1. Suppose that you wish to estimate a regression in deviations-from-means form. The deviations-from-means model is given by $y_i = \beta x_i + \varepsilon_i$ and all standard assumptions hold (i.e, x_i is nonrandom, $\mathbb{E}(\varepsilon_i) = 0$, $var(\varepsilon_i) = \sigma^2$ for all i, and $cov(\varepsilon_i, \varepsilon_j) = 0$ for all observations).

   (a) Derive the Ordinary Least Squares (OLS) estimator $\hat{\beta}^{OLS}$. Show all work and simplify completely to receive full credit.

   (b) Determine if $\hat{\beta}^{OLS}$ is an unbiased estimator of β. Make sure to be clear about when you use an assumption, show all work, and simplify completely to receive full credit.

(c) Find the variance of $\hat{\beta}^{OLS}$. Make sure to be clear about when you use an assumption, show all work and simplify completely to receive full credit.