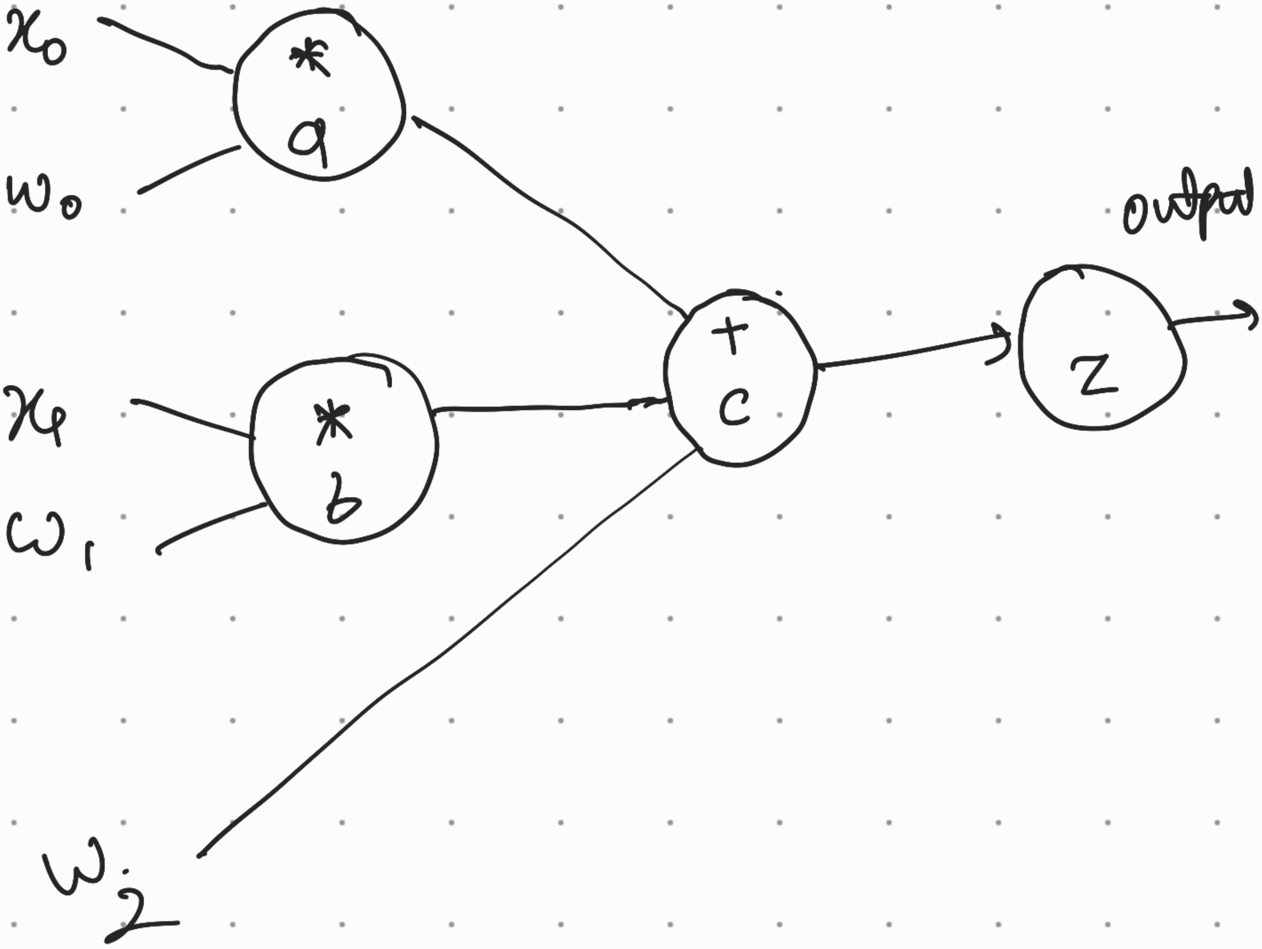
$$f(w, x) = \frac{1}{1+e^{-(w_0 x_0 + w_1 x_1 + w_2)}}$$



$a = x_0 w_0$ $\qquad \frac{\partial a}{\partial x_0} = w_0 = 2 \qquad \frac{\partial a}{\partial w_0} = x_0 = -1$

$a = -2$

$b = x_1 w_1$ $\qquad \frac{\partial b}{\partial x_1} = w_1 = -3 \qquad \frac{\partial b}{\partial w_1} = x_1 = -2$

$b = 6$

$c = a + b + w_2$ $\qquad \frac{\partial c}{\partial a} = 1 \qquad \frac{\partial c}{\partial b} = 1 \qquad \frac{\partial c}{\partial w_2} = 1$

$c = -2 + 6 - 3$

$= -1$

$$z = \frac{1}{1+e^{-c}} \qquad \frac{\partial z}{\partial c} = \frac{(1+e^{-c}) \times 0 - 1(e^{-c})(-1)}{(1+e^{-c})^2}$$

$$z = \frac{1}{1+e^{-1}} \qquad \frac{\partial z}{\partial c} = \frac{e^{-c}}{(1+e^{-c})^2}$$

$$z = 0.731 \qquad \frac{\partial z}{\partial c} = 0.19661$$

<u>We have to compute:-</u>

$$\frac{\partial z}{\partial x_0}, \frac{\partial z}{\partial w_0}, \frac{\partial z}{\partial x_4}, \frac{\partial z}{\partial w_1}, \frac{\partial z}{\partial w_2}$$

$$\frac{\partial z}{\partial x_0} = \frac{\partial z}{\partial c} \cdot \frac{\partial c}{\partial a} \cdot \frac{\partial a}{\partial x_0} = (0.19661)(1)(2)$$
$$= 0.39332$$

$$\frac{\partial z}{\partial w_0} = \frac{\partial z}{\partial c} \, \frac{\partial c}{\partial a} \cdot \frac{\partial a}{\partial w_0} = (0.19661)(1)(-1)$$
$$= -0.19661$$

$$\frac{\partial z}{\partial x_4} = \frac{\partial z}{\partial c} \, \frac{\partial c}{\partial b} \cdot \frac{\partial b}{\partial x_4} = (0.19661)(1)(-3)$$
$$= -0.58983$$

$$\frac{\partial z}{\partial w_1} = \frac{\partial z}{\partial c} \cdot \frac{\partial c}{\partial b} \cdot \frac{\partial b}{\partial w_1} = (0.19661)(1)(-2)$$
$$= -0.39322$$

$$\frac{\partial z}{\partial \omega_2} = \frac{\partial z}{\partial c} \cdot \frac{\partial c}{\partial \omega_2} = (0.19661)(1)$$

$$= 0.19661$$