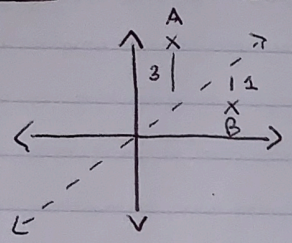
# Linear Regression

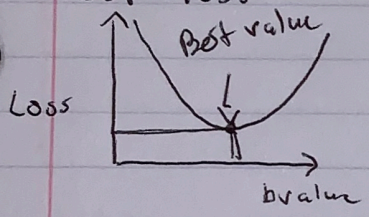
What does it mean? finding the best "m" and "b" or slope and Intercept for our data. $y = mx + b$

**Loss** - how bad the models prediction was.




point A has a loss of $(3)^2 = 9$
point B has a loss of $(1)^2 = 1$
total loss of A + B = 10

**Gradient Descent** - move in the direction that minimizes our loss




using calculus you can derive the equation

$$\frac{2}{N}\sum_{i=1}^{N} -(y_i - (mx_i + b))$$

where N is the number of iterations.
and for slope,

$$\frac{2}{N}\sum_{i=1}^{N} -x_i(y_i - (mx_i + b))$$

**Step Gradient** - having calculated the gradient descents we can "step" in that direction, using the formula..

Intercept → new_b = current_b - (learning_rate · b_gradient)
Slope → new_m = current_m - (learning_rate · m_gradient)

**Convergence** - when loss stops changing (or changes slowly) when parameters are changed.

We want to use the appropiate Learning rate as to not overshoot our convergence but also reach it.