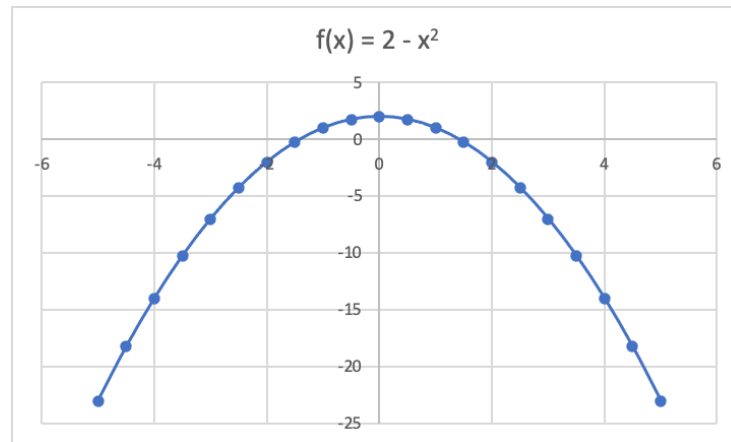


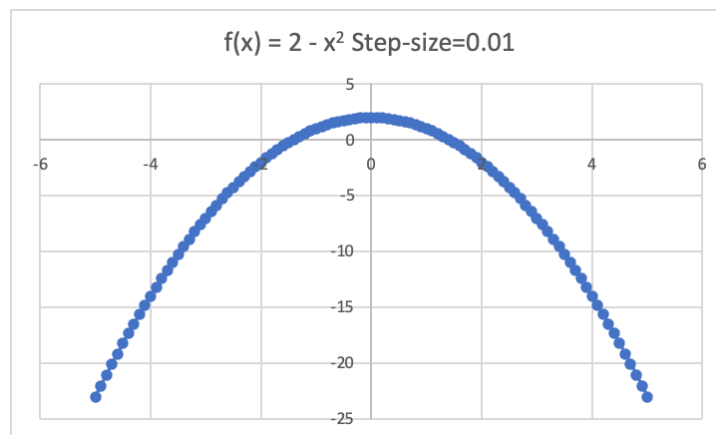
**CS571: Artificial Intelligence**  
**Assignment 2**  
**Due: Friday, February 25, 11:59PM**

**1. Hill-climbing**

- a. Consider a function  $f(x) = 2 - x^2$  in the following discrete state-space, where  $x \in [-5, 5]$ , step-size 0.5. Implement the hill-climbing algorithm in python to find the maximum value for the above function.



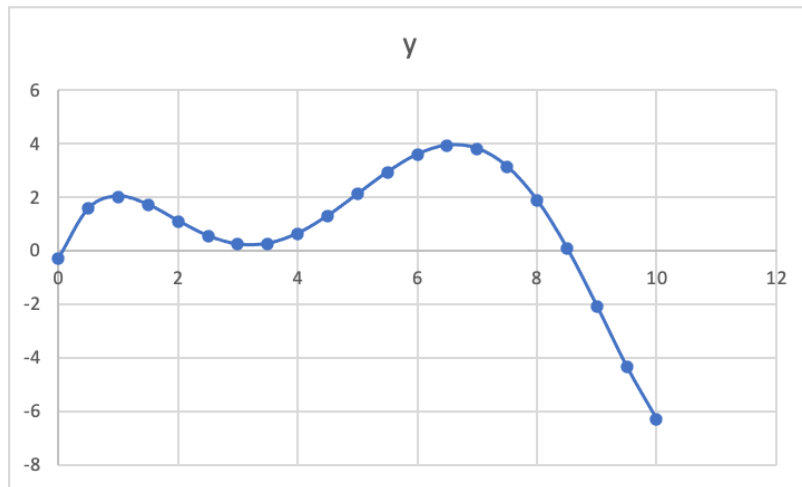
- b. Change the step-size to 0.01. Run the hill-climbing algorithm and share your observations.



## 2. Random-restart hill-climbing

a. Consider a function

$g(x) = (0.0051x^5) - (0.1367x^4) + (1.24x^3) - (4.456x^2) + (5.66x) - 0.287$  in the following discrete state-space, where  $x \in [0, 10]$ , step-size 0.5. Implement the random-restart hill-climbing algorithm for 20 random restarts in python to find the global maximum value for the above function.



b. Run the hill-climbing algorithm for the function  $g(x)$ . Compare and analyze the results of hill-climbing with the random-restart hill-climbing algorithm.