

Assignment WW-Inverse

1. (1 point) Write the system of linear equations

$$\begin{cases} 2x + 3y - 9z = -1 \\ 8x + 6y + 6z = 8 \\ -1x - 5y + 5z = 7 \end{cases}$$

as a matrix equation.

$$\begin{bmatrix} _ & _ & _ \\ _ & _ & _ \\ _ & _ & _ \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix}$$

Correct Answers:

- $\begin{bmatrix} 2 & 3 & -9 \\ 8 & 6 & 6 \\ -1 & -5 & 5 \end{bmatrix}$

- $\begin{bmatrix} -1 \\ 8 \\ 7 \end{bmatrix}$

2. (1 point) Given the matrix

$$\begin{bmatrix} 2 & 3 \\ 11 & 16 \end{bmatrix},$$

(a) does the inverse of the matrix exist? [Choose/Yes/No]

(b) if your answer is yes, write the inverse here.

$$\begin{bmatrix} _ & _ \\ _ & _ \end{bmatrix}$$

Correct Answers:

- Yes

- $\begin{bmatrix} -16 & 3 \\ 11 & -2 \end{bmatrix}$

3. (1 point) If $A = \begin{bmatrix} 0 & 0 & -1 \\ 1 & -1 & 3 \\ 1 & -2 & 5 \end{bmatrix}$, then

$$A^{-1} = \begin{bmatrix} _ & _ & _ \\ _ & _ & _ \\ _ & _ & _ \end{bmatrix}.$$

Correct Answers:

- $\begin{bmatrix} 1 & 2 & -1 \\ -2 & 1 & -1 \\ -1 & 0 & 0 \end{bmatrix}$

4. (1 point) Consider the following two systems.

(a)

$$\begin{cases} 3x - 2y = -2 \\ -x - y = 1 \end{cases}$$

(b)

$$\begin{cases} 3x - 2y = 3 \\ -x - y = 2 \end{cases}$$

(i) Find the inverse of the (common) coefficient matrix of the two systems.

$$A^{-1} = \begin{bmatrix} _ & _ \\ _ & _ \end{bmatrix}$$

(ii) Find the solutions to the two systems by using the inverse, i.e. by evaluating $A^{-1}B$ where B represents the right hand side

(i.e. $B = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$ for system (a) and $B = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ for system (b)).

Solution to system (a): $x = _$, $y = _$

Solution to system (b): $x = _$, $y = _$

Correct Answers:

- 0.2
- -0.4
- -0.2
- -0.6
- -0.8
- -0.2
- -0.2
- -1.8