

Module E: Solving Systems of Linear Equations

Readiness Assurance Outcomes

Before beginning this module, each student should be able to...

- Determine if a system to a two-variable system of linear equations will have zero, one, or infinitely-many solutions by graphing.
- Find the unique solution to a two-variable system of linear equations by back-substitution.
- Describe sets using set-builder notation, and check if an element is a member of a set described by set-builder notation.

Readiness Assurance Resources

The following resources will help you prepare for this module.

- Systems of linear equations (Khan Academy): <http://bit.ly/2l21etm>
- Solving linear systems with substitution (Khan Academy): <http://bit.ly/1SlMpix>
- Set builder notation: <https://youtu.be/xnfUZ-NTsCE>

Module V: Vector Spaces

Readiness Assurance Outcomes

Before beginning this module, each student should be able to...

- Add Euclidean vectors and multiply Euclidean vectors by scalars.
- Add complex numbers and multiply complex numbers by scalars.
- Add polynomials and multiply polynomials by scalars.
- Perform basic manipulations of augmented matrices and linear systems **E1,E2,E3**.

Readiness Assurance Resources

The following resources will help you prepare for this module.

- Adding and subtracting Euclidean vectors (Khan Academy): <http://bit.ly/2y8A0wa>
- Linear combinations of Euclidean vectors (Khan Academy): <http://bit.ly/2nK3wne>
- Adding and subtracting complex numbers (Khan Academy): <http://bit.ly/1PE3ZMQ>
- Adding and subtracting polynomials (Khan Academy): <http://bit.ly/2d5SLGZ>

Module A: Algebraic properties of linear maps

Readiness Assurance Outcomes

Before beginning this module, each student should be able to...

- State the definition of a spanning set, and determine if a set of Euclidean vectors spans \mathbb{R}^n **V3**.
- State the definition of linear independence, and determine if a set of Euclidean vectors is linearly dependent or independent **V5**.
- State the definition of a basis, and determine if a set of Euclidean vectors is a basis **V6,V7**.
- Find a basis of the solution space to a homogeneous system of linear equations **V10**.

Module M: Understanding Matrices Algebraically

Readiness Assurance Outcomes

Before beginning this module, each student should be able to...

- Compose functions of real numbers.
- Identify the domain and codomain of linear transformations.
- Find the matrix corresponding to a linear transformation and compute the image of a vector given a standard matrix **A2**
- Determine if a linear transformation is injective and/or surjective **A4**
- Interpret the ideas of injectivity and surjectivity in multiple ways.

Readiness Assurance Resources

The following resources will help you prepare for this module.

- Function composition (Khan Academy): <http://bit.ly/2wkz7f3>
- Domain and codomain: <https://www.youtube.com/watch?v=BQMyeQ0Lvpg>
- Interpreting injectivity and surjectivity in many ways: <https://www.youtube.com/watch?v=WpUv72Y6D10>

Module G: Geometry of Linear Maps

Readiness Assurance Outcomes

Before beginning this module, each student should be able to...

- Calculate the area of a parallelogram.
- Find the matrix corresponding to a linear transformation of Euclidean spaces **A2**.
- Recall and use the definition of a linear transformation **A1**.
- Find all roots of quadratic polynomials (including complex ones).
- Interpret the statement “ A is an invertible matrix” in many equivalent ways in different contexts.

Readiness Assurance Resources

The following resources will help you prepare for this module.

- Finding the area of a parallelogram (Khan Academy): <http://bit.ly/2B05iWx>
- Factoring quadratics (Khan Academy): <http://bit.ly/1XjfbV2>
- Factoring quadratics using area models (Youtube): <https://youtu.be/Aa-v1EK7DR4>
- Finding complex roots of quadratics (Youtube): <https://www.youtube.com/watch?v=2yBhDsNE0wg>