

Matrices

Name: _____ Date: _____

What is a Matrix?

A matrix is a rectangular array of numbers used to manage and organize data.

Matrices are used in the fields of mathematics, engineering, science, and computer science. Matrices can be used to solve linear systems, perform linear transformations to render and edit images in graphics software such as Photoshop, used to understand the concepts and apply rotations, reflections, and shearing. Matrices are also used in high level encryption algorithms and 3D rendering software and games. In computer science matrices can be represented as arrays.

Spreadsheets are an easy way to think about what a matrix, i.e. you have cells that are occupied with data and it can be manipulated. The game Battleship is another example of using a grid-like organized matrix structure.

Example:

Below, the matrix A is a 3×2 matrix (this means it has **dimensions of 3×2** – 3 rows and 2 columns. The numbers in the array are called “**elements**” or “**entries**.”

$$A = \begin{bmatrix} 3 & 6 \\ -1 & 0 \\ 8 & 2 \end{bmatrix}$$



In the above the element $a_{3,2} = 2$.

In General,

The matrix, B , is a $m \times n$ matrix, where $b_{i,j}$ represents the entries in **row i** and **column j** .

$$B = \begin{bmatrix} b_{1,1} & b_{1,2} & \dots & b_{1,n} \\ b_{2,1} & b_{2,2} & \dots & b_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ b_{m,1} & b_{m,2} & \dots & b_{m,n} \end{bmatrix}$$

For the following activities, activate the QR codes to gain access to the online practice questions. Complete all of the questions, in addition for the first question in each of the six sections you must write out the question and show your full solution.

determining Matrix Dimensions	determining Matrix Elements
	
Question/Solution	Question/Solution