

Instructions: Show all work. Use exact values.

1. Find the least squares line $y = \beta_0 + \beta_1 x$ that best fits the data $\{(2,3), (3,2), (5,1), (6,0)\}$.

$$A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \\ 1 & 5 \\ 1 & 6 \end{bmatrix} \quad b = \begin{bmatrix} 3 \\ 2 \\ 1 \\ 0 \end{bmatrix}$$

$$A^T = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 2 & 3 & 5 & 6 \end{bmatrix}$$

$$A^T A \begin{bmatrix} \beta_0 \\ \beta_1 \end{bmatrix} = A^T b$$

$$\begin{bmatrix} 4 & 16 \\ 16 & 74 \end{bmatrix} \begin{bmatrix} \beta_0 \\ \beta_1 \end{bmatrix} = \begin{bmatrix} 6 \\ 17 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \end{bmatrix} = \begin{bmatrix} 4.3 \\ -1.7 \end{bmatrix}$$