```
# Oppgave 1
 1
 2
   import matplotlib.pyplot as plt
 3
   import numpy as np
 4
 5
   def a(t, v):
 6
        a = np.zeros(len(t))
 7
        for i in range(1, len(t)):
8
            a[i] = ((v[i]-v[i-1]) / (t[i] - t[i-1]))
9
10
        return a
11
12
   def s(t, v):
13
        d = np.zeros(len(t))
14
        for i in range(1, len(t)):
15
            d[i] = (d[i-1] + (v[i]+v[i-1])/2 * (t[i] - t[i-1]))
16
        return d
17
18
19 t = []
20 \quad v = []
21 infile = open('running.txt','r')
22 for line in infile:
        tnext, vnext = line.strip().split(',')
23
24
        t.append(float(tnext))
25
        v.append(float(vnext))
   infile.close()
26
27
28 plt.subplot(2,1,1)
29 plt.plot(t, a(t,v), label='Akselerasjon over tid')
30 plt.xlabel('Tid')
31 plt.ylabel('Akselerasjon')
32
   plt.legend()
33
34
   plt.subplot(2,1,2)
35 plt.plot(t, s(t,v), label='Strekning over tid')
36 plt.xlabel('Tid')
37 plt.ylabel('Strekning')
38
   plt.legend()
39
   plt.show()
40
   print(s(t,v)[-1])
41
42
   0.000
43
44
    Løpeturen var 20659 meter lang.
45
   0.000
46
47
```