

```

1 import numpy as np
2 from matplotlib import pyplot as plt
3
4 def experiment(target):
5     total = 0
6     tries = 0
7     while total < target:
8         total += np.random.uniform()
9         tries += 1
10    return tries
11
12 print("2a.")
13 for target in [1, 2]:
14     for experiments in [100, 1000, 10000]:
15         print("Estimated E[N] + str(target) + "] from generating " + str(experiments) + " values of N"
16             + str(target) + ": " + str(sum([experiment(target) for i in range(experiments)]) / experiments))
17
18
19
20 print("5.")
21 def maximize(p, c, t, num_tests):
22     income = p * np.random.poisson(np.log(1 + t), num_tests) - t * c
23     return np.average(income)
24
25 x, y = [], []
26 for t in range(11):
27     x.append(t)
28     y.append(maximize(12, 3, t, 100000))
29
30 plt.plot(x, y)
31 plt.savefig('hw2_5')
32
33 print("Optimal number of hours worked is " + str(y.index(max(y))))

```

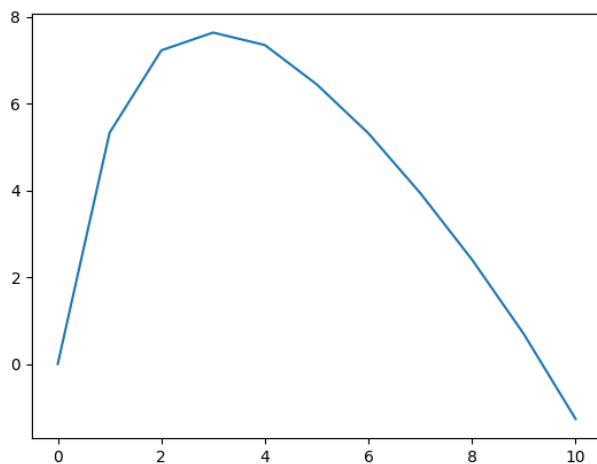
2a.

Estimated E[N1] from generating 100 values of N1: 2.69
 Estimated E[N1] from generating 1000 values of N1: 2.744
 Estimated E[N1] from generating 10000 values of N1: 2.7173
 Estimated E[N2] from generating 100 values of N2: 4.63
 Estimated E[N2] from generating 1000 values of N2: 4.665
 Estimated E[N2] from generating 10000 values of N2: 4.6673

5.

Optimal number of hours worked is 3

Income based on hours worked



Hours worked