

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

1) Which of the following calculations can be performed?

I. $[4 \ 0 \ 2] + \begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$ II. $[6] + \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ III. $[5]$

IV. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 2 & 1 & 2 \\ 4 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$

2)

$$\begin{bmatrix} -5 & -2 \\ -4 & -9 \\ -2 & 7 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ 7 & -3 \\ -2 & -2 \end{bmatrix} =$$

Let A, B, and C be the following matrices:

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

State whether or not each of the following calculations is possible. If possible, perform the calculation.

3) $2C + B$

State whether the calculation is possible. If possible, perform the calculation.

4)

$$\begin{bmatrix} 2 & 1 & 0 \\ 3 & 0 & 2 \end{bmatrix} \begin{bmatrix} 7 & -1 \\ 1 & 0 \\ 5 & 2 \end{bmatrix}$$

5) $\begin{bmatrix} 1 \\ 3 \\ -2 \end{bmatrix} [4 \ 0 \ 6] =$

6)

$$\begin{bmatrix} 3 & 1 \\ -1 & 0 \end{bmatrix} \begin{bmatrix} 2 & 7 \\ 6 & 4 \\ 1 & 6 \end{bmatrix}$$

7) If $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$, does $AB = BA$?

Explain.

8) Write the system of linear equations as a matrix equation.

$$\begin{cases} x + y + 4z = 3 \\ 4x + y - 2z = -6 \\ -3x + 2z = 1 \end{cases}$$

Solve the problem.

9) In a certain state legislature the percentage of legislators voting for or against lowering the legal drinking age by various party affiliations is summarized by this matrix.

$$\begin{array}{cc} & \begin{array}{cc} \text{For} & \text{Against} \end{array} \\ \begin{array}{c} \text{Democrat} \\ \text{Republican} \\ \text{Independent} \end{array} & \begin{bmatrix} 0.6 & 0.4 \\ 0.3 & 0.7 \\ 1 & 0 \end{bmatrix} = A \end{array}$$

There are 60 Democratic, 30 Republicans, and 10 Independents in the legislature. Use a matrix calculation to determine how many legislators voted for lowering the drinking age and how many voted against lowering the drinking age.