import matplotlib.pyplot as plt

import numpy as np

from scipy.interpolate import lagrange

x = np.array([-3, -2, 0, 2], dtype = float)

y = np.array([-13, 3, 5, 7], dtype = float)

def lagranz(x,y,t):

z = 0

for j in range(len(y)):

p1=1

p2=1

for i in range(len(x)):

if i==j:

p1 = p1\*1

p2 = p2\*1

else:

p1=p1\*(t\*x[i])

p2=p2\*(x[j]-x[i])

z=z+y[j]\*p1/p2

return z

xnew=np.linspace(np.min(x),np.max(x))

ynew=[lagranz(x,y,i) for i in xnew]

plt.plot(x, y, 'o', xnew, ynew)

plt.xlabel('x')

plt.ylabel('y')

plt.title('lagrange method')

plt.legend(['x^3+4x^2+x-2'], loc = 'upper right')

plt.grid()

plt.show()

n = 3

yp = 0

x1 = -3

for i in range(len(x)):

p = 1

for j in range(len(y)):

if i != j:

p = p \* (x1-x[j])/(x[i]-x[j])

yp=yp+p\*y[i]

print('int value at', x1, ' = ', yp)

