1. For the bivariate regression model

\[ y_i = \beta_0 + \beta_1 x_i + \varepsilon_i, \]  

(0.1)

we found that the ordinary least squares (OLS) estimators of \( \beta_0 \) and \( \beta_1 \) were given by

\[
\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}
\]

(0.2)

\[
\hat{\beta}_1 = \frac{\sum_{i=1}^{N}(y_i - \bar{y})(x_i - \bar{x})}{\sum_{i=1}^{N}(x_i - \bar{x})^2},
\]

(0.3)

from a random sample of size \( N \), where \( \bar{x} \) and \( \bar{y} \) denote sample means. We say that we could write the OLS estimator for the general multiple regression model

\[ Y = X\beta + \varepsilon \]

(0.4)

as

\[ \hat{\beta} = (X'X)^{-1}X'Y. \]

(0.5)

For the bivariate regression case, verify that the expressions in (0.2) and (0.3) are equivalent to (0.5).