

TE n° 754
2 décembre 2020
SALVADORE
DARIO
problème 1

$$x = 0.5$$

$$\begin{aligned} \text{Arec} &= dx * (2+2.3+2.3+1.63+1.25) \\ \text{Atra} &= dx * ((1.5+2)+(2+2.3)+(2.3+1.63)+(1.63+1.25)+(1.25+0.95))/2 \end{aligned}$$

print("Arec = ", Arec)

print("Atra = ", Atra)

Arec = 4.74

Atra = 4.2025

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problème 2
import math

```
def aireTrapeze(a, b, n, f):  
    dx = (b-a)/n  
    aire = 0.0  
    for k in range(n):  
        aire += dx * (f(a+k*dx)+f(a+(k+1)*dx))/2.0  
    return aire  
  
print("I = ", aireTrapeze(0, math.pi/2.0, 15, lambda x: math.sqrt(2+(math.cos(x))  
*2)))
```

$$I = 2,47737869263229$$

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Nom <== compléter
Prénom <== compléter
problème 3

```
def riemannMilieu(a, b, n, f):  
    dx = (b-a)/n  
    aire = 0.0  
    for k in range(n):  
        aire += dx * f(a+dx/2.0+k*dx)  
    return aire  
print("J = ",riemannMilieu(2,4, 20, lambda x: 1/(x+3.0)))
```

0,33646407421866736

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problème 4

```
import math
```

```
def f(x):  
    return x**2 * math.sin(x)
```

```
a = 0.0  
b = math.pi  
n = 40
```

```
1)  
sim = (b-a)/6.0 * (f(a)+4*f((a+b)/2.0)+f(b))  
print("a) Asim = ", Asim)
```

```
def aire(a, b, n, f):  
    Amin = 0.0  
    Amax = 0.0  
    dx = (b-a)/n  
    for k in range(n):  
        mini = f(a+k*dx)  
        maxi = f(a+(k+1)*dx)  
        if mini > maxi:  
            mini, maxi = maxi, mini  
        Amin += dx*mini  
        Amax += dx*maxi  
    return Amin, Amax
```

```
2)  
print("b) Amin = ", aire(a, b, n, f)[0])
```

```
3)  
print("c) Amax = ", aire(a, b, n, f)[1])
```

```
4)  
moyenne = aire(a, b, n, f)[0]+aire(a, b, n, f)[1]  
print("Moyenne de Amin et Amax donne une aire approximative :", a*0.5)
```

```
Python 3.8.5 (v3.8.5:580fbb018f, Jul 20 2020, 12:11:27)
Clang 6.0 (clang-600.0.57) on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>
RESTART: /Users/dario/Dropbox/2020_2021/OS_2020-2021/travaux_sv/TE754_CN2/TE754
corrige/Probleme-4.py
) Asim = 5.16771278004997
) Amin = 5.554709906953531
) Amax = 6.17435234055055
Moyenne de Amin et Amax donne une aire approximative : 5.864531123752041
>>
```

```
TE n° 754
28 octobre 2020
Nom <== compléter
Prénom <== compléter
problème 5
import random
import math
```

```
def listeDePointsAlea(a, b, n):
    # intervalle [a ; b], n: nombre de points
    # donne n+1 intervalles
    L = [a, b]
    for _ in range(n):
        L.append(random.uniform(a,b))
    L.sort()
    return L
```

```
1)
for _ in range(100):
    print(listeDePointsAlea(0, 12, 5))
```

```
2)
def sommeTrapezesAlea(a, b, n, f):
    aireTra = 0.0
    L = listeDePointsAlea(a, b, n)
    for k in range(n+1):
        dx = L[k+1]-L[k]
        mini = f(L[k])
        maxi = f(L[k+1])
        if mini>maxi:
            mini, maxi = maxi, mini
        aireTra += dx*(maxi+mini)/2.0
    return aireTra
```

```
print("W = ", sommeTrapezesAlea(0, 12, 100, lambda x: 10*x**2*math.e**(-x)))
```

19,9895548

```

# sv - 14.11.2020
# v 1.0
import random

def listeDePointsAlea(a, b, n):
    # intervalle [a ; b], n: nombre de points
    # donne n+1 intervalles
    L = [a, b]
    for _ in range(n):
        L.append(random.uniform(a,b))
    L.sort()
    return L

def sommeRectanglesInfAlea(a, b, n, f):
    aireInf = 0.0
    aireSup = 0.0
    aireTra = 0.0
    L = listeDePointsAlea(a, b, n)
    for k in range(n+1):
        dx = L[k+1]-L[k]
        mini = f(L[k])
        maxi = f(L[k+1])
        if mini>maxi:
            mini, maxi = maxi, mini
        aireInf += dx*mini
        aireSup += dx*maxi
        aireTra += dx*(maxi+mini)/2.0
    return aireInf, aireSup, aireTra

print(sommeRectanglesInfAlea(1.0, 4.0, 10000, lambda x: x**4+3*x**2+1))

```