```
-->// Mat01186 -  P3 2016/2 B

-->// Questao 1    Quadratura Composta de Simpson
-->// comecaremos na ponta superior, no sentido horari
o

-->a=2.65; I1 = (0 + 4*4.78 + 6.0)*a/3
 I1  =

    22.189333

-->I2 = (6.0 + 4*6.14 + 4.55)*a/3
 I2  =

    31.013833

-->I3 = (4.55 + 4*2.95 + 0)*a/3
 I3  =

    14.4425

-->I4 = (0 + 4*2.27 + 4.55)*a/3
 I4  =

    12.039833

-->I5 = (4.55 + 4*5.0 + 3.3)*a/3
 I5  =

    24.600833

-->I6 = (3.3 + 4*3.63 + 0)*a/3
 I6  =

    15.741

-->I = I1 + I2 + I3 + I4 + I5 + I6
 I  =

    120.02733

-->// a lagoa tem aproximadamente 120 Km^2

-->// Questao 2

-->// (a) Quadratura Composta do Trapezio

-->a=0;b=1; n=4; h=(b-a)/n;

-->x0=a;x1=a+h;x2=a+2*h;x3=a+3*h;x4=b;[x0 x1 x2 x3 x4]
 ans  =

    0.    0.25    0.5    0.75    1.

-->function u=f(x)
--> u = 1/(1+exp(x*x));endfunction

-->I1=(f(x0)+f(x1))*h/2,I2=(f(x1)+f(x2))*h/2
 I1  =

    0.1230475
 I2  =

    0.1152754

-->I3=(f(x2)+f(x3))*h/2,I4=(f(x3)+f(x4))*h/2
 I3  =

    0.1000991
 I4  =

    0.0789888

-->I = I1 + I2 + I3 + I4
 I  =

    0.4174109

-->// (b) Quadratura Composta de Simpson

-->x0m=(x0+x1)/2;x1m=(x1+x2)/2;x2m=(x2+x3)/2;x3m=(x3+x
4)/2;

-->[x0 x0m x1 x1m x2 x2m x3 x3m x4]
 ans  =
         column 1 to 6
```



```
    0.    0.125    0.25    0.375    0.5    0.625

          column 7 to 9

    0.75    0.875    1.

-->I1 = (f(x0)+4*f(x0m)+f(x1))*h/6
 I1  =

    0.1236981

-->I2=(f(x1)+4*f(x1m)+f(x2))*h/6
 I2  =

    0.1159087

-->I3=(f(x2)+4*f(x2m)+f(x3))*h/6
 I3  =

    0.1006275

-->I4=(f(x3)+4*f(x3m)+f(x4))*h/6
 I4  =

    0.0792340

-->I = I1 + I2 + I3 + I4
 I  =

    0.4194684

-->// Questao 3

-->// (a) quadratura de gauss-legendre

-->// x = al*u+be , dx = al*du

-->// 0 = al(-1)+be ==> al = be

-->// 3 = al(1)+be ==> 2 al = 3 ==> al = be = 3/2

-->//int_0^3 f(x)dx= int_{-1}^{1} f(3/2(u+1)) 3/2 du

-->//= int_{-1}^{1} g(u) du,onde g(u)=3/2 f(3/2(u+1))

-->function y=g(u)
--> y = 3/2*f( 3/2*(u+1) );endfunction

-->function u=f(x)
--> u = exp(-x*x); endfunction

-->Ia = 5/9*g(-sqrt(3/5))+8/9*g(0)+5/9*g(sqrt(3/5))
 Ia  =

    0.8845439

-->// (b) quadratura de gauss-legendre

-->// x = al*u+be , dx = al*du

-->// -1 = al(-1)+be ==> be = al - 1

-->// 4 = al(1)+be ==> al + al -1 = 4 ==> al = 5/2

-->// be = 5/2 - 1 = 3/2 , x = (5u+3)/2, dx=5/2 du

-->//int_{-1}^4 f(x)dx =int_{-1}^{1} f((5u+3)/2) 5/2 d
u

-->// = int_{-1}^{1} g(u) du,onde g(u)=5/2 f((5u+3)/2)

-->function u=f(x)
--> u = log(1 + x*x) ; endfunction

-->function y=g(u)
--> y = 5/2 * f( (5*u+3)/2 ); endfunction

-->Ib = 5/9*g(-sqrt(3/5))+8/9*g(0)+5/9*g(sqrt(3/5))
 Ib  =

    6.4033715

-->diary(0)
```