Data 445 HW6
Exercise 3

Observation	old weight	Correct?	New weight
1	0.16	correct	.15065
2	0.64	correct	.60261
3	0.08	incorrect	.08496
4	0.12	incorrect	.12745

$$w_i^{(t+1)} = w_i^{(t)} e^{\eta \alpha^{(t)} o_i} \quad \text{with } \eta = .1$$

$$\alpha = \log\left(\frac{1-\varepsilon^{(t)}}{\varepsilon^{(t)}}\right)$$

$$\varepsilon^{(t)} = \frac{\sum_{d_t(x_i) \neq y_i} w_i}{\sum_{i=1}^{M} w_i}$$

misclassified

$$\varepsilon^{(t)} = \frac{.12 + .08}{1} = .2$$

$\sum_{i=1}^{M} w_i = 1$

$$\alpha^{(t)} = \log\left(\frac{1-.2}{.2}\right) = \log(4) = 0.60206$$

misclassified

$$w_i^{(t+1)} = w_i^{(t)} \cdot e^{0.1(.60206)o_i} \quad \text{where } o_i = \begin{cases} 1 & \text{if } d_i(x_i) \neq y_i \\ -1 & \text{if } d_i(x_i) = y_i \end{cases}$$

$$w_1^{(t+1)} = .16 \cdot e^{0.1(.60206)(-1)} = .15065$$
$$w_2^{(t+1)} = .64 \cdot e^{0.1(.60206)(-1)} = .60261$$
$$w_3^{(t+1)} = .08 \cdot e^{0.1(.60206)(1)} = .08496$$
$$w_4^{(t+1)} = .12 \cdot e^{0.1(.60206)(1)} = .12745$$