①

a) Yes

b) $c = \log(|\Sigma_0|) - \log(|\Sigma_1|) + \mu_0^T \Sigma_0^{-1} \mu_0 - \mu_1^T \Sigma_1^{-1} \mu_1 - \log(p(y=0)) + \log(p(y=1))$

$w = 2(\Sigma_0^{-1} \mu_0 - \Sigma_1^{-1} \mu_1)$

$B = \Sigma_1^{-1} - \Sigma_0^{-1}$

②.

a) $\dim(\mu) = 784$

$\dim(\Sigma) = 784^2$

d) $\because \lambda > 0 \quad \therefore \det(\hat{\Sigma} + \lambda I) > 0 \quad \therefore \hat{\Sigma}_\lambda$ invertable