Statistics Bootcamp
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Matrix Operations Practice

For #1-5, simplify the matrix expression:

1. $$-5\begin{bmatrix} 5 & 6 & -4 \\ 4 & -2 & -1 \end{bmatrix}$$

2. $$\begin{bmatrix} 2 \\ 4 \end{bmatrix} + \begin{bmatrix} 5 \\ 6 \end{bmatrix}$$

3. $$\begin{bmatrix} 1 & 1 \\ 6 & -4 \\ 0 & 0 \end{bmatrix} + 5\begin{bmatrix} -4 & 6 \\ 1 & 1 \\ -4 & -1 \end{bmatrix}$$

4. $$\begin{bmatrix} 5 & 4 \\ 2 & -1 \end{bmatrix} \cdot \begin{bmatrix} -4 \\ 3 \end{bmatrix}$$

5. $$\left(\begin{bmatrix} -4y & 2y \\ 2 & 3 \end{bmatrix} + \begin{bmatrix} 2y & 6 \\ 2 & 2x \end{bmatrix}\right) \cdot \begin{bmatrix} 5 \\ -5 \end{bmatrix}$$

6. Find the values of B0, B1, and B2:

$$\begin{bmatrix} 2 \\ -5 \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} -1 \\ 2 \end{bmatrix} + \beta_2 \begin{bmatrix} -3 \\ 7 \end{bmatrix}$$

7. Rewrite this expression as a single vector

$$\beta_0 + \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \\ j & k & l \end{bmatrix} \cdot \begin{bmatrix} x \\ z \\ w \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \epsilon_3 \\ \epsilon_4 \end{bmatrix}$$

   a. If these were our data, how many predictor variables would we have?
   b. How many observations would we have?