131. Suppose that the random variables $Y_1, ..., Y_n$ satisfy

$$Y_i = \beta x_i + \epsilon_i, \quad i = 1, 2, ..., n$$

where $x_1, ..., x_n$ are fixed constants and $\epsilon_i, i = 1, ..., n$ are IID N(0, σ^2), where $\sigma^2 > 0$ is unknown.

(a) Find a two-dimensional sufficient statistic for (β, σ^2).

(b) Find the MLE of β assuming the value σ^2 is known.