Assignments on Linear Regression (Ref Video Lectures 1-12)

1. Annual Revenue data for a company is given as:

Y	2006	2008	2009	2011	2013	2014	2015	2016	2017	2018	2019
Rev. In billion Rupees	100.2	98.3	87.1	89.2	88.9	83.5	89.1	84	92.3	96	97

a) Draw a least square line fitting the data.
b) What is the expected revenue in 2021
c) Analyze expected error in predictions. 10

2. The following table shows the final semester marks obtained by 10 students selected at random.

M L	85	90	93	65	87	71	98	68	84	87
HUR	82	88	96	72	91	80	95	72	89	84

Find least square line fitting the above data using
a) X as independent variables (regression of Y on X)
b) Y as independent variable (regression of X on Y)
c) If a student receives a mark 96 in ML, what is her/his expected marks in HUR.
d) If a student receives 95 in HUR. What are her/his expected marks in ML.
e) After plotting a) and b) what conclusions can you draw? 10

3. Experimental results of pressure (P) for a given mass of gas corresponding to various values of volume (V) is given as:

V	54.3	61.8	72.4	88.7	118.6	194
P	61.2	49.5	37.5	28.4	19.2	10.1

Assume PV^n = const =c
a) Find the parameters n and c
b) Write the equation connecting P and V.
c) Estimate the value of P when V=100 10

4. Find the least square parabola which fits the data: $Y= W0 + W1X+ W2 X^2$ 10

X	0	1	2	3	4	5	6
Y	2.4	2.1	3.2	5.6	9.3	14.6	21.9

5. Download the COVID -19 data of India for the month of May, 2021 and WAP to design a predictor for the number of deaths on a particular day. Hence, predict the number of deaths on April 20, 2021 and June 10th , 2021. Verify your prediction with the actual number of deaths and hence calculate the accuracy of prediction. **20**

[Hints: collect data from my website or from the web for the month of May, 2021. Use 22 days data for training and rest 09 days data for testing. Use both straight line fitting and quadratic curve fitting for predictor design and compare their performance in predicting accuracy]

Deadline: 3 June 2022