

Precalculus

9-01 Matrices and Systems of Equations

Matrix

- Rectangular _____ of numbers

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & a_{m3} & \cdots & a_{mn} \end{bmatrix}$$

- $a_{\text{row},\text{column}}$
- Each entry is an _____
- Augmented Matrix
 - Two matrices _____ together
- Order of matrix
 - _____
 - _____ × _____

What is the order of $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$?

Elementary Row Operations

- _____ 2 rows
- _____ a row by a nonzero constant
- _____ a multiple of a row to another row

Add 2 times 1st row to the 2nd row: $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

Row-Echelon Form

- All rows consisting entirely of _____ are at _____
- For other rows, the first _____ entry is _____
- For successive rows, the leading 1 in the _____ row is farther to the _____
- $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 0 \end{bmatrix}$ $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

Reduced Row-Echelon Form

- Columns with leading 1 have _____ as other entries

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

$$\text{Solve } \begin{cases} x + 3y + 4z = 7 \\ 2x + 7y + 5z = 10 \\ 3x + 10y + 4z = 27 \end{cases}$$