

# STAT 332

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Your neat, clearly-legible solutions should be emailed as a PDF or HTML file to [aalharbi10@ksu.edu.sa](mailto:aalharbi10@ksu.edu.sa) by the deadline of 23.59 on Friday 13<sup>th</sup> May 2022 (Any later handing-out will be marked ZERO). A scan of a handwritten solution is acceptable. Since this work is assessed, your submission must be entirely your own work.

Question:

To investigate the linear model  $\hat{Y} = b_0 + b_1 X_1 + b_2 X_2$ ,

we assume the following data:

$i$	1	2	3	4	5	6	7	8	9	10
$X_1$	8	8	5	7	5	9	8	7	2	9
$X_2$	2	5	4	9	8	0	1	5	8	1
$Y$	7	13	10	20	19	5	6	13	16	6

a. Complete the matrices:

$$X'X = \begin{bmatrix} 10 & 68 & 43 \\ 68 & \square & \square \\ 43 & \square & \square \end{bmatrix} \quad X'Y = \begin{bmatrix} 115 \\ 715 \\ \square \end{bmatrix}$$

- b. Find the model  $\hat{Y} = b_0 + b_1 X_1 + b_2 X_2$ .
- c. Find  $SSR$ .
- d. Find  $SSR(X_2|X_1)$ .
- e. Find  $SSR(X_1|X_2)$ .
- f. Calculate  $r_{\hat{Y}2,1}^2$ .