

▼ CS156 (Introduction to AI), Fall 2022

Homework 1 submission

Roster Name: Preet LNU

Student ID: 014755741

Email address: preet.lnu@sjsu.edu

▼ References and sources

<https://sjsu.instructure.com/courses/1488511/files/folder/Example%20Jupyter%20notebooks?#> I used the Gradient_Descent example as a reference.

▼ Load libraries and set random number generator seed

```
import numpy as np
from IPython.display import display, Math, Latex

np.random.seed(42)
```

▼ Cubic curve function

```
display(Math(r' f(x) = 5x^3-20x+2 '))
```

$$f(x) = 5x^3 - 20x + 2$$

```
def f(x):
    return 5 * pow(x, 3) - (20 * x) + 2
```

```
# derivative
def f_prime(x):
    return (15 * x * x) - 20
```

▼ Gradient Descent

```
init_solution = np.random.randint(0, 10)
def gradient_descent(x, lr, iterations):
    for i in range(iterations):
        x = x - lr * f_prime(x)
        # print(x)
    return (x)

solution = gradient_descent(init_solution, .01, 1000)
print("This function has a global minimum value of x at " + str(round(solution, 3)))
```

This function has a global minimum value of x at 1.155

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