Lista 03

Erlon Lacerda Avelino
20220071286

Questão 3

```
import matplotlib.pyplot as plt
import numpy as np
```

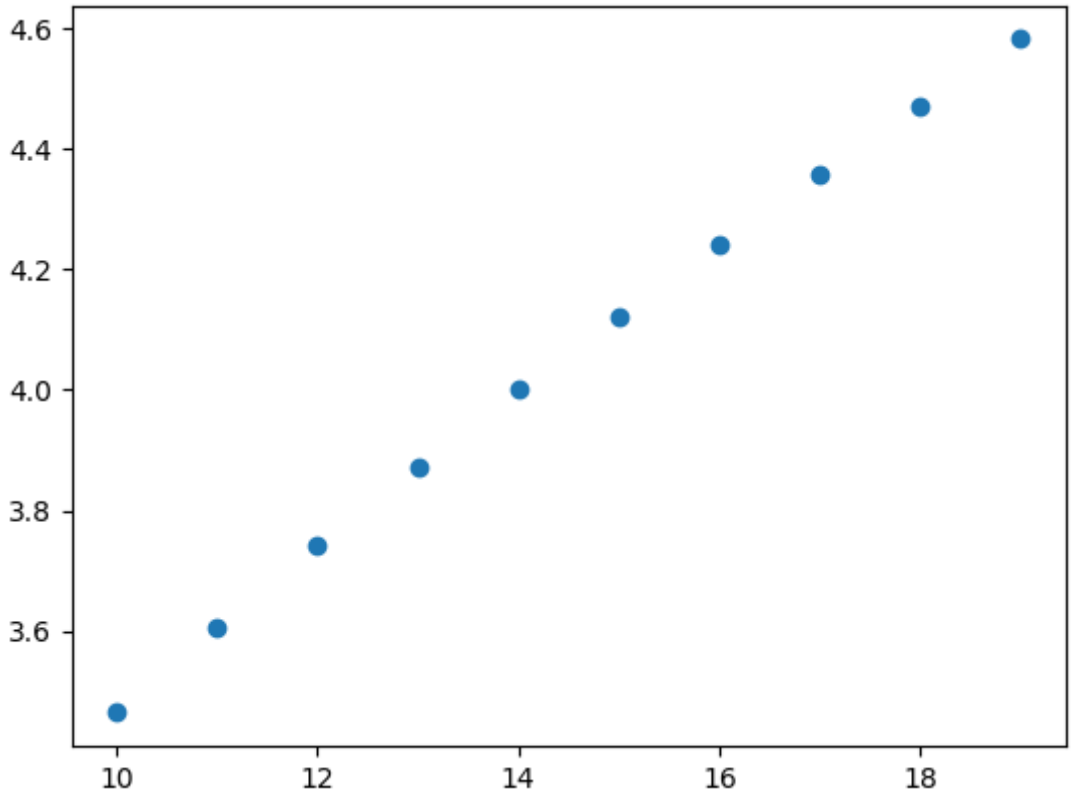
```
def a(n):
        return np.sqrt(2 + (n))
```

```
nmin = 10
nmax = 20
```

```
# dicionario que mapeia os valores de x com y(x)
data = {'x': list(range(nmin, nmax)), 'y': [a(i) for i in
range(nmin, nmax)]}

plt.plot(data['x'], data['y'], marker = "o", linestyle = "None")

plt.show()
```



Sequência de 10 pares (n, a_n) a partir de 10

```
## cabeçalho
print(f"{'X':<5}{'Y':<5}")

## elementos
for i in range(nmin, nmax):
        print(f"{i:<5}{a(i):<5}")
```

```
X Y
10 3.4641016151377544
11 3.605551275463989
12 3.7416573867739413
13 3.872983346207417
14 4.0
15 4.123105625617661
16 4.242640687119285
17 4.358898943540674
18 4.47213595499958
19 4.58257569495584
```

O limite da sequência $\{a_n\}$ é divergente para $+\infty$.

Questão 4

ii)

```
nmin = 0
nmax = 30
viewmin = 20
viewmax = viewmin+10


An = [10]
Bn = [20]
Cn = [5]

for i in range(1, nmax-1):
        An.append(0.9*An[i-1] + 0.05*Cn[i-1])
        Bn.append(0.1*An[i-1] + 0.8*Bn[i-1])
        Cn.append(0.95*Cn[i-1] + 0.2*Bn[i-1])
```

```
print("A_n")
print(f"{'X':<5}{'Y':<5}")

for i in range(viewmin, viewmax):
        print(f"{i:<5}{An[i]:<5}")
```

```
A_n
X Y
20 9.74219464956524
21 9.787809792652277
22 9.826482822924069
23 9.859046949857902
24 9.886286733562553
25 9.90892594972555
26 9.927621404556806
27 9.94296104195673
28 9.955465057107192
29 9.965589030486507
```

```
print("B_n")
print(f"{'X':<5}{'Y':<5}")

for i in range(viewmin, viewmax):
        print(f"{i:<5}{Bn[i]:<5}")
```

```
B_n
X Y
20 4.861113189563533
21 4.863110016607351
22 4.869268992551109
23 4.878063476333294
24 4.888355476052426
25 4.899313054198196
26 4.910343038331113
27 4.921036571120571
28 4.93112536109213
29 4.940446794584424
```

```
print("C_n")
print(f"{'X':<5}{'Y':<5}")

for i in range(viewmin, viewmax):
        print(f"{i:<5}{Cn[i]:<5}")
```

```
C_n
X Y
20 20.396692160871222
21 20.349080190740366
22 20.304248184524816
23 20.2628895738088
24 20.225357790385015
25 20.191760996076248
26 20.162035557112073
27 20.13600238692269
28 20.11340958180067
29 20.093964174929063
```

Observa-se que A_n se aproxima de 10, enquanto B_n se aproxima de 5 e C_n se aproxima de 20.