$$y' = M(W, b, x) = 20 \cdot \sigma(Linear(W,\ b,\ x)) \tag{1}$$

$$\mathcal{L}_{MSE} = \frac{1}{N}\sum^{N}(y - y')^2 \tag{2}$$

$$\frac{\partial \mathcal{L}}{\partial W} = \frac{(y - y')^2}{\partial W} \tag{3}$$

$$\frac{(y - y')^2}{\partial W} = -2 \cdot (y - y') \cdot \frac{y'}{\partial W} \tag{4}$$

$$-2 \cdot (y - y') \cdot \frac{y'}{\partial W} = -2 \cdot (y - y') \cdot \frac{M(W,\ b,\ x)}{\partial W} \tag{5}$$

$$-2 \cdot (y - y') \cdot \frac{M(W, b, x)}{\partial W} = -2 \cdot (y - y') \cdot \frac{20 \cdot \sigma(a)}{\partial(\sigma(a))} \cdot \frac{\sigma(a)}{\partial W} \tag{6}$$

$$-2 \cdot (y - y') \cdot \frac{20 \cdot \sigma(a)}{\partial(\sigma(a))} \cdot \frac{\sigma(a)}{\partial W} = -2 \cdot (y - y') \cdot 20 \cdot \frac{\sigma(a)}{\partial a} \cdot \frac{Linear(W,\ b,\ x)}{\partial W} \tag{7}$$

$$-2 \cdot (y - y') \cdot 20 \cdot \frac{\sigma(a)}{\partial a} \cdot \frac{Linear(W,\ b,\ x)}{\partial W} = -2 \cdot (y - y') \cdot 20 \cdot \frac{e^{-x}}{(1 + e^{-x})^2} \cdot \frac{W \cdot x + b}{\partial W} \tag{8}$$

$$-2 \cdot (y - y') \cdot 20 \cdot \frac{e^{-x}}{(1 + e^{-x})^2} \cdot \frac{W \cdot x + b}{\partial W} = -2 \cdot (y - y') \cdot 20 \cdot \frac{e^{-x}}{(1 + e^{-x})^2} \cdot x \tag{9}$$

For b the sequence of steps is similar, however the last derivative is:

$$\frac{\partial W * x + b}{\partial b} = 1 \tag{10}$$

Therefore:

$$\frac{\partial \mathcal{L}}{\partial b} = -2 \cdot (y - y') \cdot 20 \cdot \frac{e^{-x}}{(1 + e^{-x})^2} \tag{11}$$