Assignment 9

Unit 11 - Week 9

The data set below is the assignment for the week. After reviewing the materials, please answer the following questions.

1. Suppose you have a linear regression model where the output is given by $y = \beta_0 + \beta_1 x + \epsilon$, where $\epsilon$ is the error term. What does the coefficient $\beta_1$ represent?

2. Consider the following system of equations for $u = \begin{bmatrix} u_1 \\ u_2 \end{bmatrix}$ and $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$:

   $\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} u_1 \\ u_2 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$

   What is the solution for $u = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$? Provide your answer in a matrix form.

3. Consider the following system of equations for $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$:

   $\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$

   What is the solution for $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$? Provide your answer in a matrix form.

4. Suppose you have a linear system of equations:

   $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$

   What is the solution for $x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$? Provide your answer in a matrix form.

5. Consider the following system of equations:

   $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$

   What is the solution for $x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$? Provide your answer in a matrix form.

6. Consider the following system of equations:

   $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$

   What is the solution for $x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$? Provide your answer in a matrix form.