(2.1)

Exercise :- 5 :-

$$a' = \theta(wa + b)$$

$$\frac{1}{1 + e^{-\sum_j w_j x_j}}$$

$w, a \rightarrow$ will be vectors, $b \rightarrow$ scalar.

$$W = w_1, w_2, w_3, \ldots w_n$$

$$a = a_1, a_2, a_3, \ldots w_n$$

$$wa = (w_1 a_1 + w_2 a_2 + w_3 a_3 \ldots \ldots w_n a_n)$$

$$wa = \sum_{i=1}^{n} w_i a_i$$

$$a' = \theta(wa + b)$$

$$a' = \theta\left(\sum_{i=1}^{n} w_i a_i + b\right)$$

$$\theta(z) = \frac{1}{1+e^{-z}}$$

$$a' = \theta\left(\sum_{i=1}^{n} w_i a_i + b\right)$$

$$= \theta\left[\frac{1}{1+e^{\left(-\sum_{i=1}^{n} w_i a_i - b\right)}}\right] \rightarrow (1)$$

Rule 4: $\frac{1}{1+e^{\left(-\sum_j w_j x_j - b\right)}} \rightarrow (2)$