```
 1: program Aula13do03exerc01
 2: PARAMETER (NNN = 100000)
 3: implicit real*8 (a-h,o-z)
 4: PARAMETER (PI = ACOS(-1.0))
 5: real*8 L1,L2,L3,L4,K1,K2,K3,K4,DIFF,EXATA,X
 6: Dimension Y(0:NNN)
 7: Dimension Z(0:NNN)
 8: open(14,file="dados-13do03exerc01.txt")
 9: open(15,file="erro-13do03exerc01.txt")
10: H = 0.001d0
11: NSTEP = 20.d0/H
12: Y(0) = PI/180.d0
13: Z(0) = 0.d0
14: DO 10 IX = 0, NSTEP-1
15:    X = IX*H
16:    K1 = H*Z(IX)
17:    K2 = H*(Z(IX) + L1/2.0d0)
18:    K3 = H*(Z(IX) + L2/2.0d0)
19:    K4 = H*(Z(IX) + L3)
20:    Y(IX+1) = Y(IX) + (K1 + 2*K2 + 2*K3 + K4)/6.0d0
21:    L1 = H*func(X,Y(IX),Z(IX))
22:    L2 = H*func((X + H/2.d0), (Y(IX) + K1/2.d0), (Z(IX) + L1/2.d0))
23:    L3 = H*func((X + H/2.d0), (Y(IX) + K2/2.d0), (Z(IX) + L2/2.d0))
24:    L4 = H*func((X + H), (Y(IX) + K3), (Z(IX) + L3))
25:    Z(IX+1) = Z(IX) + (L1 + 2*L2 + 2*L3 + L4)/6.0d0
26:    DIFF = EXATA(X+H)-Y(IX+1)
27:    erro = dabs(DIFF/EXATA(X+H))
28:    write(14,*)X+H,Y(IX+1),EXATA(X+H)
29:    write(15,*)erro
30: 10 CONTINUE
31: end
32:
33: real*8 function func(X,Y,Z)
34: implicit real*8 (a-h,o-z)
35:      func = -((9.8d0)/1.5d0)*Y
36: end
37:
38: real*8 function exata(x)
39: implicit real*8 (a-h,o-z)
40: PARAMETER (PI = ACOS(-1.0))
41:      exata = (PI/180.d0)*dcos(dsqrt(9.8d0/1.5d0)*x)
42: end
43:
44:
```