

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the inverse of the matrix, if it exists.

1) $\begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$ 1) _____

2) $\begin{bmatrix} 2 & -1 \\ -6 & 8 \end{bmatrix}$ 2) _____

3) $\begin{bmatrix} 3 & 1 \\ 6 & 2 \end{bmatrix}$ 3) _____

4) Two $n \times n$ matrices A and B are called inverses of each other if both products AB and BA equal I_n . Are the following matrices inverses of each other? 4) _____

$$A = \begin{bmatrix} 7 & 4 \\ 5 & 3 \end{bmatrix}, B = \begin{bmatrix} 3 & -4 \\ -5 & 7 \end{bmatrix}$$

5) Consider the system $\begin{cases} 2x + 3y = 4 \\ -2x - y = 8 \end{cases}$ 5) _____

(a) Rewrite it in the form $AX = B$, where A , B , and X are appropriate matrices.

(b) Find the inverse of A .

(c) Solve the system by computing $A^{-1}B$.

6) Given that the matrices $A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 3 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & -2 & -2 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$ are inverses of each other, find the 6) _____

solution $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ of the system $\begin{cases} -5x - 2y - 2z = 1 \\ -x + y = 2 \\ -x + z = -3 \end{cases}$.

Solve the problem.

7) A charitable organization estimates that 60% of the people in a certain area who make a contribution in one year will also contribute the next year, and that 10% of those who do not contribute one year will contribute the next. Let x and y denote the number of people who contribute in one year respectively, and let u and v be the corresponding numbers for the following year. 7) _____

(a) Write a matrix equation relating $\begin{bmatrix} x \\ y \end{bmatrix}$ to $\begin{bmatrix} u \\ v \end{bmatrix}$.

(b) Solve the equation for $\begin{bmatrix} x \\ y \end{bmatrix}$.

(c) Suppose that out of 10,000 people, 1500 made a contribution this year. How many made a contribution last year?