The Image Cartoonifier SoC'23
Week 2 Assignment

PART I (Warm-up) :

Q1: Consider the following function

$$f(x_1, x_2) = (x_1 - x_2)^4 + 8x_1x_2 - x_1 + x_2 + 3$$

Plot $f(x_1, x_2)$ versus x_1 for $x_2 = -1$ and $x_2 = +1$. Thus, there should be two curves in this same figure. (HINT: use matplotlib and numpy)

Q2. For the same function above,Generate a contour plot of the function.

PART II (Mandatory) :
LINEAR REGRESSION
Q1.

A. Create a dataset containing no. of years of experience and corresponding salary of employees. There are three data points

No. of years experience	Salary
1	300
3	480
5	570

These three points will constitute our data or training set.
scatter plot the dataset, by including axis labels and title of the plot.

You are given w = 200 and b = 100.

B. Define a function `compute_cost` which implements cost function(J) for the above problem data (same training data and parameters) and returns the total cost

C. Create a function `compute_gradient` which returns $\frac{dJ}{dw}$, $\frac{dJ}{db}$ for the above data. *(All Notations are same as in the video lec's)*

Q2.

A. Write a function named `compute_gradient_descent` using the functions you have created i.e, `compute_cost`, `compute_gradient`. Initialize the parameters w_init and b_init as '0' . You are given, number of iterations: 10000 and learning rate i.e, alpha =0.01.
(Hint: This function takes the arguments (x_train, y_train, w_init, b_init, alpha, num_iters) where x_train and y_train are the no. of years experience and salary respectively.)
