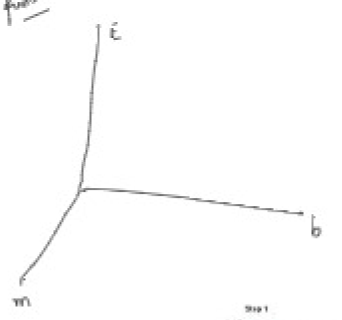
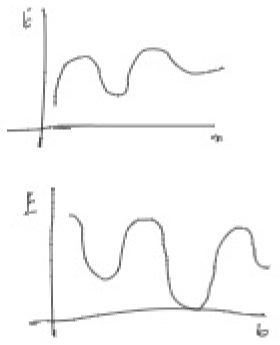
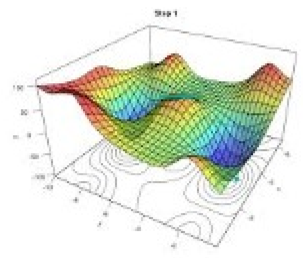
Error function $\Rightarrow E(m,b) = \sum_{i=0}^{n} (y_i - mx_i - b)^2$







$m = ?$
$b = ?$

$E(m,b) = \sum_{i=0}^{n} (y_i - mx_i - b)^2$

$y = f(x)$

$\Rightarrow \frac{dy}{dx} = 0$

$y = f(x, y)$

$\Rightarrow \frac{\partial E}{\partial x} = 0, \frac{\partial E}{\partial b} = 0 \rightarrow m, b$

diff with r.t. b.

$\frac{\partial E}{\partial b} = 0$

$\Rightarrow \frac{d}{db} \sum_{i=0}^{n} (y_i - mx_i - b)^2 = 0$

$\Rightarrow \sum_{i=0}^{n} \frac{d}{db} (y_i - mx_i - b)^2 = 0$

by apply chain rule...

$\sum_{i=0}^{n} 2(y_i - mx_i - b)(-1) = 0$

$\sum_{i=0}^{n} -2(y_i - mx_i - b) = 0$

$\sum_{i=0}^{n} (y_i - mx_i - b) = 0$

$\sum_{i=0}^{n} y_i - \sum_{i=0}^{n} mx_i - \sum_{i=0}^{n} b = 0$

$\Rightarrow$ Devide by n both side ...

$\frac{\sum_{i=0}^{n} y_i}{n} - \frac{\sum_{i=0}^{n} mx_i}{n} - \frac{\sum_{i=0}^{n} b}{n} = \frac{0}{n}$

$\bar{y} - m\bar{x} - \frac{nb}{n} = 0$

$\Rightarrow \bar{y} - m\bar{x} - b = 0$

$\rightarrow \boxed{b = \bar{y} - m\bar{x}}$

x CGPA	y pkg

$\rightarrow \left[\frac{y_1 + y_2 + y_3 + y_4 + \cdots}{n}\right]$

$\bar{y}$

$\left[\frac{b + b + b \cdots}{n}\right]$

$E(m,b) = \sum_{i=0}^{n} (y_i - mx_i - b)^2$

$\Rightarrow \frac{\partial E}{\partial m} \Rightarrow \frac{d}{dm} \sum_{i=0}^{n} (y_i - mx_i - b)^2 = 0$

$\Rightarrow \frac{d}{dm} \sum_{i=0}^{n} (y_i - mx_i - (\bar{y} - m\bar{x}))^2 = 0$

$\Rightarrow \frac{d}{dm} \sum_{i=0}^{n} (y_i - mx_i - \bar{y} + m\bar{x})^2 = 0$

$\Rightarrow \sum_{i=0}^{n} \frac{d}{dm} (y_i - mx_i - \bar{y} + m\bar{x})^2 = 0$

$\Rightarrow \sum_{i=0}^{n} 2(y_i - mx_i - \bar{y} + m\bar{x})(-x_i + \bar{x}) = 0$

$\Rightarrow \sum_{i=0}^{n} -2(y_i - mx_i - \bar{y} + m\bar{x})(x_i - \bar{x}) = 0$

$\Rightarrow \sum_{i=0}^{n} (y_i - mx_i - \bar{y} + m\bar{x})(x_i - \bar{x}) = 0$

$\Rightarrow \sum_{i=0}^{n} [(y_i - \bar{y}) - m(x_i - \bar{x})](x_i - \bar{x}) = 0$

$\Rightarrow \sum_{i=0}^{n} [(y_i - \bar{y})(x_i - \bar{x}) - m(x_i - \bar{x})(x_i - \bar{x})] = 0$

$\Rightarrow \sum_{i=0}^{n} [(y_i - \bar{y})(x_i - \bar{x}) - m(x_i - \bar{x})^2] = 0$

$\Rightarrow \sum_{i=0}^{n} (y_i - \bar{y})(x_i - \bar{x}) - m\sum_{i=0}^{n} (x_i - \bar{x})^2 = 0$

$\sum_{i=0}^{n} (y_i - \bar{y})(x_i - \bar{x}) = m\sum_{i=0}^{n} (x_i - \bar{x})^2$

$$m = \frac{\sum_{i=0}^{n} (y_i - \bar{y})(x_i - \bar{x})}{\sum_{i=0}^{n} (x_i - \bar{x})^2}$$

LR

x_i

$\frac{7 \times 3}{2}$

Cal / Im

$y_i =$

$\bar{x}$

Algo