



$$\begin{aligned}\frac{df}{dx} &= 1 & \frac{df}{dw} &= \frac{df}{dq} \times \frac{dq}{dw} \\ & & &= 1 \cdot q \cdot \exp(w) \\ & & &= (x-y)^2 \exp(w)\end{aligned}$$

$$\begin{aligned}\frac{df}{dx} &= \frac{df}{dq} \times \frac{dq}{dx} \\ &= 1 \cdot \exp(w) \cdot 2(x-y) \\ &= 2(x-y) \exp(w)\end{aligned}$$

$$\begin{aligned}\frac{df}{dy} &= \frac{df}{dq} \times \frac{dq}{dy} \times \frac{dq}{dx} \\ &= 1 \cdot \exp(w) \cdot (-2)(x-y) \\ &= -2(x-y) \exp(w)\end{aligned}$$

$$\begin{aligned}\therefore \frac{df}{dw} &= (x-y)^2 \exp(w) \\ \frac{df}{dx} &= 2(x-y) \exp(w) \\ \frac{df}{dy} &= -2(x-y) \exp(w)\end{aligned}$$