

1. Consider independent random samples  $X_1, \dots, X_n$  and  $Y_1, \dots, Y_m$  from normal distributions with a common mean,  $\mu$ , but with possibly different variances,  $\sigma_1^2$  and  $\sigma_2^2$ , so that  $X_i \sim N(\mu, \sigma_1^2)$  and  $Y_i \sim N(\mu, \sigma_2^2)$ . Assume the variances are known and find the MLE of  $\mu$ .