

```
1: Program Aula21do01exe03
2: External func
3: Real func
4: COMMON / h / h
5: COMMON / NN / N
6: open(13, file="Aula21do01exerc3.txt")
7: N = 10
8: if(MOD(N,2) .NE. 0) N = N+1
9: a = 0
10: b = 3.0
11: call simpson(func, a, b, SS)
12: EXATA = 116/15.0
13: ERROR = ABS(EXATA - SS)/EXATA*100
14: write(13, *) "Integral de x*sqrt(1+x) "
15: Write(13,*) "Valor Exato:", EXATA
16: Write(13,*) "Valor numerico pela Integral de Simpson:", SS
17: Write(13,*) "ERRO RELATIVO", ERROR, "%"
18: write(13,*) "Reparticoes (N):", N
19: end program
20:
21: subroutine simpson(func, a, b, SS)
22: COMMON / h / h
23: COMMON / NN / N
24: H = (b-a)/N
25: soma = func(a)
26: fator = 2
27: do i = 1, N-1
28:     if (fator == 2.) then
29:         fator = 4
30:     else
31:         fator = 2
32:     end if
33:     x = a+i*h
34:     soma = soma + fator*func(x)
35: enddo
36: soma = soma + func(b)
37: SS = soma * h/3
38: end
39:
40: real function func(x)
41: func = x*sqrt(1.0 + x)
42: return
43: end
44:
45:
46:
47:
48:
```