

**Lecture 9 Sample Problem Solutions**

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**Problem 9.1**

$$\vec{w} = \Sigma^{-1} (\vec{\mu}_1 - \vec{\mu}_0)$$
$$b = \ln \left( \frac{1 - \pi_0}{\pi_0} \right) + \frac{1}{2} (\vec{\mu}_0^T \Sigma^{-1} \vec{\mu}_0 - \vec{\mu}_1^T \Sigma^{-1} \vec{\mu}_1)$$

**Problem 9.2**

$$b = 2 \ln \left( \frac{1 - \pi_0}{\pi_0} \right) + \ln \left( \frac{|\Sigma_0|}{|\Sigma_1|} \right)$$

**Problem 9.3**

By setting

$$\nabla_{\vec{\mu}} \ln p(\mathcal{D}) = 0$$

We obtain

$$\hat{\mu}_{ML} = \frac{1}{N} \sum_{n=1}^N \vec{x}_n$$