

You are not allowed to object to the criteria.

Problem 1

Answer:

$$\hat{\beta}_1^* = \frac{\hat{\beta}_1 + b\hat{\beta}_2 - a}{c}; \quad \hat{\beta}_2^* = \frac{d}{c}\hat{\beta}_2$$

Criteria [max = 2 points]:

- Full solution using standard expressions for the OLS estimates in a linear regression with an intercept (either ready-made or derived) : 1 point for each $\hat{\beta}^*$
- Standard expressions for the OLS estimates in a linear regression with an intercept without further correct solution: 0.5 point for each estimate expression
- Answer without a solution: 0 points

Problem 2

Answer:

$$\hat{\beta}_1 = \frac{29}{2}; \quad \hat{\beta}_2 = -\frac{7}{2}; \quad X_2 = \frac{13}{7}; \quad X_3 = \frac{15}{7};$$

estimations were not made using the OLS method since $\sum_{i=1}^4 u_i^2 \neq 0$

Criteria [max = 3 points]:

- Full solution with an estimated model formula $\hat{Y}_i = \hat{\beta}_1 + \hat{\beta}_2 X_i$ mentioned beforehand: 0.5 points for each $\hat{\beta}$ and X_i
- The estimated model formula is written without further correct solution: 0.25 points
- Arithmetic errors: -0.25 points for each $\hat{\beta}$, X_i or OLS method solution where the mistake occurs
- Computed squared errors sum with correct solution and conclusion: 1 point
- The idea of the squared errors sum without a solution: 0.5 points
- Computed squared errors sum with a correct solution but a wrong conclusion: 0 points

Problem 3

Answer:

1. A one-year increase in tenure is associated with a 2.2 thousand rubles increase in wage. The minimal wage a novice worker (with no experience) gets is 38.5 thousand rubles.
2. -
3. $R^2 = 0.556$
4. R^2 is interpreted as the fraction of the sample variation in the response variable that is explained by explanatory variables. It shows how well the data fit the regression model.

Criteria [max = 3 points]:

1.
 - Full interpretation close to what is given in the answer section: 0.5 points for each coefficient
 - Interpretation with lacking details (numbers / measures): 0.25 for each coefficient
 - General words about coefficient interpretation without their relation to the given model: 0.25 points in total
2. -
3.
 - Correct numbers taken from the table and correct answer: 1 point
4.
 - Full explanation about variation AND goodness of fit: 1 point
 - Only one part of the explanation (either variation or goodness of fit): 0.5 points
 - Other thoughts related to the question: 0.5 points

Problem 4

Answer:

$$\hat{\beta} = \frac{\sum_{i=1}^n X_i Y_i}{\sum_{i=1}^n X_i^2} = \frac{\overline{XY}}{\overline{X^2}}$$

Criteria [max = 2 points]:

- Full solution with RSS minimisation and correct answer: 2 points

- RSS minimisation with a correct FOC derivative but incorrect answer: 1 point
- RSS minimisation with a wrong FOC derivative: 0.5 points
- Answer without a solution: 0 points