

MODULE 10.2 - SOLVING SYSTEMS WITH INVERSES (2x2 MATRICES)**LEARNING OBJECTIVES**

In this section, you will:

- Find the inverse of a matrix.
- Solve a system of linear equations using inverse matrix.

FINDING THE INVERSE OF A MATRIX

- State the definition of the identity matrix and multiplicative inverse.

How To... Given two matrices, show that one is the multiplicative inverse of the other.

**SOLVING A SYSTEM OF LINEAR EQUATIONS USING THE INVERSE OF A MATRIX**

- State the definition of solving a system of equations using the inverse of a matrix.

MODULE 10.2 - CLASS NOTES

For the following exercises, show that matrix A is the inverse of matrix B .

$$1. \quad A = \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$$

$$2. \quad A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix}$$

For the following exercises, find the multiplicative inverse of each matrix, if it exists.

$$3. \quad A = \begin{bmatrix} 3 & -2 \\ 1 & 9 \end{bmatrix}$$

$$4. \quad A = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$$

For the following exercises, solve the system using the inverse of a 2×2 matrix.

$$5. \quad \begin{cases} 5x - 6y = -61 \\ 4x + 3y = -2 \end{cases}$$

$$6. \quad \begin{cases} \frac{8}{5}x - \frac{4}{5}y = \frac{2}{5} \\ -\frac{8}{5}x + \frac{1}{5}y = \frac{7}{10} \end{cases}$$