import matplotlib.pyplot as plt

import math

x= [1.340,1.345,1.350,1.355,1.360,1.365,1.370]

y= [4.2556,4.3532,4.4552,4.5618,4.6734,4.7903,4.9130]

x1= 1.394

x2= 1.381

h= x[1]-x[0]

q1= (x1-x[0])/h

q2= (x2-x[1])/h

def n(y,j):

mas=[]

for i in range(len(y)):

mas.append(y[i] - y[i-1])

mas.pop(0)

if j==1:

return mas

else:

j-= 1

return n(mas,j)

s1\_1 = y[0] + q1 \* n(y,1)[0] + q1 \* (q1-1) \* n(y,2)[0] / math.factorial (2)

s2\_1 = q1 \* (q1-1) \* (q1-2) \* n(y,3)[0] / math.factorial (3)

s3\_1 = q1 \* (q1-1) \* (q1-2) \* (q1-3) \* n(y,4)[0] / math.factorial(4)

s4\_1 = q1 \* (q1-1) \* (q1-2) \* (q1-3) \* (q1-4) \* n(y,5)[0] / math.factorial(5)

d1 = s1\_1 +s2\_1 +s3\_1 +s4\_1

print("1st Newtons interpolation -", d1)

s1\_2= y[5] + q2 \* n(y,1)[4] + q2\*(2-1) \*n(y,2)[3] / math.factorial(2)

s2\_2 = q1 \* (q2-1) \* (q2-2) \* n(y,3)[0] / math.factorial(3)

s3\_2 = q1 \* (q2-1) \* (q2-2) \* (q2-3) \* n(y,4)[0] / math.factorial(4)

s4\_2 = q1 \* (q2-1) \* (q2-2) \* (q2-3) \* (q2-4) \* n(y,5)[0] / math.factorial(5)

d2 = s1\_2 +s2\_2 +s3\_2 +s4\_2

print ("2nd Newtons interpritation -", d2)

f= n(y,j)

plt.plot(x.new,f(new), 'b',x,y, 'ro')

plt,title("Newtons interpritations")

plt.grid()

plt.xlable('x')

plt.ylable('y')

plt.show()



