

Here are the objective skills for you to master about matrices:

Create and manipulate matrices by hand and with the calculator

- determine size
- add
- subtract
- scalar multiply
- matrix multiply

Matrix Properties

- Similarities/Differences with the real number system (associativity, commutativity, etc.)
- Proofs

Find

- inverse matrix (with the calculator and by hand)
- transpose of a matrix
- rref (row reduced echelon form) of a matrix – and interpretation
- incidence matrix for a network (communication, dominance, food web, etc.)
- transformation matrices (translation, dilation, reflection, rotation – all in 2D and 3D)
- determinant of a matrix

Use matrices to solve

- Systems of equations (any number of variables)
  - solve using an inverse matrix
  - solve using rref
  - solve by hand using row operations
  - interpret results in the context of (potentially) intersecting lines and planes
- General word problems
- Probability problems (Markov chains – transition matrices)
- Transformations
- Area and Volume problems with determinants

Interpret the Determinant

- geometric interpretation for transformations
- consequences of the determinant being zero