answer
eqnarray* $\ell(\phi, \mu_0, \mu_1, \Sigma) = \log \prod_{i=1}^{p} (x^{(i)}, y^{(i)}; \phi, \mu_0, \mu_1, \Sigma)$
wrt phi eqnarray* $\partial \ell \partial \phi = \Sigma(y^i \phi - 1 - y^i 1 - \phi)$
eqnarray* $\partial \ell \partial \mu_0 = -12\Sigma \partial \partial \mu_0 (x^i - \mu_0)^T \Sigma^{-} 1(x^i - \mu_0)$
For Sigma eqnarray* $\partial \ell \partial \Sigma = \Sigma \partial \partial \Sigma [12 \log 1\Sigma - 12(x^i - \mu_y)^T 1\Sigma(x^i - \mu_y)]$