In [1]:
```
# Implement Gradient Descent Algorithm to find the local minima of a function. For examp
# local minima of the function y=(x+3)2 starting from the point x=2
```

In [13]:
```
# Set the learning rate, initial point, and number of iterations
x_initial = 2 #start
learning_rate = 0.01  #learning rate (gra descent)
precision = 0.000001  #when u want to stop the aldo
prev_step_size = 1
max_iter = 10000
iters = 0 #interation starts from 0
gf = lambda x: (x + 3) ** 2 #gradient function
```

In [14]:
```
import matplotlib.pyplot as plt
```

In [15]:
```
gd = []
```

In [16]:
```
while precision < prev_step_size and iters < max_iter:
    prev = x_initial
    x_initial = x_initial - learning_rate * gf(prev)  #gradient descent
    prev_step_size = abs(x_initial - prev)
    iters += 1
    print('Iteration', iters, 'Value', x_initial)
    gd.append(x_initial)
```

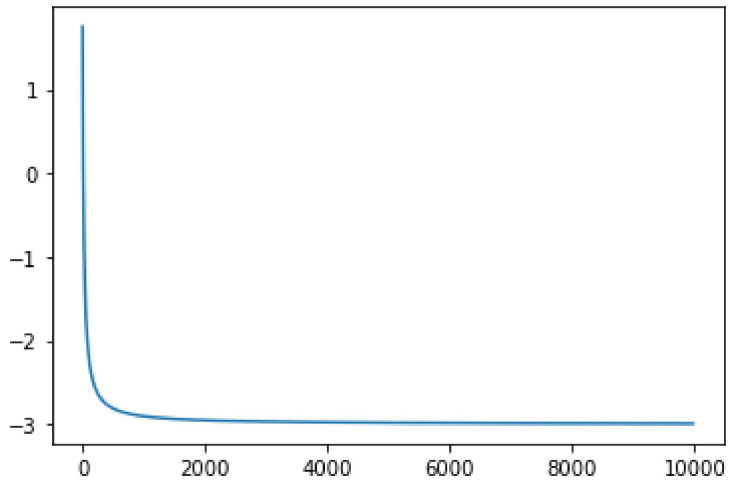
```
Iteration 1 Value 1.75
Iteration 2 Value 1.524375
Iteration 3 Value 1.31967530859375
Iteration 4 Value 1.133079360877005
Iteration 5 Value 0.9622559108439301
Iteration 6 Value 0.8052611918137536
Iteration 7 Value 0.6604610644345152
Iteration 8 Value 0.5264713123921045
Iteration 9 Value 0.4021113132208596
Iteration 10 Value 0.28636769934540596
Iteration 11 Value 0.1783655727923978
Iteration 12 Value 0.07734549564927831
Iteration 13 Value -0.017355057346650715
Iteration 14 Value -0.10631676588600673
Iteration 15 Value -0.19005079247993095
Iteration 16 Value -0.26900893796835756
Iteration 17 Value -0.34359205977732477
Iteration 18 Value -0.41415709122610556
Iteration 19 Value -0.4810229267146679
```

In [17]:
```
print('Local Minima: ',x_initial)
```

```
Local Minima:  -2.990001240409911
```

In [18]:
```
plt.plot(gd)
```

Out[18]:
```
[<matplotlib.lines.Line2D at 0x2482731b4f0>]
```



In [ ]: