# Algorithms in Machine Learning.

1)Linear Regression and Multi Linear Regression(R).

2)Logistic Regression (C).

3)K-Nearest Neighbours (C).

4)Support Vector Machines (C/R).

5)Decision Tree (C/R).

6)Random Forest (C/R).

7)Naive Bayes(C).

8)Gradient Boosting Algorithms.

a)GBM.

b)XGBoost.

c)CatBoost.

d)LightGBM.

9)k-Means.

10)Dimensionality Reduction Algorithms.

# 1)Linear Regression and Multi Linear Regression(R)

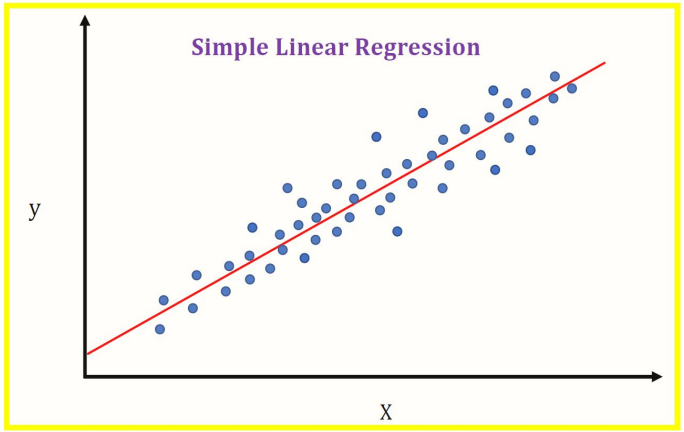
## Simple Linear Regression:

one independent variable.One dependent variable..

Y= mx+c, m=slope, c = intercept

EX.Predicting the Salary of a person based on years of experience.

It is used to know the relationship b/w the two quantitative variables.



# Multiple Linear Regression:

--> More than one independent variable,One dependent variable

Y = c + m1x1 + m2x2+ m3x3+ …….  Mnxn

It used to model the relationship b/w a continuous response variable and continuous or categorical explanatory variables.

EX:1 House Price Prediction based on multiple feature.

# Advantages and Disadvantages

--> Linear regression performs exceptionally well for linearly separable data.

--> Easier to implement, interpret and efficient to train.

--> It handles overfitting pretty well using dimensionally reduction techniques, regularization, and cross-validation.

## Disadvantages:

--> The assumption of linearity between dependent and independent variables.

--> It is often quite prone to noise and overfitting.

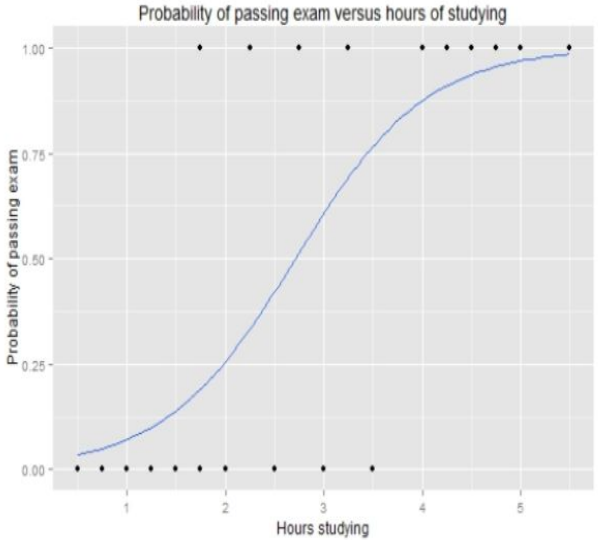
-->Linear regression is quite sensitive to outliers.

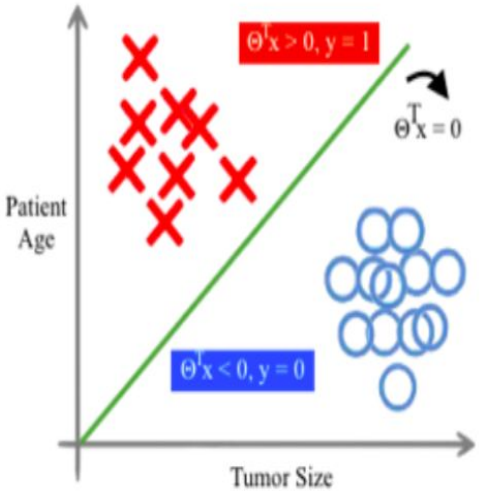
# 2)Logistic Regression (C).

>It is a type of supervised learning where it used to solve classification problem.

EX:When we have to predict if a student passes or fails in an exam when the number of hours spent studying is given as a feature, the response variable has two values, pass and fail.

Data set having labels like:
[Yes-No, 0-1, etc. then use logistic regression as there linear regression fails].



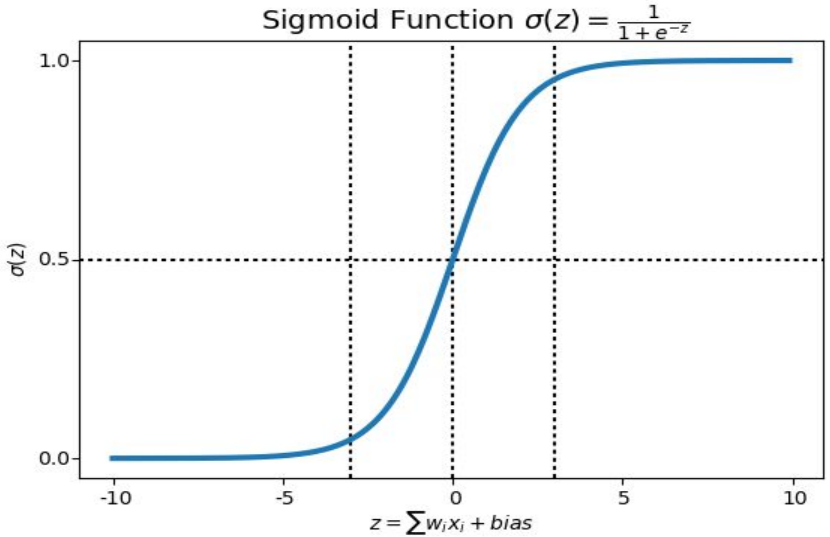



Here we use Sigmoid function:

In order to map predicted values to probability that ranges between 0-1.

Y = 1/1+e-x.

x = independent variable (That has to be transformed), e = 2.718
e = natural logarithm base(also known as Euler's number).



Types of Logistic Regression.

1)Binomial LR: Based on the number of categories,LR can be classified as..

Target variable can have only 2 possible types: '0' or '1', 'Yes' or 'No' etc.

2. Multinomial Logistic Regression:
Target variable can have 3 or more possible types which are not ordered
(i.e,types have no quantitative significance)like "disease A" vs "disease B" vs "disease C".)

3. Ordinal Logistic Regression: It deals with target variables with ordered categories.
For example: a test score can be categorized as:"very poor", "poor", "good",
"very good". Here, each category can be given a score like 0, 1, 2, 3.

Applications:

-Fraud Detection
-Disease Diagnosis
-Emergency Detection
-Spam no spam