Iteration 21 $w = 0.182$ $b = 0.0645$

x	y	$\hat{y} = 0.182x + 0.0645$	$\hat{y} - y$
1	2	0.2465	-1.7535
2	2.8	0.4285	-2.3715
3	3.6	0.6105	-2.9895
4	4.5	0.7925	-3.7075

2) Calculate Gradients:-

Gradient w.r.t. $w \Rightarrow \frac{\partial L}{\partial w} = \frac{2}{4} \sum_{i=1}^{n} (\hat{y} - y) \cdot x_i$

$= \frac{2}{4} [(-1.7535)(1) + (-2.3715)(2) + (-2.9895)(3) + (-3.7075)(4)]$

$= \frac{2}{4} (-31.27) = \boxed{-15.635}$

Gradient w.r.t. $b \Rightarrow \frac{\partial L}{\partial b} = \frac{2}{4} \sum_{i=1}^{n} (\hat{y} - y)$

$= \frac{2}{4} \{(-1.7535) + (-2.3715) + (-2.9895) + (-3.7075)\}$

$= \boxed{-5.411}$

3) update parameters :-

$w_t = w_{t-1} - \alpha \cdot \frac{\partial L}{\partial w} = 0.182 - (0.01)(-15.635) \Rightarrow \boxed{w_2 = 0.33835}$

$b_t = b_{t-1} - \alpha \frac{\partial L}{\partial b} = 0.0649 - (0.01)(-5.411) \Rightarrow \boxed{b_2 = 0.11861}$

Iteration 3:- $w_2 = 0.33835$, $b_2 = 0.11861$

x	y	$\hat{y} = 0.33835x + 0.11861$	$\hat{y} - y$
1	2	0.45696	-1.54304
2	2.8	0.79537	-2.00469
3	3.6	1.13366	-2.46634
4	4.5	1.47201	-3.02799

2) Calculate Gradients :-

Gradient w.r.t. $w \Rightarrow \frac{\partial L}{\partial w} = \frac{2}{n} \sum_{i=1}^{n} (\hat{y} - y)\, x_i$

$$= \frac{2}{4} [(-1.54304)(1) + (-2.00469)(2) + (-2.46634)(3) + (-3.02799)(4)]$$

$$= -12.53218$$

Gradient w.r.t. $b \Rightarrow \frac{\partial L}{\partial b} = \frac{2}{n} \sum_{i=1}^{n} (\hat{y} - y)$

$$= \frac{2}{4} [(-1.54304) + (-2.00469) + (-2.46634) + (-3.02799)]$$

$$= -4.52103$$

3) update Parameters :-

$$w_3 = w_2 - \alpha \frac{\partial L}{\partial w} = 0.33835 - (0.01)(-12.53218)$$

$$\boxed{w_3 = 0.46367}$$

$$b_3 = b_2 - \alpha \frac{\partial L}{\partial b} = 0.11861 - (0.01)(-4.52103)$$

$$\boxed{b_3 = 0.16382}$$