y: E = A + B
G = E * LOG(E) - A * LOG(A) - B * LOG(B) + LOG(E + 1)
G = (G + 1 / 2 * LOG(E / A / B / 2 / 3.14159)) * K
FOR J = 1 TO K
Z = N * A(J, 3) / 1000: H = X + Z: L = Y + N - Z: F = H + L
G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
G = G + 1 / 2 * LOG(H * L * 2 * 3.14159 / F) - LOG(F + 1)
NEXT J
PRINT U; R; G; G - 2*LOG(R)
NEXT JJ
```

PRINT  
DEFDBL A-Z

'ST61.BAS

DIM A(20, 5)  
DATA 1,346,400,290,367  
DATA 2,298,378,286,426  
DATA 3,276,356,281,521  
DATA 4,222,333,277,275  
DATA 5,273,311,273,418  
DATA 6,270,311,273,466  
DATA 7,263,289,268,586  
DATA 8,210,267,264,138  
DATA 9,269,244,259,510  
DATA 10,230,244,259,200  
DATA 11,264,222,254,277  
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DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

FOR J = 1 TO 18  
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)  
NEXT  
K = 18  
U = .2653889: N = 45  
FOR JJ = 0 TO 24 : R = 1\*.707 \* 2 ^ (JJ / 2)  
30 X = R \* U: Y = (1 - U) \* R  
A = X: B = Y: E = A + B  
G = E \* LOG(E) - A \* LOG(A) - B \* LOG(B) + LOG(E + 1)  
G = (G + 1 / 2 \* LOG(E / A / B / 2 / 3.14159)) \* K  
FOR J = 1 TO K  
Z = N \* A(J, 3) / 1000: H = X + Z: L = Y + N - Z: F = H + L  
G = G + H \* LOG(H) + L \* LOG(L) - F \* LOG(F)  
G = G + 1 / 2 \* LOG(H \* L \* 2 \* 3.14159 / F) - LOG(F + 1)  
NEXT J  
IF JJ > 0 THEN PRINT R; G; (G - G1)/LOG(2)\*2  
G1=G  
NEXT JJ

$$\frac{G - G_1}{\frac{1}{2} \ln 2}$$

```
DIM A(20, 5)
DATA 1,346,400,290,367
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DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
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DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
P = 0: Q = 0: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000: T = A(X, 5)
P = P + LOG(Z): Q = Q + LOG(1 - Z)
AA=AA+((.265-Z)^2)/Z/(1-Z)
NEXT
P = EXP(P / 18): Q = EXP(Q / 18)
PRINT
PRINT AA*45/18
```

```

PRINT
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
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DATA 4,222,333,277,275
DATA 5,273,311,273,418
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DATA 15,226,222,254,186
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DATA 18,200,156,239,70

```

```
U=.2653889:K=18:N=45
```

```

FOR J = 1 TO K
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT J

```

```

10 FOR JJ=-10 TO -1: A=1+JJ/2000
SS=0: SM=0

```

```

FOR J = 1 TO K
Z = A(J, 3) / 1000
ZZ=A*U+(1-A)*Z
SGS=Z*(1-Z)/N
SM=SM+(Z-ZZ)^2/SGS
SS=SS+(ZZ-U)^2
NEXT J
SS=SS/K

```

$$\begin{aligned}
ZZ &= A \cdot U + (1-A)Z = A(U-Z) + Z \\
(Z-ZZ)^2 &= (A(U-Z))^2 \\
(ZZ-U)^2 &= (1-A)Z - (1-A)U = (1-A)(Z-U) \\
ZZ-U &= A \cdot U + Z - AZ - U = AU - U + Z - AZ \\
&= U(A-1) + Z(1-A) = (1-A)(Z-U)
\end{aligned}$$

```

PRINT A, -(LOG(SS)*K/2)-SM/2
NEXT JJ
INPUT U
GOTO 10

```

$SM = \sum \frac{A^2(U-Z)^2}{6.2}$        $SS = (1-A)^2 \sum (U-Z)^2$   
This analyzes the behavior of the variance as a function of A!

PRINT

'ST67

67±

DIM A(20, 5)

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DATA 5,273,311,273,418  
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DATA 10,230,244,259,200  
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DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

U=.2653889:K=18:N=45:A=.1

FOR J = 1 TO K  
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)  
NEXT J

30 FOR JJ=1 TO 20: S=JJ/200  
S1=0: S2=0

FOR J = 1 TO K  
Z = A(J, 3) / 1000  
UU=A\*U+(1-A)\*Z  
S1=S1+(U-UU)^2  
S2=S2+(UU-Z)^2/Z/(1-Z)  
NEXT J  
S1=S1/S^2  
S2=S2\*N

*look at  $64\frac{1}{2}$  for some procs simplifica!*

PRINT A,S,S^(-K/2)\*EXP(-(S1+S2)/2)  
NEXT JJ  
INPUT A  
GOTO 30

```
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
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DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
```

```
U=.2653889:K=18:N=45:A=.1
```

```
FOR J = 1 TO K
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT J
```

```
30 FOR JJ=1 TO 20: S=JJ/200
S1=0: S2=0
```

```
FOR J = 1 TO K
Z = A(J, 3) / 1000
UU=A*U+(1-A)*Z
S1=S1+(U-UU)^2
S2=S2+((UU-Z)^2)/Z/(1-Z)
NEXT J
S1=S1/S^2
S2=S2*N
```

```
PRINT A,S,(S^(-K/2))*EXP(-(S1+S2)/2)
NEXT JJ
INPUT A
GOTO 30
```

```
PRINT
DIM A(20, 5):DEFDBL A-Z
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
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DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
```

```
U=.265:K=18:N=45:A=.1
```

```
FOR J = 1 TO K
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT J
```

```
30 INTT=0
FOR JJ=1 TO 100: S=JJ/100
S1=0: S2=0
```

```
FOR J = 1 TO K
Z = A(J, 3) / 1000
UU=A*U+(1-A)*Z
S1=S1+(U-UU)^2
S2=S2+((UU-Z)^2)/Z/(1-Z)
NEXT J
S1=S1/S^2
S2=S2*N
```

```
INTT=INTT+ (S^(-K/2))*EXP(-(S1+S2)/2)
NEXT JJ
PRINT A,INTT/100000000
INPUT A
GOTO 30
```

'ST71

DIM A(20, 5)

DATA 1,346,400,290,367  
DATA 2,298,378,286,426  
DATA 3,276,356,281,521  
DATA 4,222,333,277,275  
DATA 5,273,311,273,418  
DATA 6,270,311,273,466  
DATA 7,263,289,268,586  
DATA 8,210,267,264,138  
DATA 9,269,244,259,510  
DATA 10,230,244,259,200  
DATA 11,264,222,254,277  
DATA 12,256,222,254,270  
DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

SS=0: K=18: U=.2653889

FOR J = 1 TO K

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000: T = A(X, 5)

SS=SS+Z\*LOG(Z)+(1-Z)\*LOG(1-Z)

NEXT

SS=SS/K

SU=U\*LOG(U)+(1-U)\*LOG(1-U)

PRINT

PRINT EXP(SS) ,EXP(SU), EXP(SS-SU)



DIM A(20, 5)

'ST76

DATA 1,346,400,290,367

DATA 2,298,378,286,426

DATA 3,276,356,281,521

DATA 4,222,333,277,275

DATA 5,273,311,273,418

DATA 6,270,311,273,466

DATA 7,263,289,268,586

DATA 8,210,267,264,138

DATA 9,269,244,259,510

DATA 10,230,244,259,200

DATA 11,264,222,254,277

DATA 12,256,222,254,270

DATA 13,303,222,254,435

DATA 14,264,222,254,538

DATA 15,226,222,254,186

DATA 16,285,200,249,558

DATA 17,316,178,244,408

DATA 18,200,156,239,70

K=18:N=45:S=0:SS=0:P = 1: Q = 1: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

'PRINT X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000

P = P \* Z: Q = Q \* (1 - Z)

S=S+Z:SS=SS+Z\*Z

SS1 = SS1 + (V - Z) ^ 2

SS2 = SS2 + (V - W) ^ 2

SS3 = SS3 + (V - (N \* Z + 775\*.2653889)/(775+N) ) ^ 2

SS4 = SS4 + Z

NEXT

P = P ^ (1 / 18): Q = Q ^ (1 / 18)

'PRINT P, Q, 1 / (1 - P - Q)

PRINT SS1, SS2, SS3, SS4 / 18

U=S/K

SIG=SS/K-U\*U:NN=1/(SIG/U/(1-U)):R=N\*NN/(N-NN)

PRINT U, SIG, NN, R

```

DEFDBL A-Z
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
WW=775:K=18:N=45:P = 1: Q = 1:S=0:SS=0: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000
P = P * Z: Q = Q * (1 - Z)
S=S+Z:SS=SS+Z*Z
SS1 = SS1 + (V - Z) ^ 2
SS2 = SS2 + (V - W) ^ 2
SS3 = SS3 + (V - (N * Z + WW*.2653889)/(WW+N) ) ^ 2
SS4 = SS4 + Z
NEXT
P = P ^ (1 / 18): Q = Q ^ (1 / 18)
'PRINT P, Q, 1 / (1 - P - Q)
PRINT WW,SS1, SS2, SS3, SS4 / 18
U=S/K
SIG=SS/K-U*U:NN=U*(1-U)/SIG:R=N*NN/(N-NN)
PRINT SIG,NN,R

```

DEFDBL A-Z

'ST77A

```
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
RANDOMIZE TIMER
K=18:N=45:S=0:SS=0
DIM A(K, 5)
UU=.2653889: R=100
FOR JJ=1 TO K: X=0
FOR J=1 TO R
IF RND < UU THEN X=X+1
NEXT J
X=X/R: Y=0: 'PRINT JJ,X
FOR L=1 TO N
IF RND < X THEN Y=Y+1
NEXT L
A(JJ,3)=Y*1000/N: 'PRINT JJ,A(JJ,3)
NEXT JJ

FOR J = 1 TO K
GOTO 30
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
30 V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000
S=S+Z:SS=SS+Z*Z: 'PRINT J,Z
NEXT J
U=S/K
SIG=SS/K-U*U:AA=SIG-U/N+SS/K/N:RR=U*(1-U)/AA
PRINT SIG,RR,R
```

DEFDBL A-Z

DIM A(20, 5)

DATA 1, 346, 400, 290, 367

DATA 2, 298, 378, 286, 426

DATA 3, 276, 356, 281, 521

DATA 4, 222, 333, 277, 275

DATA 5, 273, 311, 273, 418

DATA 6, 270, 311, 273, 466

DATA 7, 263, 289, 268, 586

DATA 8, 210, 267, 264, 138

DATA 9, 269, 244, 259, 510

DATA 10, 230, 244, 259, 200

DATA 11, 264, 222, 254, 277

DATA 12, 256, 222, 254, 270

DATA 13, 303, 222, 254, 435

DATA 14, 264, 222, 254, 538

DATA 15, 226, 222, 254, 186

DATA 16, 285, 200, 249, 558

DATA 17, 316, 178, 244, 408

DATA 18, 200, 156, 239, 70

WW=552 :K=18:N=45:P = 1: Q = 1:S=0:SS=0: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000

P = P \* Z: Q = Q \* (1 - Z)

S=S+Z:SS=SS+Z\*Z

SS1 = SS1 + (V - Z) ^ 2

SS2 = SS2 + (V - W) ^ 2

SS3 = SS3 + (V - (N \* Z + WW\*.2653889)/(WW+N) ) ^ 2

SS4 = SS4 + Z

NEXT

P = P ^ (1 / 18): Q = Q ^ (1 / 18)

'PRINT P, Q, 1 / (1 - P - Q)

PRINT WW, SS1, SS2, SS3, SS4 / 18

U=S/K

SIG=SS/K-U\*U:AA=SIG-U/N+SS/K/N:R=U\*(1-U)/AA

PRINT SIG, R

'ST77B

DEFDBL A-Z

'ST77A->ST81

DATA 1,346,400,290,367  
DATA 2,298,378,286,426  
DATA 3,276,356,281,521  
DATA 4,222,333,277,275  
DATA 5,273,311,273,418  
DATA 6,270,311,273,466  
DATA 7,263,289,268,586  
DATA 8,210,267,264,138  
DATA 9,269,244,259,510  
DATA 10,230,244,259,200  
DATA 11,264,222,254,277  
DATA 12,256,222,254,270  
DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

RANDOMIZE TIMER

K=18:N=45:S=0:SS=0

DIM A(K, 5)

UU=.2653889: R=100

FOR JJ=1 TO K: X=0

FOR J=1 TO R

IF RND < UU THEN X=X+1

NEXT J

X=X/R: Y=0: 'PRINT JJ,X

FOR L=1 TO N

IF RND < X THEN Y=Y+1

NEXT L

A(JJ,3)=Y\*1000/N: 'PRINT JJ,A(JJ,3)

NEXT JJ

FOR J = 1 TO K

'GOTO 30

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

30 V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000

S=S+Z:SS=SS+Z\*Z: 'PRINT J,Z

NEXT J

U=S/K

SIG=SS/K-U\*U:AA=SIG-U/N+SS/K/N:RR=U\*(1-U)/AA

PRINT SIG-U\*(1-U)/N/K ,SS/K' ,RR,R

DEFDBL A-Z

'ST81A.BAS

```
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
```

```
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT
K = 18
U = .2653889: UU=.4: N = 45: S1=0: S2=0
FOR R = 2 TO 100000 STEP 10
30 X = R * U: Y = (1 - U) * R
A = X: B = Y: E = A + B
G = E * LOG(E) - A * LOG(A) - B * LOG(B) + LOG(E + 1)
G = (G + 1 / 2 * LOG(E / A / B / 2 / 3.141592654)) * K
FOR J = 1 TO K
Z = N * A(J, 3) / 1000: H = X + Z: L = Y + N - Z: F = H + L
G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
G = G + 1 / 2 * LOG(H * L * 2 * 3.141592654 / F) - LOG(F + 1)
NEXT J
G=G+460
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
S2=S2+IGD*R*U/(R+N)           '(R*U+N*UU)/(R+N)
NEXT R
PRINT S1,S2,S2/S1,N*S2/S1/(U-S2/S1)           '(N*UU-N*S2/S1)/(S2/S1-U)
```

'THIS PGM WORKS FINE FOR UU=0, SO THAT'S WHAT THIS IS.  
'IN ASSIGNMENT OF S2 AND I N FINAL P.O., U CAN BE SET TO 1

```

DEFDBL A-Z
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
WW=552 :K=18:N=45:P = 1: Q = 1:S=0:SS=0: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0

FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000
P = P * Z: Q = Q * (1 - Z)
S=S+V*A(J,5):SS=SS+A(J,5)
SS1 = SS1 + (V - Z) ^ 2
SS2 = SS2 + (V - W) ^ 2
SS3 = SS3 + (V - (N * Z +WW*.2653889)/(WW+N) ) ^ 2
SS4 = SS4 + Z
NEXT
P = P ^ (1 / 18): Q = Q ^ (1 / 18)
'PRINT P, Q, 1 / (1 - P - Q)
'PRINT WW,SS1, SS2, SS3, SS4 / 18
U=S/K
SIG=SS/K-U*U:AA=SIG-U/N+SS/K/N:R=U*(1-U)/AA
PRINT S,SS,S/SS

```

'ST77B-->ST82

DIM A(20, 5)

'ST76-->ST82A

DATA 1,346,400,290,367

DATA 2,298,378,286,426

DATA 3,276,356,281,521

DATA 4,222,333,277,275

DATA 5,273,311,273,418

DATA 6,270,311,273,466

DATA 7,263,289,268,586

DATA 8,210,267,264,138

DATA 9,269,244,259,510

DATA 10,230,244,259,200

DATA 11,264,222,254,277

DATA 12,256,222,254,270

DATA 13,303,222,254,435

DATA 14,264,222,254,538

DATA 15,226,222,254,186

DATA 16,285,200,249,558

DATA 17,316,178,244,408

DATA 18,200,156,239,70

RR=160:K=18:N=45:S=0:SS=0:P = 1: Q = 1: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0

DEL=.0091

U=.2653889+DEL

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

V = A(X, 2) / 1000: Z = A(X, 3) / 1000+DEL: W = A(X, 4) / 1000+DEL

VV=A(X,5)

S=S+Z:SS=SS+Z\*Z

SS1 = SS1 + VV\*(V - Z) ^ 2

SS2 = SS2 + VV\*(V - W) ^ 2

SS3 = SS3 + VV\*(V - (N \* Z +RR\*U)/(RR+N) ) ^ 2

SS4 = SS4 + Z

NEXT

PRINT SS1, SS2, SS3, SS4 / 18

U=S/K

SIG=SS/K-U\*U:NN=1/(SIG/U/(1-U)):R=N\*NN/(N-NN)

PRINT U,SIG,NN,R



DIM A(20, 5)

'ST76-->ST82A-->83A

DATA 1,346,400,290,367

DATA 2,298,378,286,426

DATA 3,276,356,281,521

DATA 4,222,333,277,275

DATA 5,273,311,273,418

DATA 6,270,311,273,466

DATA 7,263,289,268,586

DATA 8,210,267,264,138

DATA 9,269,244,259,510

DATA 10,230,244,259,200

DATA 11,264,222,254,277

DATA 12,256,222,254,270

DATA 13,303,222,254,435

DATA 14,264,222,254,538

DATA 15,226,222,254,186

DATA 16,285,200,249,558

DATA 17,316,178,244,408

DATA 18,200,156,239,70

RR=10000 :K=18:N=45:S=0:SS=0:P = 1: Q = 1: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0

DEL=.0091

U=.2653889+DEL

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

V = A(X, 2) / 1000: Z = A(X, 3) / 1000+DEL: W = A(X, 4) / 1000+DEL

VV=A(X,5)

S=S+Z:SS=SS+Z\*Z

ZZ=Z

SS1 = SS1 + VV\*(V\*LOG(ZZ) + (1-V)\*LOG(1-ZZ))

ZZ=W

SS2 = SS2 + VV\*(V\*LOG(ZZ) + (1-V)\*LOG(1-ZZ))

ZZ=(N \* Z +RR\*U)/(RR+N)

SS3 = SS3 + VV\*(V\*LOG(ZZ) + (1-V)\*LOG(1-ZZ))

NEXT

PRINT RR, SS3, SS1, SS2

U=S/K

SIG=SS/K-U\*U:NN=1/(SIG/U/(1-U)):R=N\*NN/(N-NN)

'PRINT U,SIG,NN,R

DIM A(20, 5)

'ST76-->ST82A-->ST84

DATA 1,346,400,290,367

DATA 2,298,378,286,426

DATA 3,276,356,281,521

DATA 4,222,333,277,275

DATA 5,273,311,273,418

DATA 6,270,311,273,466

DATA 7,263,289,268,586

DATA 8,210,267,264,138

DATA 9,269,244,259,510

DATA 10,230,244,259,200

DATA 11,264,222,254,277

DATA 12,256,222,254,270

DATA 13,303,222,254,435

DATA 14,264,222,254,538

DATA 15,226,222,254,186

DATA 16,285,200,249,558

DATA 17,316,178,244,408

DATA 18,200,156,239,70

RR=212:K=18:N=45:S=0:SS=0:P = 1: Q = 1: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0

DEL=.0091

U=.2653889+DEL

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

V = A(X, 2) / 1000: Z = A(X, 3) / 1000+DEL: W = A(X, 4) / 1000: VV=A(X,5)

S=S+Z:SS=SS+Z\*Z

SS1 = SS1 + VV\*(V - Z) ^ 2

SS2 = SS2 + VV\*(V - W) ^ 2

SS3 = SS3 + VV\*(V - U)^2      '(N \* Z +RR\*U)/(RR+N) ) ^ 2

NEXT

PRINT SS1, SS2, SS3, RR

U=S/K

SIG=SS/K-U\*U:NN=1/(SIG/U/(1-U)):R=N\*NN/(N-NN)

PRINT U, SIG, NN, R

Test date	TRG date	STAN	SSZ
2	3	4	5

DEFDBL A-Z

'ST81A.BAS-->ST83.BAS

DIM A(20, 5)

DATA 1,346,400,290,367  
 DATA 2,298,378,286,426  
 DATA 3,276,356,281,521  
 DATA 4,222,333,277,275  
 DATA 5,273,311,273,418  
 DATA 6,270,311,273,466  
 DATA 7,263,289,268,586  
 DATA 8,210,267,264,138  
 DATA 9,269,244,259,510  
 DATA 10,230,244,259,200  
 DATA 11,264,222,254,277  
 DATA 12,256,222,254,270  
 DATA 13,303,222,254,435  
 DATA 14,264,222,254,538  
 DATA 15,226,222,254,186  
 DATA 16,285,200,249,558  
 DATA 17,316,178,244,408  
 DATA 18,200,156,239,70

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

NEXT

K = 18: DEL = .0091 *Mod ifn to ST81A*

U = .2653889: DEL: UU = .4: N = 45: S1 = 0: S2 = 0

FOR R = 20 TO 810

30 X = R \* U: Y = (1 - U) \* R

A = X: B = Y: E = A + B

G = E \* LOG(E) - A \* LOG(A) - B \* LOG(B) + LOG(E + 1)

G = (G + 1 / 2 \* LOG(E / A / B / 2 / 3.141592654)) \* K

FOR J = 1 TO K

Z = N \* A(J, 3) / 1000 + N \* DEL: H = X + Z: L = Y + N - Z: F = H + L

G = G + H \* LOG(H) + L \* LOG(L) - F \* LOG(F)

G = G + 1 / 2 \* LOG(H \* L \* 2 \* 3.141592654 / F) - LOG(F + 1)

NEXT J

LL = LOG(R) ^ 2

IGD = EXP(G) / R / LL

S1 = S1 + IGD

S2 = S2 + IGD \* R \* U / (R + N)

'(R \* U + N \* UU) / (R + N)

NEXT R

PRINT S1, S2, S2 / S1, N \* S2 / S1 / (U - S2 / S1)

'(N \* UU - N \* S2 / S1) / (S2 / S1 - U)

'THIS PGM WORKS FINE FOR UU=0, SO THAT'S WHAT THIS IS.

'IN ASSIGNMENT OF S2 AND IN FINAL P.O., U CAN BE SET TO 1

```

DIM A(20, 5)                                'ST76-->ST82A-->ST84
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
RR=212:K=18:N=45:S=0:SS=0:P = 1: Q = 1: SS1 = 0: SS2 = 0: SS3 = 0: SS4 = 0
DEL=.0091
U=.2653889+DEL
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
V = A(X, 2) / 1000: Z = A(X, 3) / 1000+DEL: W = A(X, 4) / 1000: VV=A(X,5)
S=S+Z:SS=SS+Z*Z
SS1 = SS1 + VV*(V - Z) ^ 2
SS2 = SS2 + VV*(V - W) ^ 2
SS3 = SS3 + VV*(V - U)^2      '(N * Z +RR*U)/(RR+N) ) ^ 2
NEXT
PRINT SS1, SS2, SS3, RR
U=S/K
SIG=SS/K-U*U:NN=1/(SIG/U/(1-U)):R=N*NN/(N-NN)
'PRINT U,SIG,NN,R

```

```
S3=.404475  
A=1.6811069'1.6189  
B=2.3565'2.2392  
C=2.7605'2.6083  
D=3.0296488'2.8541
```

ST 90

```
BA=B-A
```

```
CB=C-B
```

```
DC=D-C
```

```
'PRINT CB/BA,DC/CB'BA
```

```
'PRINT 2*D-A
```

```
'PRINT 4*B-3*A      '45*(1+(2*D-A)/S3)
```

```
PRINT 5*C-4*B
```

PRINT  
DEFDBL A-Z

'STEIN50->ST93

DIM A(20, 5)  
DATA 1,346,400,290,367  
DATA 2,298,378,286,426  
DATA 3,276,356,281,521  
DATA 4,222,333,277,275  
DATA 5,273,311,273,418  
DATA 6,270,311,273,466  
DATA 7,263,289,268,586  
DATA 8,210,267,264,138  
DATA 9,269,244,259,510  
DATA 10,230,244,259,200  
DATA 11,264,222,254,277  
DATA 12,256,222,254,270  
DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

FOR J = 1 TO 18  
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)  
NEXT  
K = 18  
U = .2653889+.0091: N = 45  
FOR JJ = 4 TO 26: R = .81 \* 2 ^ (JJ / 2)  
30 X = R \* U: Y = (1 - U) \* R  
A = X: B = Y: E = A + B  
G = E \* LOG(E) - A \* LOG(A) - B \* LOG(B) + LOG(E + 1)  
G = (G + 1 / 2 \* LOG(E / A / B / 2 / 3.14159)) \* K  
FOR J = 1 TO K  
N=A(J,5)  
Z = N \* A(J, 2) / 1000: H = X + Z: L = Y + N - Z: F = H + L  
G = G + H \* LOG(H) + L \* LOG(L) - F \* LOG(F)  
G = G + 1 / 2 \* LOG(H \* L \* 2 \* 3.14159 / F) - LOG(F + 1)  
NEXT J  
PRINT U; R; G; G - 2\*LOG(R)  
NEXT JJ

DEFDBL A-Z

'ST81A->ST83->ST96

```
DIM A(20, 5)
DATA 1,346,400,290,367
DATA 2,298,378,286,426
DATA 3,276,356,281,521
DATA 4,222,333,277,275
DATA 5,273,311,273,418
DATA 6,270,311,273,466
DATA 7,263,289,268,586
DATA 8,210,267,264,138
DATA 9,269,244,259,510
DATA 10,230,244,259,200
DATA 11,264,222,254,277
DATA 12,256,222,254,270
DATA 13,303,222,254,435
DATA 14,264,222,254,538
DATA 15,226,222,254,186
DATA 16,285,200,249,558
DATA 17,316,178,244,408
DATA 18,200,156,239,70
CC=8: HIT= 0'1000
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
IF X=CC THEN A(J,3)=(A(J,3)*45+HIT)/46: PRINT A(J,3)
NEXT
```

```
K = 18
U = .2653889: U=(U*810+HIT/1000)/811: N = 45: S1=0 ' : S2=0
```

```
R=1000: G1= 0
10 GOSUB 100
IF ABS(G-G1) < .001 THEN GOTO 20
R=R+1000: G1=G: GOTO 10
20 RR=R: GG=G
PRINT RR,EXP(G),EXP(G1)
```

```
FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
PRINT S1,S1+EXP(GG)/LOG(RR) ' S2,S2/S1,N*S2/S1/(1-S2/S1) '(N*UU-N*S2/S1)
END
```

'THIS PGM WORKS FINE FOR UU=0, SO THAT'S  
'IN ASSIGNMENT OF S2 AND IN FINAL P.O.,

```
100
X = R * U: Y = (1 - U) * R
A = X: B = Y: E = A + B
G = E * LOG(E) - A * LOG(A) - B * LOG(B) + LOG(E + 1)
G = (G + 1 / 2 * LOG(E / A / B / 2 / 3.141592654)) * K
FOR J = 1 TO K
IF J=CC THEN N=46 ELSE N=45
Z = N * A(J, 3) / 1000 : H = X + Z: L = Y + N - Z: F = H + L
G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
G = G + 1 / 2 * LOG(H * L * 2 * 3.141592654 / F) - LOG(F + 1)
NEXT J
RETURN
```

100

Page 2 of 4 ST(100, 62)

X = R \* U: Y = (1 - U) \* R

A = X: B = Y: E = A + B

G = E \* LOG(E) - A \* LOG(A) - B \* LOG(B) + LOG(E + 1)

G = (G + 1 / 2 \* LOG(E / A / B / 2 / 3.141592654)) \* K

FOR J = 1 TO K

IF J=CC THEN N=46 ELSE N=45

Z = N \* A(J, 3) / 1000 : H = X + Z: L = Y + N - Z: F = H + L

G = G + H \* LOG(H) + L \* LOG(L) - F \* LOG(F)

G = G + 1 / 2 \* LOG(H \* L \* 2 \* 3.141592654 / F) - LOG(F + 1)

NEXT J

RETURN



PRINT  
DEFDBL A-Z

'ST81A->ST83->ST96->ST100

DIM A(20, 5)

*← DATA statements omitted from this listing*

FOR J = 1 TO 18  
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)  
NEXT J

K = 18: N=45: EPS=.01  
UU = .2653889+.0091: S1=0: S2=0: S3=0: S4=0  
FOR CC=1 TO 18  
S1=0: HIT=0  
U=(UU\*810+HIT/1000)/811  
A(CC,3)=(A(CC,3)\*45+HIT)/46       ': PRINT A(CC,3)

R=1000: G1= 0  
10 GOSUB 100  
IF ABS(G-G1) < EPS THEN GOTO 20  
R=R+1000: G1=G: GOTO 10  
20 RR=R: GG=G  
'PRINT RR,EXP(G),EXP(G1)

FOR R = 2 TO RR  
GOSUB 100  
LL=LOG(R)^2  
IGD=EXP(G)/R/LL  
S1=S1+IGD  
NEXT R  
H0= S1+EXP(GG)/LOG(RR)       ':PRINT H0

S1=0: HIT=1000  
U=(UU\*810+HIT/1000)/811  
A(CC,3)=(A(CC,3)+1000/46)       ': PRINT A(CC,3)

R=1000: G1= 0  
40 GOSUB 100  
IF ABS(G-G1) < EPS THEN GOTO 60  
R=R+1000: G1=G: GOTO 40  
60 RR=R: GG=G  
'PRINT RR,EXP(G),EXP(G1)

FOR R = 2 TO RR  
GOSUB 100  
LL=LOG(R)^2  
IGD=EXP(G)/R/LL  
S1=S1+IGD  
NEXT R  
H1=S1+EXP(GG)/LOG(RR)       ': PRINT H1

A(CC,3)=A(CC,3)\*46/45-1000/45  
BA=1000\*H1/(H0+H1)  
PRINT USING "## ###.### ####.## ####.## ####.###"; CC,BA, (A(CC,3)-1000\*UU),  
BA=BA/1000  
S2=S2+A(CC,5)\*A(CC,2)/1000\*LOG(BA)+(A(CC,5)-A(CC,5)\*A(CC,2)/1000)\*LOG(1-BA)  
X=A(CC,4)/1000  
S3=S3+A(CC,5)\*A(CC,2)/1000\*LOG(X)+(A(CC,5)-A(CC,5)\*A(CC,2)/1000)\*LOG(1-X)  
X=UU\*.9+.1\*A(CC,3)/1000  
S4=S4+A(CC,5)\*A(CC,2)/1000\*LOG(X)+(A(CC,5)-A(CC,5)\*A(CC,2)/1000)\*LOG(1-X)

NEXT CC  
PRINT S2,S3,S4  
END

*See next p. for listing of SRTN 100*

*See ST101 for  
Program  
PRINT  
statements*

Page 204 ST 101.605

```
G = E * LOG(E) - A * LOG(A) - B * LOG(B) + LOG(E + 1)
G = (G + 1 / 2 * LOG(E / A / B / 2 / 3.141592654)) * K
FOR J = 1 TO K
IF J=CC THEN N=46 ELSE N=45
Z = N * A(J, 3) : H = X + Z: L = Y + N - Z: F = H + L :PRINT X,Y,Z,H,L,F
G = G + H * LOG(H) + L * LOG(L) - F * LOG(F)
G = G + 1 / 2 * LOG(H * L * 2 * 3.141592654 / F) - LOG(F + 1)
NEXT J
RETURN
```

ST101.BAS  
 ST 81A → 83 → 96 → 100 → ST101.BAS

```

FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
FOR JJ=2 TO 4: A(X,JJ)=A(X,JJ)/1000: NEXT JJ:A(X,2)=A(X,2) '-.0091
NEXT J

K = 18: N=45: EPS=.01
UU = .2653889: S1=0: S2=0:S3=0: S4=0.
FOR CC=1 TO 18
S1=0: HIT=0
U=(UU*810+HIT)/811
A(CC,3)=(A(CC,3)*45+HIT)/46 ': PRINT A(CC,3)

```

Double A-Z }  
 Dim A(20,5) } not  
 data } printed

```

R=1000: G1= 0
10 GOSUB 100
IF ABS(G-G1) < EPS THEN GOTO 20
R=R+1000: G1=G: GOTO 10
20 RR=R: GG=G
'PRINT RR,EXP(G),EXP(G1)
'END

```

```

FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
H0= S1+EXP(GG)/LOG(RR) ':PRINT H0

```

```

S1=0: HIT=1
U=(UU*810+HIT)/811
A(CC,3)=A(CC,3)+HIT/46 ': PRINT A(CC,3)

```

```

R=1000: G1= 0
40 GOSUB 100
IF ABS(G-G1) < EPS THEN GOTO 60
R=R+1000: G1=G: GOTO 40
60 RR=R: GG=G
'PRINT RR,EXP(G),EXP(G1)

```

```

FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
H1=S1+EXP(GG)/LOG(RR) ': PRINT H1

```

```

A(CC,3)=A(CC,3)*46/45-1/45
BA=H1/(H0+H1)
A=CC: B=BA: C=A(CC,3)-UU: D=BA-UU: E=C/D
PRINT USING "###.### #.##### #.##### ###.###";A,B,C,D,E
V=A(CC,2):VV=A(CC,5)
S2=S2+A(CC,5)*V*LOG(BA)+(A(CC,5)-A(CC,5)*V)*LOG(1-BA)
'S2=S2+VV*(V-BA)^2
X=A(CC,4)
S3=S3+A(CC,5)*V*LOG(X)+(A(CC,5)-A(CC,5)*V)*LOG(1-X)
'S3=S3+VV*(V-X)^2
X=UU*.9+.1*A(CC,3)
S4=S4+A(CC,5)*V*LOG(X)+(A(CC,5)-A(CC,5)*V)*LOG(1-X)
'S4=S4+VV*(V-X)^2
NEXT CC
PRINT S2,S3,S4
END

```

3 calc 1/2 by of ST100 for SRTN 100  
 on separate page. (ANY differences?)

```

100
X = R * U: Y = (1 - U) * R
A = X: B = Y: E = A + B
':PRINT A,B,E

```

See next p for rest of SRTN 100

PRINT  
DEFDBL A-Z

'ST101->ST103

DIM A(20, 8)  
DATA 1,346,400,290,367  
DATA 2,298,378,286,426  
DATA 3,276,356,281,521  
DATA 4,222,333,277,275  
DATA 5,273,311,273,418  
DATA 6,270,311,273,466  
DATA 7,263,289,268,586  
DATA 8,210,267,264,138  
DATA 9,269,244,259,510  
DATA 10,230,244,259,200  
DATA 11,264,222,254,277  
DATA 12,256,222,254,270  
DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

K=18:N=45

FOR J = 1 TO 18

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

FOR JJ=2 TO 4: A(X, JJ)=A(X, JJ)/1000: NEXT JJ: A(X, 3)=ROUND(A(X, 3)\*45, 0)/45 ' -.

NEXT J

S=0:SS=0

FOR J= 1 TO K

X=2\*A(J, 3)-1: Y=N^(.5)\*ATN(X\*((1-X^2)^(-.5))):

A(J, 6)=Y

S=S+Y

SS=SS+Y\*Y

NEXT J

S=S/K

V=SS-S\*S\*K

W=(K-3)/V

FOR J=1 TO K

A(J, 7)=S\*W+(1-W)\*A(J, 6)

A(J, 8)=(SIN(A(J, 7)\*(N^-.5))+1)/2

PRINT J, A(J, 7), A(J, 8)

NEXT J

PRINT W, S, 45\*W/(1-W), W\*S

*equiv. "R"?*

```
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
FOR JJ=2 TO 4: A(X, JJ)=1-A(X, JJ)/1000: NEXT
NEXT J
```

'JJ:A(X,3)=1-A(X,3)'

```
K = 18: N=45: EPS=.01
UU = 1-.2653889: S1=0: S2=0:S3=0: S4=0
FOR CC=1 TO 18
S1=0: HIT=0.
U=(UU*810+HIT)/811
A(CC,3)=(A(CC,3)*45+HIT)/46
```

': PRINT A(CC,3)

```
R=1000: G1= 0
10 GOSUB 100
IF ABS(G-G1) < EPS THEN GOTO 20
R=R+1000: G1=G: GOTO 10
20 RR=R: GG=G
'PRINT RR,EXP(G),EXP(G1)
'END
```

Double A-2  
 Dim A(20,5)  
 DATA statements  
 SRTN 100

not printed! But see  
 Listing of ST101 for  
 source.

```
FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
H0= S1+EXP(GG)/LOG(RR)
```

':PRINT H0

```
S1=0: HIT=1
U=(UU*810+HIT)/811
A(CC,3)=A(CC,3)+HIT/46
```

': PRINT A(CC,3)

```
R=1000: G1= 0
40 GOSUB 100
IF ABS(G-G1) < EPS THEN GOTO 60
R=R+1000: G1=G: GOTO 40
60 RR=R: GG=G
'PRINT RR,EXP(G),EXP(G1)
```

```
FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
```

H1=S1+EXP(GG)/LOG(RR) ': PRINT H1

```
A(CC,3)=A(CC,3)*46/45-1/45
BA=H1/(H0+H1)
PRINT USING "## ###.### #.##### #.##### ####.###";
V=A(CC,2):VV=A(CC,5)
S2=S2+A(CC,5)*V*LOG(BA)+(A(CC,5)-A(CC,5)*V)*LOG(1-BA)
'S2=S2+VV*(V-BA)^2
X=A(CC,4)
S3=S3+A(CC,5)*V*LOG(X)+(A(CC,5)-A(CC,5)*V)*LOG(1-X)
'S3=S3+VV*(V-X)^2
X=UU*.9+.1*A(CC,3)
S4=S4+A(CC,5)*V*LOG(X)+(A(CC,5)-A(CC,5)*V)*LOG(1-X)
'S4=S4+VV*(V-X)^2
```

see ST101 for pro for  
 P/R PUT  
 statements

```
NEXT CC
PRINT S2,S3,S4
END
```

DEFDBL A-Z

'ST77A-&gt;ST81-&gt;ST109

DATA 1,346,400,290,367  
 DATA 2,298,378,286,426  
 DATA 3,276,356,281,521  
 DATA 4,222,333,277,275  
 DATA 5,273,311,273,418  
 DATA 6,270,311,273,466  
 DATA 7,263,289,268,586  
 DATA 8,210,267,264,138  
 DATA 9,269,244,259,510  
 DATA 10,230,244,259,200  
 DATA 11,264,222,254,277  
 DATA 12,256,222,254,270  
 DATA 13,303,222,254,435  
 DATA 14,264,222,254,538  
 DATA 15,226,222,254,186  
 DATA 16,285,200,249,558  
 DATA 17,316,178,244,408  
 DATA 18,200,156,239,70

RANDOMIZE TIMER

K=18:N=45:S=0:SS=0

DIM A(K, 5)

UU=.2653889: R=100

FOR JJ=1 TO K: X=0

FOR J=1 TO R

IF RND &lt; UU THEN X=X+1

NEXT J

X=X/R: Y=0: 'PRINT JJ,X

FOR L=1 TO N

IF RND &lt; X THEN Y=Y+1

NEXT L

A(JJ,3)=Y\*1000/N: 'PRINT JJ,A(JJ,3)

NEXT JJ

FOR J = 1 TO K

'GOTO 30

READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)

30 V = A(X, 2) / 1000: Z = A(X, 3) / 1000: W = A(X, 4) / 1000

S=S+Z:SS=SS+Z\*Z: 'PRINT J,Z

NEXT J

U=S/K

SIG=SS/K-U\*U:AA=SIG-U/N+SS/K/N:RR=U\*(1-U)/AA

PRINT (SIG\*18/15-(U-SS/K)/45)^-1 '-U\*(1-U)/N/K ,SS/K' ,RR,R

Not used in this program.

DEFDBL A-~~S~~

'ST112

```
PRINT
FOR X= 0 TO 80 STEP .001
Y=EXP(-X)*SQR(X)
'PRINT X,Y
S0=S0+Y
S1=S1+Y*X
S2=S2+Y*X*X
NEXT X
U=S1/S0
PRINT U, S2/S0-U*U
```

```
FOR J = 1 TO 18
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)
NEXT J
```

ST 114.BAS

ST 100 → ST 114

```
K = 18: N=45: EPS=.01
UU = .2653889 '+.0091: S1=0: S2=0:S3=0: S4=0
FOR CC=1 TO 18
S1=0: HIT=0
U=(UU*810+HIT/1000)/811
A(CC,3)=(A(CC,3)*45+HIT)/46
```

': PRINT A(CC,3)

```
R=1000: G1= 0
10 GOSUB 100
IF ABS(G-G1) < EPS THEN GOTO 20
R=R+1000: G1=G: GOTO 10
20 RR=R: GG=G
'PRINT RR,EXP(G),EXP(G1)
```

```
FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
```

H0= S1+EXP(GG)/LOG(RR)

':PRINT H0

```
S1=0: HIT=1000
U=(UU*810+HIT/1000)/811
A(CC,3)=(A(CC,3)+1000/46)
```

': PRINT A(CC,3)

```
R=1000: G1= 0
40 GOSUB 100
IF ABS(G-G1) < EPS THEN GOTO 60
R=R+1000: G1=G: GOTO 40
60 RR=R: GG=G
'PRINT RR,EXP(G),EXP(G1)
```

```
FOR R = 2 TO RR
GOSUB 100
LL=LOG(R)^2
IGD=EXP(G)/R/LL
S1=S1+IGD
NEXT R
```

H1=S1+EXP(GG)/LOG(RR)

': PRINT H1

A(CC,3)=A(CC,3)\*46/45-1000/45

BA=1000\*H1/(H0+H1)

PRINT USING "## ###.### ####.## ####.## ####.###"; CC,BA, (A(CC,3)-1000\*UU),

BA=BA/1000

S2=S2+A(CC,5)\*A(CC,2)/1000\*LOG(BA)+(A(CC,5)-A(CC,5)\*A(CC,2)/1000)\*LOG(1-BA)

X=A(CC,4)/1000

S3=S3+A(CC,5)\*A(CC,2)/1000\*LOG(X)+(A(CC,5)-A(CC,5)\*A(CC,2)/1000)\*LOG(1-X)

X=UU\*.9+.1\*A(CC,3)/1000

S4=S4+A(CC,5)\*A(CC,2)/1000\*LOG(X)+(A(CC,5)-A(CC,5)\*A(CC,2)/1000)\*LOG(1-X)

NEXT CC

PRINT S2,S3,S4

END

Defdb1 A-z  
Dim A(20,5)  
DATA statements  
Ertn 100

Not finished here!  
See listing of ST 101 for  
them.

See ST 101 for  
program parameters  
to comment



DEFDBL A-Z

PRINT

'ST77A->ST81->ST109->ST118

Early Version

Early Version

Early Version

DATA 1,346,400,290,367  
 DATA 2,298,378,286,426  
 DATA 3,276,356,281,521  
 DATA 4,222,333,277,275  
 DATA 5,273,311,273,418  
 DATA 6,270,311,273,466  
 DATA 7,263,289,268,586  
 DATA 8,210,267,264,138  
 DATA 9,269,244,259,510  
 DATA 10,230,244,259,200  
 DATA 11,264,222,254,277  
 DATA 12,256,222,254,270  
 DATA 13,303,222,254,435  
 DATA 14,264,222,254,538  
 DATA 15,226,222,254,186  
 DATA 16,285,200,249,558  
 DATA 17,316,178,244,408  
 DATA 18,200,156,239,70

K=18: N=45: UU=.2653889       $uv = \bar{v}$   
 FOR J = 1 TO K  
 READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)  
 NEXT J

T=TIMER

FOR S=.01 TO .4 STEP .01  
 S2=1

$$B1 = \frac{N}{2.2(4-2)} = \frac{1}{2.6}$$

FOR J=0 TO K  
 S1=0: SS=2\*S\*S: A1=1/SS: Z=A(J,3)\*.001: Z1=2\*Z\*(1-Z): B1=N/Z1

FOR U=0 TO 1 STEP .005  
 A=U-UU: B=Z-U       $A = U - \bar{v}$  ;  $B = M_i^2 - U$   
 S1=S1+EXP(-A\*A\*A1-B\*B\*B1)       $S1 = S1 + \exp(-\frac{(U-\bar{v})^2}{2S^2} - \frac{(U_i^2 - U)}{2G_i^2})$   
 NEXT U

S2=S2\*S1\*SQR(2\*B1)/S       $SQR(2*B1) = \sqrt{\frac{1}{G_i^2}} = \frac{1}{G_i}$   
 NEXT J

PRINT USING "####";S, : PRINT S2  
 NEXT S

PRINT TIMER-T

changed to  $w = -A + A * A1 - B * B * B1$   
 if  $w > -1000$  then  $S1 = S1 + \exp(w)$  } otherwise, underflow when  $w < -400$ , say,

Pgen to 255      .5-4 for  $\Delta U = .005$   
 ~ 2 " for  $\Delta U = .001$  ← which is what I'm using,  
 .648      2.2715  
 .049      2.7859

DEFDBL A-Z

PRINT

'ST77A->ST81->ST109->ST118

LATER version

DATA 1,346,400,290,367  
DATA 2,298,378,286,426  
DATA 3,276,356,281,521  
DATA 4,222,333,277,275  
DATA 5,273,311,273,418  
DATA 6,270,311,273,466  
DATA 7,263,289,268,586  
DATA 8,210,267,264,138  
DATA 9,269,244,259,510  
DATA 10,230,244,259,200  
DATA 11,264,222,254,277  
DATA 12,256,222,254,270  
DATA 13,303,222,254,435  
DATA 14,264,222,254,538  
DATA 15,226,222,254,186  
DATA 16,285,200,249,558  
DATA 17,316,178,244,408  
DATA 18,200,156,239,70

N, Range and Step of S,  
Step of U, Are all varied.

Defaults: N=15  
S = .01 to .01 step .01  
U = 0 to 1 step .001.

K=18: (N=100000): UU=.2653889  
FOR J = 1 TO K  
READ X, A(X, 2), A(X, 3), A(X, 4), A(X, 5)  
NEXT J

T=TIMER

FOR S=.03 TO .07 STEP .001  
S2=1

FOR J=0 TO K  
S1=0: SS=2\*S\*S: A1=1/SS: Z=A(J,3)\*.001: Z1=2\*Z\*(1-Z): B1=N/Z1

FOR U=0 TO 1 STEP .001  
A= U-UU: B=Z-U  
W=-A\*A\*A1-B\*B\*B1  
IF W> -10000 THEN S1=S1+EXP(W)  
NEXT U

S2=S2\*S1\*SQR(2\*B1)/S  
NEXT J

PRINT USING " .#### ";S, : PRINT S2  
NEXT S

PRINT TIMER-T

2.12.77

subject of S. 1000. 1980. 1981.

C:\DOS>qbasic

R

G

.255	1024	-392.7399	
.255	2048	-386.7145	
.255	4096	-380.5886	
.255	8192	-374.411	
.255	16384	-368.1984	
.255	32768	-361.9536	
.255	65536	-355.6865	
.255	131072	-349.6608	
.255	262144	-342.8088	
.255	524288	-337.9299	
.255	1048576	-330.9875	17
.255	2097152	-323.6474	6
.255	4194304	-317.3738	18
.255	8388608	-299.8265	!
.255	1.677722E+07	-281.4025	19
.255	3.355443E+07	-368.0446	113 1
.255	6.710886E+07	-955.996	
.255	1.342177E+08	834.8065	
.255	2.684355E+08	-1150.06	
.255	5.368709E+08	-3840.126	
.255	1.073742E+09	17004.11	

Press any key to continue

.2653889	.810000002384186	-481.941283005955	-481.51984094921
.2653889	1.14551298889395	-482.125854416015	-482.39755953983
.2653889	1.62000000476837	-481.825089511145	-482.789941815521
.2653889	2.29102597778791	-481.084825540116	-482.742825025051
.2653889	3.24000000953674	-479.981424703015	-482.33257136851
.2653889	4.58205195557582	-478.612534344985	-481.65682819104
.2653889	6.48000001907349	-477.086631500316	-480.824072526931
.2653889	9.16410391115164	-475.513419591969	-479.944007799144
.2653889	12.960000038147	-473.995306617665	-479.1190420054
.2653889	18.3282078223033	-472.619193148316	-478.436075716611
.2653889	25.9200000762939	-471.448371684964	-477.958401433819
.2653889	36.6564156446066	-470.516066396669	-477.719243326084
.2653889	51.8400001525879	-469.82351207855	-477.719836188525
.2653889	73.3128312892131	-469.34472031131	-477.934191601845
.2653889	103.680000305176	-469.037014813286	-478.319633284381
.2653889	146.625662578426	-468.853318142944	-478.829083794599
.2653889	207.360000610352	-468.751719706373	-479.420632538587
.2653889	293.251325156852	-468.700158565695	-480.06221857847
.2653889	414.720001220703	-468.676827912608	-480.732035105943
.2653889	586.502650313705	-468.668238188303	-481.416592562197
.2653889	829.440002441406	-468.666685138136	-482.108186692591
.2653889	1173.00530062741	-468.668075590329	-482.802724325344
.2653889	1658.88000488281	-468.670391741279	-483.498187656854

R: ratio of successive values =  $\sqrt{2}$

G

$G = 2 \ln R$

The peak distribution looks symmetric in log space.

$$\frac{e^G}{R^2}$$

So maybe approximated by log normal d.f.

[It's sym. out to at least about  $\Delta \ln = 4$ ; a factor of down by  $\times 54.6$ .

3.7 - 0.5 = 3.2 : so  $e^G \propto \exp\left(\frac{(\ln \frac{R}{43.6})^2}{\frac{6.4}{(\ln 2)^2}}\right) \cdot \left(\frac{R}{43.6}\right)^{-\frac{1}{2}}$

$$\frac{3.2}{(\ln 2)^2} = \frac{6.4}{\ln 2}$$

$$\propto \exp\left(-\frac{1}{2} \cdot \left(\frac{\ln 2}{6.4}\right)^2 \cdot \ln \frac{R}{43.6} \cdot \left(\frac{\ln R}{43.6}\right)\right)$$

$$\propto \frac{R}{43.6} \left(-\frac{1}{2} \left(\frac{\ln 2}{6.4}\right)^2 \cdot \ln \frac{R}{43.6}\right) \text{ say } X = \frac{R}{43.6}$$

$\propto X$

$$\propto X^{-0.005865 \ln X}$$

.999849012874363	-482.112662519383	-1.09604795183953
1.41400003433228	-481.998805033873	.328523259427496
1.99969802574873	-481.423422621717	1.66020270526451
2.82800006866455	-480.451828775729	2.80342724673015
3.99939605149745	-479.174562376433	3.68541180031761
5.6560001373291	-477.697066401021	4.26315223331964
7.9987921029949	-476.129625511734	4.52267839572258
11.3120002746582	-474.578488717687	4.47563472102438
15.9975842059898	-473.137626875918	4.1574484674522
22.6240005493164	-471.880514056921	3.62726085960795
31.9951684119796	-470.85272277841	2.96557876115322
45.2480010986328	-470.06786266671	2.2646275818827
63.9903368239592	-469.509627487289	1.61072625000167
90.4960021972656	-469.140411224148	1.0653329436979
127.980673647918	-468.913491403215	.654752200678426
180.992004394531	-468.784089451678	.373375107528649
255.961347295837	-468.716031786113	.196372913208386
361.984008789063	-468.683634917851	9.34776023647364E-2
511.922694591674	-468.670444443718	3.80596632366844E-2
723.968017578125	-468.666776704954	.010582857053083
1023.84538918335	-468.667340661157	-1.62723363500851E-3
1447.93603515625	-468.669447093846	-6.0778799887853E-3
2047.6907783667	-468.671839631355	-6.90340399898454E-3
2895.8720703125	-468.674001341165	-6.23737604421623E-3

$\uparrow$   
R

$\uparrow$   
G

$\uparrow$   
slope component

3.1499 ST 81A. Bks output  
 91 S1 S2 Out put of ST 81A. BAs

S1	S2	S1/S2	
2.613763E-6	5.864442E-7	.2243677	246.1302
1.234982E-5	3.170142E-6	.2566954	1328.732
4.107785E-5	8.729588E-6	.2125132	180.8601
8.410033E-5	1.992074E-5	.2368688	373.7392
2.742564E-7	4.826712E-8	.1759927	88.59069
2.93794E-7	5.330124E-8	.1814238	97.23179
2.953362E-7	5.370897E-8	.181857	97.96942
1.239834E-4	3.048685E-5	.2458945	567.6119
1.239875E-4	3.048785E-5	.2458945	567.6111
1.239807E-4	3.048633E-5	.2458957	567.6501
4.124894E-5	8.772729E-6	.2126777	181.5646
4.122187E-5	8.771422E-6	.2127857	182.0297
1.540129E-6	3.05832E-7	.1985756	133.7443
3.950809E-8	2.726081E-10		6.900058E-3
4.068332E-6	2.425552E-8	5.96203E-3	1.034169
4.094087E-4	2.373072E-6	5.796341E-3	1.004787
2.238684E-6	4.870896E-7	.2175785	204.789
2.613763E-6	5.864442E-7	.2243677	246.1302
2.699308E-6	6.091426E-7	.2256662	255.6468
3.077873E-6	7.095763E-7	.2305411	297.7046
4.127195E-6	9.880375E-7	.2393969	414.4674
<del>1.234982E-5</del>	<del>3.170142E-6</del>	<del>.2566954</del>	<del>1328.732</del>
9.380034E-6	2.382041E-6	.253948	998.8464
1.618936E-6	3.257447E-7	.2012091	141.0789
2.854178E-6			272.866

1.201222 - 1.0  
 - 1.01  
 - 1.001  
 2.5 10k  
 100k  
 200k  
 500k  
 750k  
 R = M ← wrong! (I need double precision)  
 R = 500k  
 R = k

S1 = NORMEN

S2 ( ) double precision:

B	S2
1k	1.6199
10k	2.2392
100k	2.6083
1000k	2.7498
	2.8541

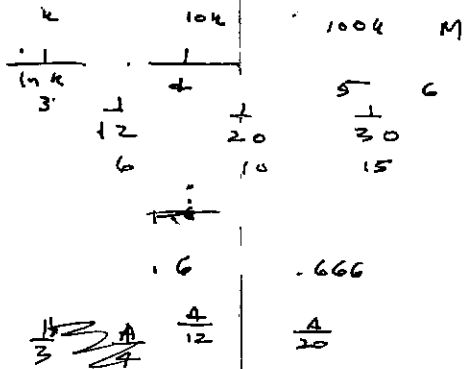
C:\>d:

D:\>cd\

D:\>cd pb35 lower index limit was 20 (stop 1)

D:\PB35>pb

1.59608575773996E-208	3.31932874738818E-209	.207966817026694
140.682707084481		
1.59608575773996E-208	1.20927612842095E-208	.757651098981846
140.682707084482		
1.59608575773996E-208	1.20927612842095E-208	140.682707084482
0	140.68270708448	
1.59608575773996E-208	1.20927612842095E-208	140.682707084482
3.86809629319014E-209 s3	140.68270708448 s10	
• 1.68110690176177E-208,1	1.29024025040139E-208	148.543783579351
3.90866651360392E-209 s3	148.543783579348 k	
• 2.35645782688583E-208,1	1.95279924754415E-208	217.698745020613
4.03658579341694E-209 s3	217.698745020604 10k	
• 2.76045405628017E-208,1	2.3560293667518E-208	262.153434864395
4.04424689528361E-209 s3	262.153434864406 100k	
• 3.02964885676619E-208,1	2.6251737190191E-208	292.064471536757
4.0447513774705E-209 s3	292.064471536783 M	



$$.675 \times 12 = 8.1$$

$$\frac{302}{1.34} = 225.37$$

$$4.36$$

$$\frac{k}{3} \quad \frac{1}{6}$$

$$\frac{A}{3} \quad \frac{A}{12} \quad \frac{A}{20}$$

$$\frac{N \cdot 52}{53}$$

$$D + D - A = 2D - A$$

$$4.3781915 \times 10^{-208} + 4.04475 \times 10^{-208} = 8.4229415 \times 10^{-208}$$

$$\text{Print } N / (1 + (2 \times D - A) / 53)$$

$$N * (2 \times D - A + 53) = 532.097 = R \text{ for } \beta = \infty$$

$$\frac{N * 52}{53} = \frac{N * 51 + 53}{53}$$

$$= N \left( \frac{51}{53} + 1 \right)$$

3.17.99

STEM : output of ST93 N = A(D.5) U = U + .0093

93 ± .1

U	R	G	G-214R
.274488900374019	.810000002384186	-3932.15804155171	-3931.73659949496
.274488900374019	1.14551298889395	-3932.24864037552	-3932.52034549933
.274488900374019	1.62000000476837	-3931.81706016538	-3932.78191246975
.274488900374019	2.29102597778791	-3930.89583867858	-3932.55383816352
.274488900374019	3.24000000953674	-3929.54428680718	-3931.89543347267
.274488900374019	4.58205195557582	-3927.83912285719	-3930.88341670325
.274488900374019	6.48000001907349	-3925.86477960884	-3929.60222063545
.274488900374019	9.16410391115164	-3923.70613522997	-3928.13672343715
.274488900374019	12.960000038147	-3921.44457793557	-3926.56831332331
.274488900374019	18.3282078223033	-3919.15679993679	-3924.97368250508
.274488900374019	25.9200000762939	-3916.91500337432	-3923.42503312318
.274488900374019	36.6564156446066	-3914.787139717	-3921.99031664642
.274488900374019	51.8400001525879	-3912.83609493559	-3920.73241904556
.274488900374019	73.3128312892131	-3911.11718362682	-3919.70665491735
.274488900374019	103.680000305176	-3909.6738781363	-3918.9564966074
.274488900374019	146.625662578426	-3908.53242224906	-3918.50818790071
.274488900374019	207.360000610352	-3907.6968565905	-3918.36576942272
.274488900374019	293.251325156852	-3907.14669348069	-3918.50875349347
.274488900374019	414.720001220703	-3906.83932674569	-3918.89453393903
.274488900374019	586.502650313705	-3906.71768675505	-3919.46604112894
.274488900374019	829.440002441406	-3906.72111771579	-3920.16261927024
.274488900374019	1173.00530062741	-3906.79565887571	-3920.93030761072
.274488900374019	1658.88000488281	-3906.90038282693	-3921.72817874251

- adjust for 22 PK

- 2 down from 1653 for 22  
- Max for 22

- adjust for 22 PK



.274488900374019	.810000002384186	-488.176285886021	-487.754843829277
.274488900374019	1.14551298889395	-488.31644519681	-488.588150320626
.274488900374019	1.62000000476837	-487.953944277488	-488.918796581863
.274488900374019	2.29102597778791	-487.128449631227	-488.786449116162
.274488900374019	3.24000000953674	-485.908488745714	-488.259635411209
.274488900374019	4.58205195557582	-484.382232547192	-487.426526393247
.274488900374019	6.48000001907349	-482.647518899808	-486.384959926423
.274488900374019	9.16410391115164	-480.803491535072	-485.234079742247
.274488900374019	12.960000038147	-478.944336051265	-484.068071439
.274488900374019	18.3282078223033	-477.154262742631	-482.971145310926
.274488900374019	25.9200000762939	-475.502771562597	-482.012801311452
.274488900374019	36.6564156446066	-474.040171470214	-481.243348399629
.274488900374019	51.8400001525879	-472.794529189658	-480.690853299633
.274488900374019	73.3128312892131	-471.771631066075	-480.36110235661
.274488900374019	103.680000305176	-470.958595228845	-480.24121369994
.274488900374019	146.625662578426	-470.330101761661	-480.305867413315
.274488900374019	207.360000610352	-469.855157350721	-480.524070182935
.274488900374019	293.251325156852	-469.502561868337	-480.864621881111
.274488900374019	414.720001220703	-469.244294321701	-481.299501515036
.274488900374019	586.502650313705	-469.056992822442	-481.805347196336
.274488900374019	829.440002441406	-468.92213770941	-482.363639263865
.274488900374019	1173.00530062741	-468.825548365485	-482.9601971005
.274488900374019	1658.88000488281	-468.756624127347	-483.584420042921

Duplicate

Not a  $X_{24}$   
 Why? +.value was deduced to be .81  
 Semi-b.t.: The dabbles are out. -  
 Edge t. d. signal pt. is moved  $\approx$  bit.

.274488900374019	.810000002384186	-488.176285886021	-487.754843829277
.274488900374019	1.14551298889395	-488.31644519681	-488.588150320626
.274488900374019	1.62000000476837	-487.953944277488	-488.918796581863
.274488900374019	2.29102597778791	-487.128449631227	-488.786449116162
.274488900374019	3.24000000953674	-485.908488745714	-488.259635411209
.274488900374019	4.58205195557582	-484.382232547192	-487.426526393247
.274488900374019	6.48000001907349	-482.647518899808	-486.384959926423
.274488900374019	9.16410391115164	-480.803491535072	-485.234079742247
.274488900374019	12.960000038147	-478.944336051265	-484.068071439
.274488900374019	18.3282078223033	-477.154262742631	-482.971145310926
.274488900374019	25.9200000762939	-475.502771562597	-482.012801311452
.274488900374019	36.6564156446066	-474.040171470214	-481.243348399629
.274488900374019	51.8400001525879	-472.794529189658	-480.690853299633
.274488900374019	73.3128312892131	-471.771631066075	-480.36110235661
.274488900374019	103.680000305176	-470.958595228845	-480.24121369994
.274488900374019	146.625662578426	-470.330101761661	-480.305867413315
.274488900374019	207.360000610352	-469.855157350721	-480.524070182935
.274488900374019	293.251325156852	-469.502561868337	-480.864621881111
.274488900374019	414.720001220703	-469.244294321701	-481.299501515036
.274488900374019	586.502650313705	-469.056992822442	-481.805347196336
.274488900374019	829.440002441406	-468.92213770941	-482.363639263865
.274488900374019	1173.00530062741	-468.825548365485	-482.9601971005
.274488900374019	1658.88000488281	-468.756624127347	-483.584420042921

duplicate.

- a djab of pass.

-  $\approx$  Max for  $\frac{1}{2}$

down 1 from  $R=1658$

edge of peak

SQ 100 Printout

3 2399

14	261.801	-43.39	-3.59	12.093
15	261.801	-43.39	-3.59	12.093
16	259.485	-65.39	-5.90	11.076
17	257.155	-87.39	-8.23	10.613
18	254.902	-109.39	-10.49	10.431

eps = .001

output for EPS = .0001

1	278.876	134.61	13.49	9.981
2	276.737	112.61	11.35	9.924
3	274.605	90.61	9.22	9.832
4	272.368	67.61	6.98	9.688
5	270.236	45.61	4.85	9.410
6	270.236	45.61	4.85	9.410
7	268.095	23.61	2.71	8.724
8	265.962	1.61	0.57	2.814
9	263.721	-21.39	-1.67	12.827
10	263.721	-21.39	-1.67	12.827
11	261.592	-43.39	-3.80	11.427
12	261.592	-43.39	-3.80	11.427
13	261.592	-43.39	-3.80	11.427
14	261.592	-43.39	-3.80	11.427
15	261.592	-43.39	-3.80	11.427
16	259.452	-65.39	-5.94	11.014
17	257.314	-87.39	-8.07	10.823
18	255.171	-109.39	-10.22	10.705

f readin.  
= .01

$u_1 - \bar{u}$

$u_2 - \bar{u}$

$\frac{u_2' - \bar{u}}{u_1 - \bar{u}}$

3-23-94

ST100 output. EPS=1.001

1002.2

14	-43.39	-3.59	12.093
15	-43.39	-3.59	12.093
16	-65.39	-5.90	11.076
17	-87.39	-8.23	10.613
18	-109.39	-10.49	10.431

1	278.756078163152
2	276.843801446187
3	274.714839630043
4	272.425081496695
5	270.296271361738
6	270.296271361737
7	268.098712254426
8	265.964225703527
9	263.721299005547 ✓
10	263.721299005548
11	261.800850306822
12	261.800850306822
13	261.800850306823
14	261.800850306991
15	261.800850307138 ✓
16	259.485317856071
17	257.154721555851
18	254.901665690843

cc

Praden.

3.23.99

ST 100 printout.

100 1/2 13

14	-43.39	-3.59	12.093
15	-43.39	-3.59	12.093
16	-65.39	-5.90	11.076
17	-87.39	-8.23	10.613
18	-109.39	-10.49	10.431

1	134.61	14.18	9.493
2	112.61	11.88	9.475
3	90.61	9.59	9.448
4	67.61	7.64	8.845
5	45.61	5.29	8.622
6	45.61	5.29	8.622
7	23.61	2.94	8.041
8	1.61	0.58	2.764
9	-21.39	-1.88	11.392
10	-21.39	-1.88	11.392
11	-43.39	-4.23	10.255
12	-43.39	-4.23	10.255
13	-43.39	-4.23	10.255
14	-43.39	-4.23	10.255
15	-43.39	-4.23	10.255
16	-65.39	-6.58	9.932
17	-87.39	-8.94	9.779
18	-109.39	-11.29	9.689

← 2.45 = .01

14	-43.39	-4.23	10.255
15	-43.39	-4.23	10.255
16	-65.39	-6.58	9.932
17	-87.39	-8.94	9.779
18	-109.39	-11.29	9.689

$\frac{x}{p}$  BA = -397.9387612342<sup>92</sup>  
~~10.255~~

1	134.61	13.37	10.070
2	112.61	11.45	9.831
3	90.61	9.33	9.716
4	67.61	7.04	9.609
5	45.61	4.91	9.294
6	45.61	4.91	9.294
7	23.61	2.71	8.713
8	1.61	0.58	2.800
9	-21.39	-1.67	12.826
10	-21.39	-1.67	12.826
11	-43.39	-3.59	12.093
12	-43.39	-3.59	12.093
13	-43.39	-3.59	12.093
14	-43.39	-3.59	12.093
15	-43.39	-3.59	12.093
16	-65.39	-5.90	11.076
17	-87.39	-8.23	10.613
18	-109.39	-10.49	10.431

← 2.45 = .001

A(4,3)-uu

BA-uu

ratio of col 2 / col 3

16	258.805	-65.39	-6.58	9.932	
17	256.452	-87.39	-8.94	9.779	
18	254.099	-109.39	-11.29	9.689	
-3907.93876123742			-3909.79354349225		-3907.95274130486
cc	BA	A(cc,3)-uu	BA-UU		
1	279.568	134.61	14.18	5.470	EPS = .01
2	277.274	112.61	11.88	5.464	
3	274.980	90.61	9.59	5.804	
4	273.033	67.61	7.64	5.823	
5	270.679	45.61	5.29	5.993	
6	270.679	45.61	5.29	5.993	
7	268.325	23.61	2.94	9.043	
8	265.972	1.61	0.58	-1.160	
9	263.511	-21.39	-1.88	3.348	
10	263.511	-21.39	-1.88	3.348	
11	261.158	-43.39	-4.23	3.810	
12	261.158	-43.39	-4.23	3.810	
13	261.158	-43.39	-4.23	3.810	
14	261.158	-43.39	-4.23	3.810	
15	261.158	-43.39	-4.23	3.810	
16	258.805	-65.39	-6.58	3.990	
17	256.452	-87.39	-8.94	4.086	
18	254.099	-109.39	-11.29	4.145	
-3907.93876123742			-3909.79354349225		-3907.95274130486

cc (not column 12)

$$\frac{A(cc,3) - 1000uu}{A(cc,4) - 1000uu}$$

A(cc,3) is (TNG) data  
A(cc,3) is ST estimate.  
UU = .2653889.

That first last col. is "non-smooth"  
of the 4 array col. for  
A(cc,4) → "BA", suggests that my "BA"  
estimate may not be too bad.  
See 100% .3 for EPS = .01  
w.  $\frac{A(cc,3) - 1000uu}{BA - 1000uu}$  to compare.