In [1]:
```
x = 2
lr = 0.01
precision = 0.000001
previous_step_size = 1
max_iter = 10000
iters = 0
gf = lambda x: (x+3) ** 2
```

In [2]:
```
import matplotlib.pyplot as plt
```

In [3]:
```
gd = []
```

In [4]:
```
while precision < previous_step_size and iters < max_iter:
 prev = x
 x = x -lr * gf(prev)
 previous_step_size = abs(x - prev)
 iters += 1
 print('Iteration:', iters, 'Value:',x)
 gd.append(x)
```

```
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
Iteration: 20 Value: -0.5444753816720392
Iteration: 21 Value: -0.604771393184186
Iteration: 22 Value: -0.6621425939732744
Iteration: 23 Value: -0.7167983664824145
Iteration: 24 Value: -0.7689284634753881
Iteration: 25 Value: -0.8187052654862911
Iteration: 26 Value: -0.8662857326744634
Iteration: 27 Value: -0.911813098420349
Iteration: 28 Value: -0.9554183437796372
Iteration: 29 Value: -0.9972214852691652
Iteration: 30 Value: -1.0373327030598396
Iteration: 31 Value: -1.0758533322446235
Iteration: 32 Value: -1.1128767362349647
Iteration: 33 Value: -1.1484890783613968
Iteration: 34 Value: -1.1827700052908672
Iteration: 35 Value: -1.2157932538275726
Iteration: 36 Value: -1.2476271909584447
Iteration: 37 Value: -1.2783352955771266
Iteration: 38 Value: -1.3079765891216815
Iteration: 39 Value: -1.3366060213512845
Iteration: 40 Value: -1.3642748166333325
Iteration: 41 Value: -1.3910307853883317
Iteration: 42 Value: -1.4169186047240125
Iteration: 43 Value: -1.4419800717647022
Iteration: 44 Value: -1.4662543327324855
Iteration: 45 Value: -1.4897780904511042
Iteration: 46 Value: -1.5125857926119193
Iteration: 47 Value: -1.5347098028553183
Iteration: 48 Value: -1.5561805564738014
Iteration: 49 Value: -1.5770267023288445
Iteration: 50 Value: -1.5972752323876958
Iteration: 51 Value: -1.6169516001244257
Iteration: 52 Value: -1.6360798288884095
Iteration: 53 Value: -1.6546826112200603
Iteration: 54 Value: -1.6727813999855972
Iteration: 55 Value: -1.6903964921078392
Iteration: 56 Value: -1.7075471055866738
```

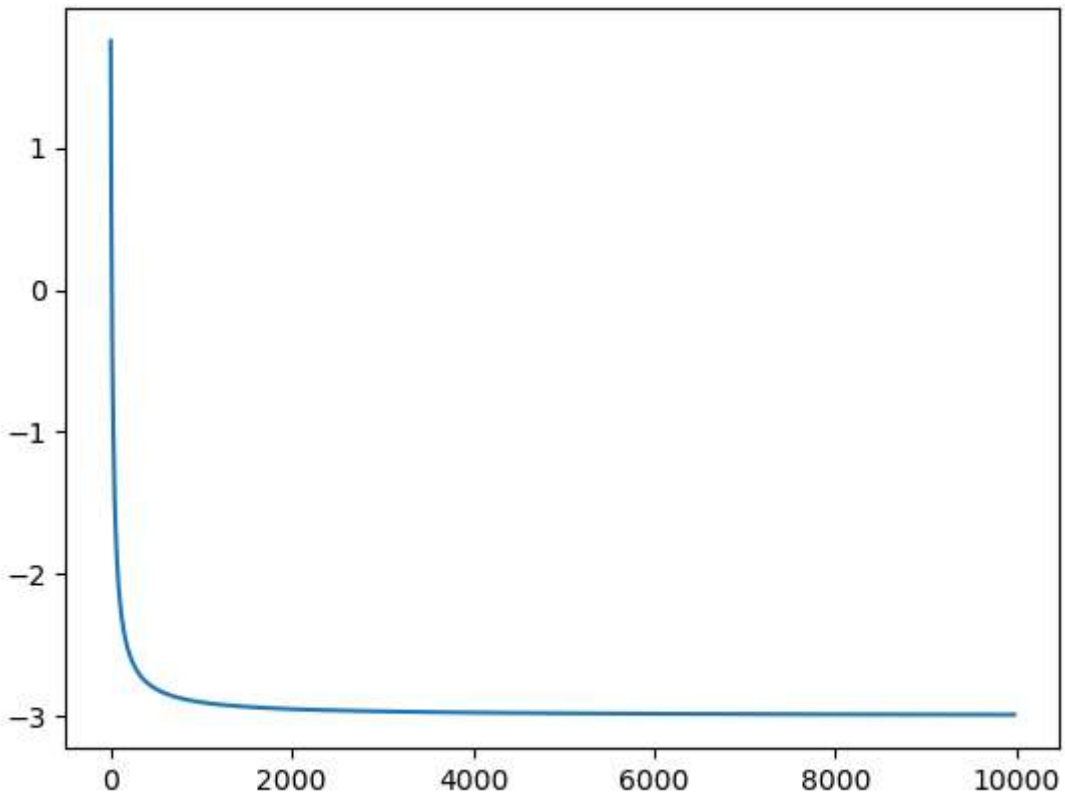
```
Iteration: 9969 Value: -2.9899952376967227
Iteration: 9970 Value: -2.98999623864941
Iteration: 9971 Value: -2.9899972394018217
Iteration: 9972 Value: -2.9899982399540175
Iteration: 9973 Value: -2.989999240306058
Iteration: 9974 Value: -2.990000240458002
Iteration: 9975 Value: -2.990001240409911
```

In [5]:
```
print('Local Minima:', x)
```

```
Local Minima: -2.990001240409911
```

In [6]:
```
plt.plot(gd)
```

Out[6]:
```
[<matplotlib.lines.Line2D at 0x232e3dea190>]
```



In [ ]: