```
 1: Program I3DGeneric
 2: COMMON/xm/xmax
 3: COMMON/NN/N
 4: Real xmax, PI, s, xmin
 5: parameter (PI = 3.1415926)
 6: dimension ICLOCK(3)
 7: open(13, file="Aula14do01exerc2.txt")
 8: call itime(ICLOCK)
 9: write(13,*)"hora inicial",ICLOCK(1),ICLOCK(2),ICLOCK(3)
10: N = 1000
11: xmax = 3
12: xmin = 2
13: call int3d(xmin, xmax, s)
14: write(13, *)"Integral sobre um volume esferico"
15: write(13, *)"Raio:", xmax
16: write(13, *)"Valor numerico:", s
17: exata = 7561/5.0
18: error = ABS(exata - s)/exata*100
19: write(13, *)"Valor exato:", exata
20: write(13, *)"Erro percentual:", error, "%"
21: write(13, *)"Repartições (N):", N
22: call itime(ICLOCK)
23: write(13,*)"hora final",ICLOCK(1),ICLOCK(2),ICLOCK(3)
24: end program
25:
26: Subroutine int3d(x1,x2,ss)
27: real ss,x1,x2,h
28: external h
29: call qtrapz(h,x1,x2,ss)
30: return
31: end
32:
33: Subroutine qtrapz(func,A,B,SS)
34: Real SS, func, soma
35: COMMON/NN/N
36: External func
37: h = (B-A)/N
38: soma = 0.0
39: do i = 1, N-1
40: soma = soma + func(A+i*h)
41: enddo
42: SS = h/2.0 * (func(A) + 2.0*soma + func(B))
43: return
44: end
45:
46: real function z1(x,y)
47: COMMON/xm/xmax
48: real x, y
49: z1 = 1
50: end
51:
52: real function z2(x,y)
53: COMMON/xm/xmax
54: real x, y
55: z2 = x*y
56: end
57:
58: real function y1(x)
59: COMMON/xm/xmax
60: real x
61: y1 = 0
62: end
63:
64: real function y2(x)
65: COMMON/xm/xmax
66: real x
67: y2 = 3*x
68: end
69:
70: function h(xx)
71: real h, xx, g, y1, y2, ss
72: external g
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 73: COMMON/xrange/xmin,xmax
 74: COMMON/xyz/x,y,z
 75: x = xx
 76: call qtrapz(g, y1(x), y2(x), ss)
 77: h = ss
 78: return
 79: end
 80:
 81: function g(yy)
 82: real g, yy, f, z1, z2, x, y, ss
 83: external f
 84: COMMON/xrange/xmin,xmax
 85: COMMON/xyz/x,y,z
 86: y = yy
 87: call qtrapz(f, z1(x,y), z2(x,y), ss)
 88: g = ss
 89: return
 90: end
 91:
 92: function f(zz)
 93: real f, zz, x, y, z
 94: COMMON/xyz/x,y,z
 95: z = zz
 96: f = func(x,y,z)
 97: return
 98: end
 99:
100: real function func(x,y,z)
101: real x,y,z
102: func = (2*z + x + y)
103: return
104: end
```