```
 1: program MonteCarlo
 2: implicit real*8 (a-h,o-z)
 3: open(15, file="Monte_Carlo-DP.txt")
 4:          idum = -1
 5:         N = 10**7
 6:           PI = dACOS(-1.d0)
 7:           EXATO = PI/4.d0
 8:         SUMF = 0.d0
 9:         SUMF2 = 0.d0
10:         DO 20 IX = 1, N
11:            FX = FUNC(ran3(idum))
12:            SUMF = SUMF + FX
13:            SUMF2 = SUMF2 + FX**2
14:         20 CONTINUE
15:         FAVE = SUMF/N
16:         F2AVE = SUMF2/N
17:         SIGMA = dSQRT((F2AVE - FAVE**2)/N)
18:                ERRO = dABS(FAVE - EXATO)
19:         write(15,*) "Integral =", FAVE, "Exato =", EXATO
20:         write(15,*) "Erro estimado:", SIGMA,"Erro obtido:", ERRO
21:         write(15,*) "N =",N
22: end
23:
24: real*8 function FUNC(X)
25: implicit real*8 (a-h,o-z)
26:    FUNC = 1.d0/(1.d0 + X**2)
27: return
28: end
29:
30: real*8 FUNCTION ran3(idum)
31: implicit real*8 (a-h,o-z)
32:       INTEGER idum
33:       INTEGER MBIG,MSEED,MZ
34:       PARAMETER (MBIG=1000000000,MSEED=161803398,MZ=0,FAC=1./MBIG)
35:       INTEGER i,iff,ii,inext,inextp,k
36:       INTEGER mj,mk,ma(55)
37:       SAVE iff,inext,inextp,ma
38:       DATA iff /0/
39:       if(idum.lt.0.or.iff.eq.0)then
40:         iff=1
41:         mj=abs(MSEED-abs(idum))
42:         mj=mod(mj,MBIG)
43:         ma(55)=mj
44:         mk=1
45:         do 11 i=1,54
46:           ii=mod(21*i,55)
47:           ma(ii)=mk
48:           mk=mj-mk
49:           if(mk.lt.MZ)mk=mk+MBIG
50:           mj=ma(ii)
51: 11      continue
52:         do 13 k=1,4
53:           do 12 i=1,55
54:             ma(i)=ma(i)-ma(1+mod(i+30,55))
55:             if(ma(i).lt.MZ)ma(i)=ma(i)+MBIG
56: 12        continue
57: 13      continue
58:         inext=0
59:         inextp=31
60:         idum=1
61:       endif
62:       inext=inext+1
63:       if(inext.eq.56)inext=1
64:       inextp=inextp+1
65:       if(inextp.eq.56)inextp=1
66:       mj=ma(inext)-ma(inextp)
67:       if(mj.lt.MZ)mj=mj+MBIG
68:       ma(inext)=mj
69:       ran3=mj*FAC
70:       return
71:       END
72:
```