Matrices

Instructional Focus: Representing linear equations

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Representing and finding inverses of matrices (A.REI.8, A.REI.9)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Represent a system of equations using matrices when variables are **on both sides of an equation, or have missing variables**. Find the inverse of a matrix and use it solve systems of linear equations with dimensions of • 2x2 **without** technology • 3x3 with technology	Represent a system of equations using matrices when all variables are **on one side of each equation**. Find the inverse of a matrix **and use it solve systems of linear equations with dimensions of** • 2x2 **with** technology • 3x3 with technology	**Identify** a system of equations in a matrix. Find the inverse of a matrix	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1

A.REI.9   Find the inverse of a matrix if it exists and use it to solve systems of linear equations.

A.REI.8   Represent a system of linear equations as a single matrix equation in a vector variable.

Matrices

Instructional Focus: Perform operations on matrices and use matrices in applications.

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Matrix operations and applications (N.VM.6, N.VM.7, N.VM.8, N.VM.11)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Extract a matrix or matrices from a situation (i.e. word problem) **and use the matrix or matrices to solve problems.** Given matrices, do **all** of the following with and without solving technology: • Multiply by scalars • Add matrices • Subtract matrices • Multiply matrices • Multiply by a vector	Extract a matrix or matrices from a situation (i.e. word problem) Given matrices, do **all** of the following with solving technology: • Multiply by scalars • Add matrices • Subtract matrices • Multiply matrices • Multiply by a vector	**Identify** the corresponding matrix from a situation. Given matrices, do **three** of the following with solving technology : • Multiply by scalars • Add matrices • Subtract matrices • Multiply matrices • Multiply by a vector	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Explaining properties of matrices (N.VM.9, N.VM.10)		Can explain **all** of the following: • Lack of Commutative property of Matrix Multiplication • Associative property of Matrix Multiplication • Distributive property of Matrix Multiplication • Zero Matrix • Identity Matrix	Can explain **four** of the following: • Lack of Commutative property of Matrix Multiplication • Associative property of Matrix Multiplication • Distributive property of Matrix Multiplication • Zero Matrix • Identity Matrix	Can explain **three** of the following: • Lack of Commutative property of Matrix Multiplication • Associative property of Matrix Multiplication • Distributive property of Matrix Multiplication • Zero Matrix • Identity Matrix	
Finding and using determinants and absolute values (N.VM.12)		Find the area by using the determinant and absolute value of a 2 x 2 matrix as a transformation on the plane.	Find determinant and absolute value of a 2 x 2 matrix as a transformation on the plane.	Find determinant and absolute value of a 2 x 2 matrix	

N.VM.6   Use matrices to represent and manipulate data.

N.VM.7   Multiply matrices by scalars to produce new matrices.

N.VM.8   Add, subtract, and multiply matrices of appropriate dimensions.

N.VM.11 Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

N.VM.9   Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

N.VM.10 Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers.

N.VM.12 Work with 2 × 2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.