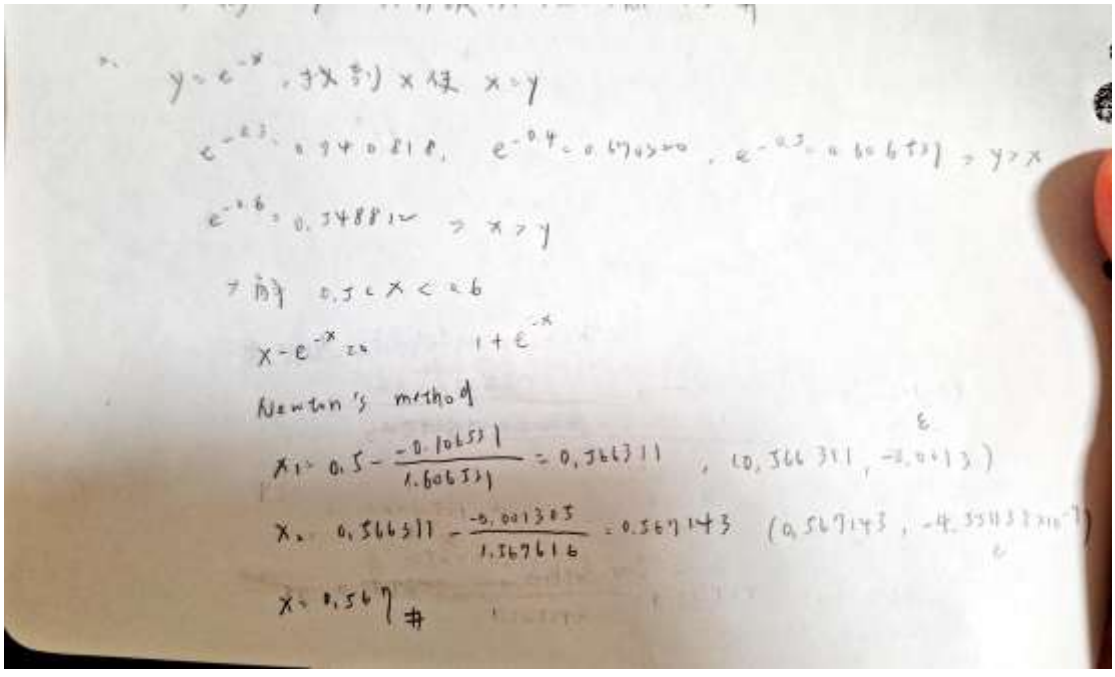
答案

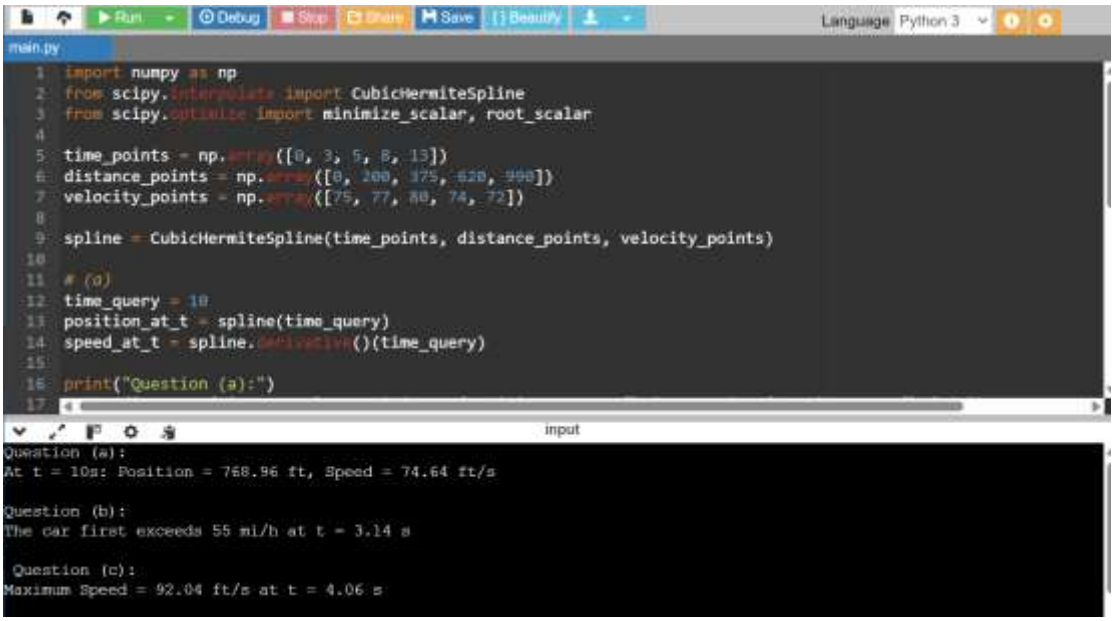
1.

```
C:\Users\user\Desktop\新文件1.exe
使用 1 階 Lagrange 多項式:
  近似 cos(0.750) = 0.73207714286
  誤差界估計值: 0.00044200000
  真實誤差: 0.00037714286

使用 2 階 Lagrange 多項式:
  近似 cos(0.750) = 0.73171632653
  誤差界估計值: 0.00000265200
  真實誤差: 0.00001632653

使用 3 階 Lagrange 多項式:
  近似 cos(0.750) = 0.73170395569
  誤差界估計值: 0.00000003514
  真實誤差: 0.00000395569

  degree 4:只有提供4點，無法求
--------------------------------
Process exited after 0.157 seconds with return value 0
請按任意鍵繼續 . . .
```

2.



3.


Run
Debug
Stop
Share
Save
{ } Beautify
Language
Python 3
main.py
import numpy as np
from scipy.interpolate import CubicHermiteSpline
from scipy.optimize import minimize_scalar, root_scalar
time_points = np.array([0, 3, 5, 8, 13])
distance_points = np.array([0, 200, 375, 620, 980])
velocity_points = np.array([75, 77, 80, 74, 72])
spline = CubicHermiteSpline(time_points, distance_points, velocity_points)
# (a)
time_query = 10
position_at_t = spline(time_query)
speed_at_t = spline.derivative()(time_query)
print("Question (a):")
input
Question (a):
At t = 10s: Position = 768.96 ft, Speed = 74.64 ft/s
Question (b):
The car first exceeds 55 mi/h at t = 3.14 s
Question (c):
Maximum Speed = 92.04 ft/s at t = 4.06 s