**Supervised learning** : given the right answer of some example in the data

**Classification problem** : discrete value output🡪 decide where an example lies

**Training set**: learn from the data and make estimates for the test data

m: no of training examples

x: input variable/feature

y: output variable/target

(x,y): one training example

(x(i), y(i)) : ith training example

Supervised learning: feed the data to the learning algorithm which outputs a function **h (hypothesis)**, which takes the input and tries to output the corresponding value of y. **h maps x to y**

How to represent h?

1. **h(x)= a + b\*x** 🡪 y is linear function of x : LINEAR REGRESSION WITH ONE VARIABLE (X)/ UNIVARIATE LINEAR REGRESSION

COST FUNCTION:

a,b are parameters: we need to come up with values a,b that fits majority of data. For (x,y) h produces h(x) closest to y for x.

minimize : J(a,b) : 1/2m \* sum{ [ h(x) –y ]^ 2 } minimize average square error

**Cost Function: 1/2m \* sum{ [ h(x) –y ]^ 2 }**: squared error function/ Cost function

EXAMPLE:

H = a + bx

A = 0, H = bx

J = 1/2m {(Ax – y) ^2}

CONTOUR PLOTS/FIGUREs

GRADIENT DESCENT: just to minimize the cost function J

Start a,b with arbitrary value, and find the direction of local minima🡪

**C: it is the learning rate**

**a:= a – c (derivative of J at a) : set new value of a**

**b:= b – c)derivative of J at b) : set new value to b**

simultaneously update a&b