from sympy.abc import x

from sympy.utilities.lambdify import lambdify, implemented\_function

from sympy import Function

import numpy as np

import matplotlib.pyplot as plt

from sympy import \*

x = symbols('x')

point = []

numPoint = int(input("¿Cuantos puntos contendrá el polinomio?: "))

for i in range (0, numPoint):

print("Introduce la coordenada del punto", i, "en x:")

v1 = float(input())

print("Introduce la coordenada del punto", i, "in y:")

v2 = float(input())

point.append([v1, v2])

print("Los puntos por los que pasa la función son: ", point)

run = point

lenP = len(run)

num = []

den = []

lis = []

multi = 1

restaDen = 1

for i in range (0, lenP):

for j in range (0, lenP):

num.append(x-run[j][0])

num.pop(i)

for m in range (0, lenP-1):

multi = multi \* num[m]

varN = expand(multi\*run[i][1])

for b in range (0, lenP):

den.append(run[i][0]-run[b][0])

den.pop(i)

for o in range (0, lenP-1):

restaDen = restaDen \* den[o]

if varN == 0:

lis.append((0, 0))

else:

lis.append(div(varN, restaDen))

num = []

den = []

multi = 1

restaDen = 1

suma = 0

for u in range (0, lenP):

suma = suma + lis[u][0]

print("El polinomio generado es:", suma)

f = lambdify(x, suma, 'numpy')

x = np.linspace(-10, 10, 100)

aa = f(x)

plt.figure(figsize=(7, 7))

plt.axis([-10, 10, -10, 10])

plt.plot(x, aa, color="red")

for p in range (0, lenP):

plt.plot(run[p][0], run[p][1], marker='.', color='blue')

plt.show()