

## Points of Emphasis in M101

Whereas a typical instructional unit on linear equations and expressions might begin with a focus on students performing computations or manipulating algebraic expressions disconnected from real-world contexts, in M101, students should:

- examine the structure of an equation before manipulating it in order to gain insights about the relationships involved (LP 3).
- use variables to represent quantities to write and solve equations and inequalities in mathematical or real-world situations (LP 3).
- have opportunities to understand and explain why certain equation-solving moves produce equations with the same solution (LP 3).
- recognize that different forms of an equation are helpful for different purposes or for particular contexts (LP 3).
- understand naming a solution of a linear equation or inequality as making a mathematical claim and employ reasoning to justify the solution or its reasonableness (LP 3).
- regularly encounter real-world tasks involving constant rate of change (LP 1) that require them to make sense of multiple representations and how they relate to each other—verbal, algebraic, numerical, tabular, and graphical (LP 3).
- be able to choose tasks that are organized around different scientific, social, or other topics, allowing students to have agency in their learning (LP 4).
- frequently collaborate, share their solution methods, and make their thinking visible (LP 2).
- regularly engage with tasks that focus on understanding and reasoning about different representations—verbal, algebraic, numerical, graphical. As examples, students should engage with the following:
  - Reason about and explain the real-world meaning of the slope and  $y$ -intercept.
  - Make connections between the different representations of a situation.
  - Engage with a variety of equations to reason about having one solution, no solution, or an infinite number of solutions.
  - Reason about systems of equations by determining if a system has one solution, no solution, or an infinite number of solutions and extend this knowledge to understand that the solution to a system of inequalities is a region of the plane.
  - Determine the reasonableness of solutions and understand what it means to find the solution to an equation.
  - Explain the relationship between parameters in an equation and the features of its graph (LP 3).
- use open-ended tasks to interpret data, analyze graphs, and reason about the context (LP 3).
- have opportunities to share their reasoning with partners or in groups, allowing for practice-sharing, critiquing, and revising their arguments and including social interaction as part of the learning process (LP 2).

Students should also be given opportunities to understand and reflect on the ways that equations can authentically represent real-world situations (LP 6).

Often, coursework with linear equations is focused on performing computations by hand. Instead, students should be given frequent opportunities to:

- use spreadsheets and graphing software to allow for focus on understanding, rather than computation or symbolic manipulation. Students should write spreadsheet formulas that exhibit linear equations (LP 7).
- use various technologies like motion detectors to measure distance vs. time (LP 7).