In [1]:

```
import matplotlib.pyplot as plt
import numpy as np
```

executed in 1.38s, finished 19:13:04 2023-09-05

In [2]:

```
def cal_m2(m1,a,b,c):
    return a*b*c*m1
```

executed in 15ms, finished 19:13:35 2023-09-05

In [4]:

```
cal_m2(0.53,3,2,1.5)
```

executed in 20ms, finished 19:14:05 2023-09-05

Out[4]:

4.7700000000000005

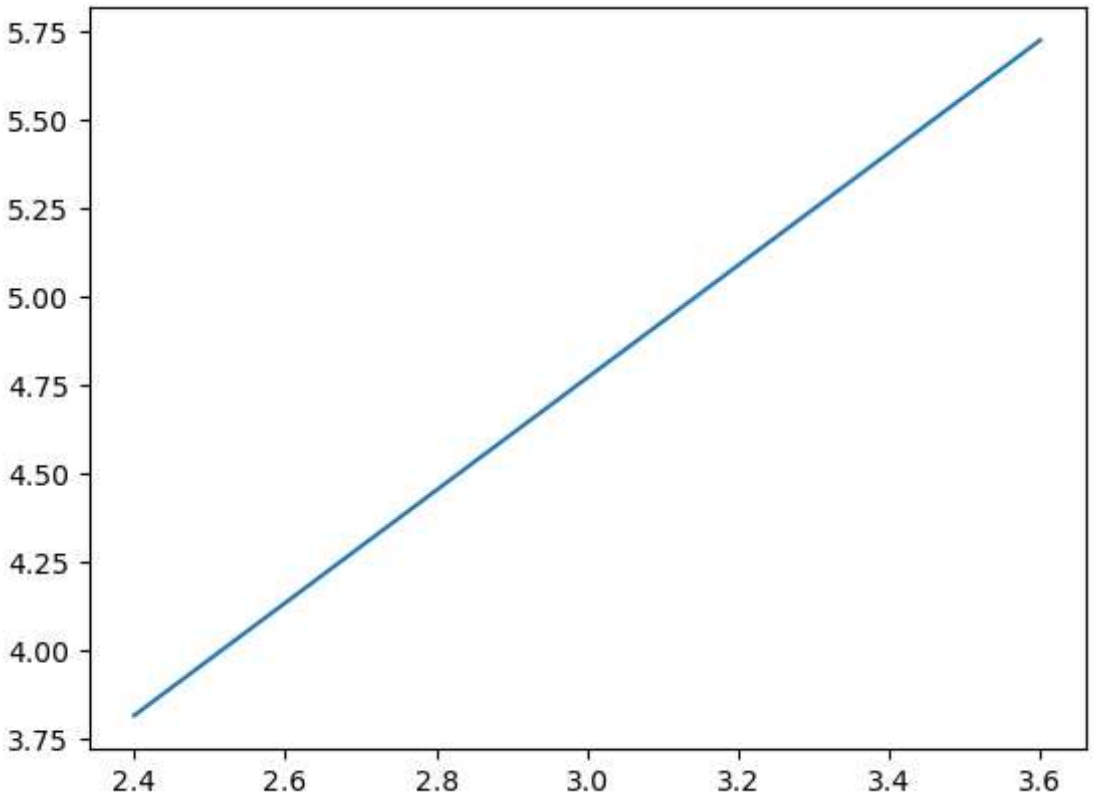
In [7]:

```
1 aarray = np.linspace(3*0.8, 3*1.2, 100)
2 plt.plot(aarray, cal_m2(0.53, aarray, 2, 1.5))
```

executed in 730ms, finished 19:15:59 2023-09-05

Out[7]:

[<matplotlib.lines.Line2D at 0x1293489a8e0>]



In [6]:

```
1  aarray
```

executed in 18ms, finished 19:15:00 2023-09-05

Out[6]:

```
array([0.424     , 0.42614141, 0.42828283, 0.43042424, 0.43256566,
       0.43470707, 0.43684848, 0.4389899 , 0.44113131, 0.44327273,
       0.44541414, 0.44755556, 0.44969697, 0.45183838, 0.4539798 ,
       0.45612121, 0.45826263, 0.46040404, 0.46254545, 0.46468687,
       0.46682828, 0.4689697 , 0.47111111, 0.47325253, 0.47539394,
       0.47753535, 0.47967677, 0.48181818, 0.4839596 , 0.48610101,
       0.48824242, 0.49038384, 0.49252525, 0.49466667, 0.49680808,
       0.49894949, 0.50109091, 0.50323232, 0.50537374, 0.50751515,
       0.50965657, 0.51179798, 0.51393939, 0.51608081, 0.51822222,
       0.52036364, 0.52250505, 0.52464646, 0.52678788, 0.52892929,
       0.53107071, 0.53321212, 0.53535354, 0.53749495, 0.53963636,
       0.54177778, 0.54391919, 0.54606061, 0.54820202, 0.55034343,
       0.55248485, 0.55462626, 0.55676768, 0.55890909, 0.56105051,
       0.56319192, 0.56533333, 0.56747475, 0.56961616, 0.57175758,
       0.57389899, 0.5760404 , 0.57818182, 0.58032323, 0.58246465,
       0.58460606, 0.58674747, 0.58888889, 0.5910303 , 0.59317172,
       0.59531313, 0.59745455, 0.59959596, 0.60173737, 0.60387879,
       0.6060202 , 0.60816162, 0.61030303, 0.61244444, 0.61458586,
       0.61672727, 0.61886869, 0.6210101 , 0.62315152, 0.62529293,
       0.62743434, 0.62957576, 0.63171717, 0.63385859, 0.636     ])
```

In [11]:

```
1  T0= 26
2  Te = 8
3  Ta = 10
4  Tlist = [T0]
5  t0 = 0
6  k = 0.439
7  tlist = [t0]
8  while Tlist[-1]>Ta:
9      Tnew = Tlist[-1]-k*(Tlist[-1]-Te)
10     Tlist.append(Tnew)
11     t = t+1
12     tlist.append(t)
```

executed in 16ms, finished 19:45:45 2023-09-05

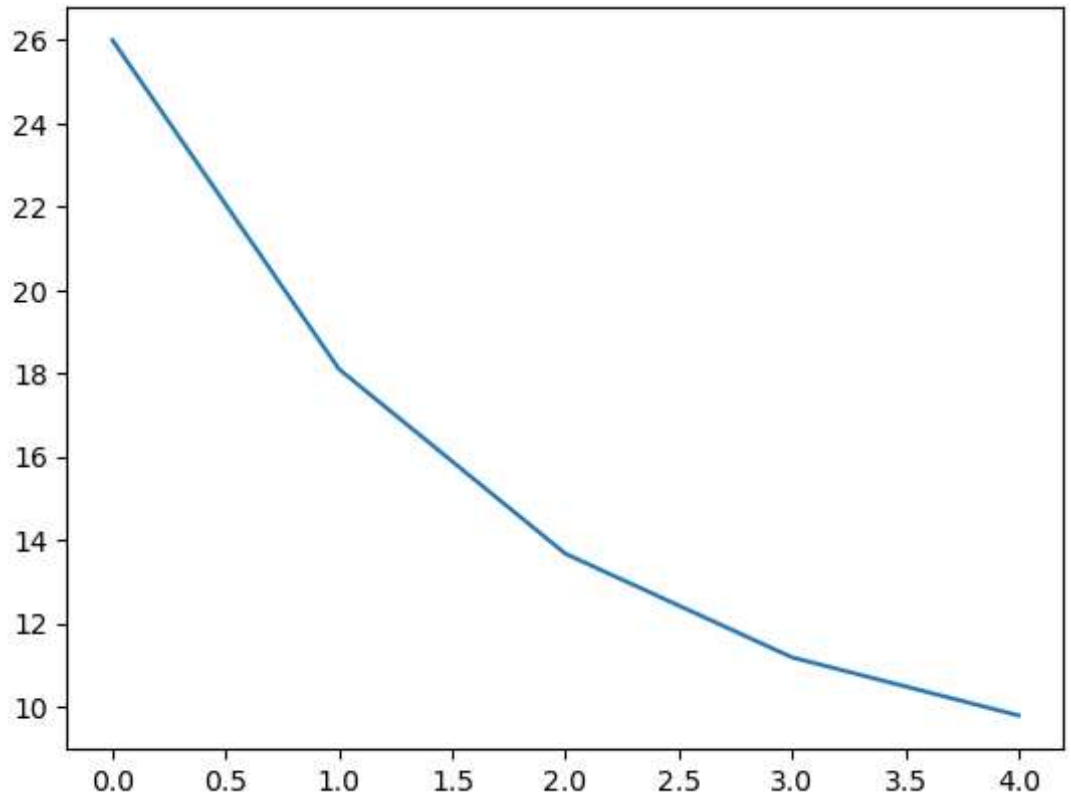
In [12]:

```
1 plt.plot(tlist,Tlist)
```

executed in 447ms, finished 19:45:55 2023-09-05

Out[12]:

[<matplotlib.lines.Line2D at 0x12934b1c250>]



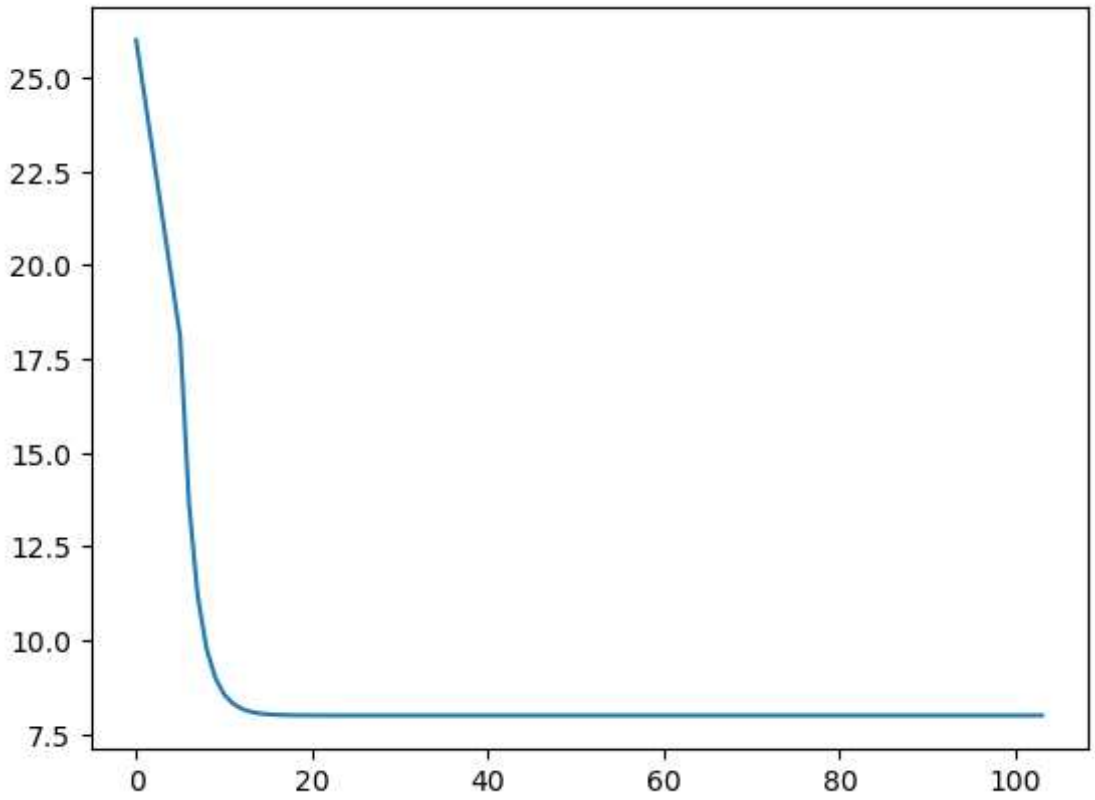
In [13]:

```
T0= 26
Te = 8
Ta = 10
Tlist = [T0]
t0 = 0
k = 0.439
tlist = [t0]
for i in range(1,100):
    Tnew = Tlist[-1]-k*(Tlist[-1]-Te)
    Tlist.append(Tnew)
    t = t+1
    tlist.append(t)
plt.plot(tlist,Tlist)
```

executed in 397ms, finished 19:47:29 2023-09-05

Out[13]:

```
[<matplotlib.lines.Line2D at 0x12934b7f100>]
```



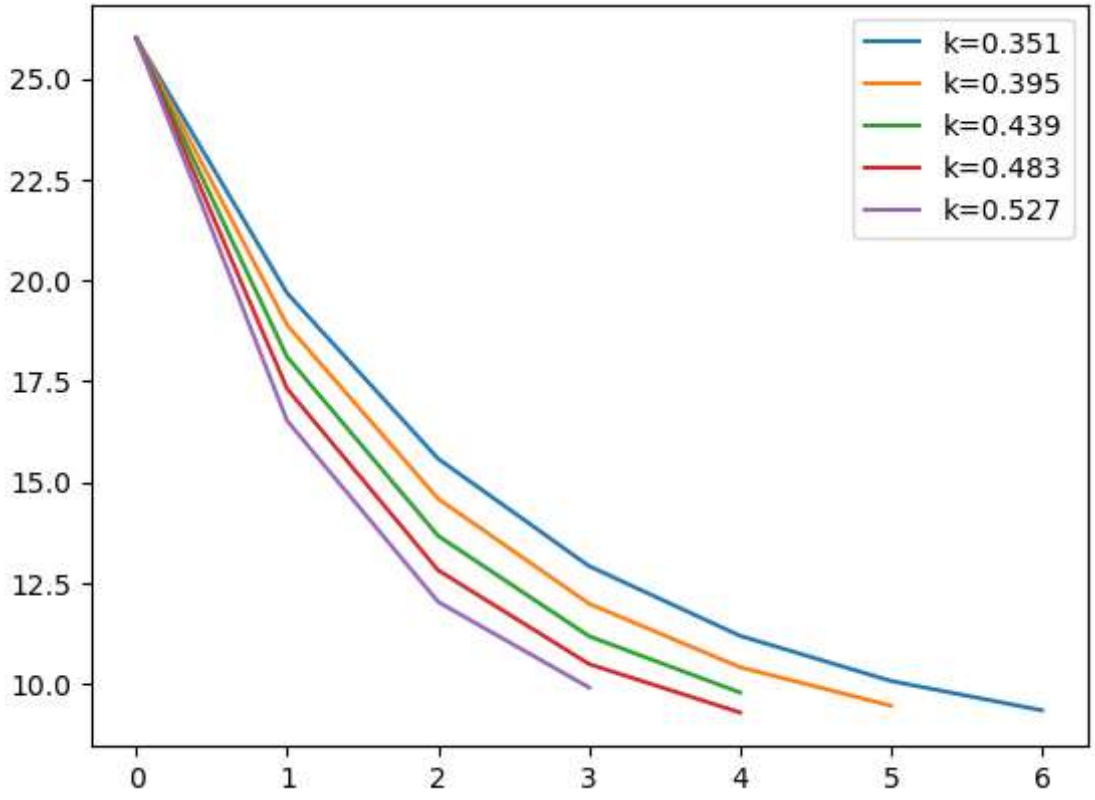
In [15]:

```
T0= 26
Te = 8
Ta = 10
t0 = 0
for k in np.linspace(0.439*0.8, 0.439*1.2, 5):
    Tlist = [T0]
    tlist = [t0]
    t = 0
    while Tlist[-1]>Ta:
        Tnew = Tlist[-1]-k*(Tlist[-1]-Te)
        Tlist.append(Tnew)
        t = t+1
        tlist.append(t)
    plt.plot(tlist,Tlist,label=f'k={round(k,3)}')
plt.legend()
```

executed in 593ms, finished 19:52:57 2023-09-05

Out[15]:

<matplotlib.legend.Legend at 0x12934bdb9a0>




```
1
```

Type *Markdown* and LaTeX: α^2