

# Module 3: Reasoning Algebraically

## TOPIC 3: MULTIPLE REPRESENTATIONS OF EQUATIONS

This topic broadens students' perspective on solving and interpreting linear equations and inequalities through the use of tables and graphs. Students write and solve two-step equations using positive and negative numbers on four-quadrant graphs. Students then compare graphs of linear equations in different forms. Finally, students practice solving problems by writing equations and inequalities for problem situations, analyzing tables and graphs to solve the equations or inequalities, and interpreting the quantities in each problem situation.

### Where have we been?

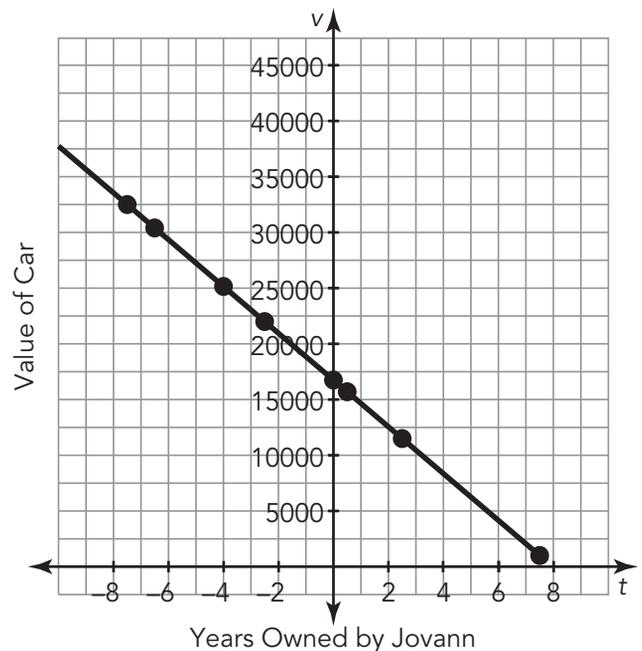
In grade 6, students used multiple representations to model and solve problems, primarily one-step equations. They learned that quantities can vary in relation to each other and are often classified as independent and dependent quantities.

### Where are we going?

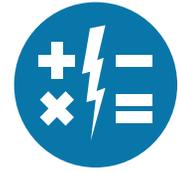
Students' ability to use symbolic algebra can be supported through the use of visual representations. Using and connecting symbolic and graphical representations of equations and inequalities occurs throughout the study of functions in grade 8 and in high school.

## Interpreting Situations in More Than One Quadrant

This graph shows the relationship between the time someone has owned a car,  $t$ , and the value of the car,  $v$ . We only have information on the values to the right of the vertical axis, but if we assume that the relationship is linear, we can use an equation to determine car values for negative time values.



## Myth: Memory is like an audio or video recording.



Let's play a game. Memorize the following list of words: strawberry, grape, watermelon, banana, orange, peach, cherry, blueberry, raspberry. Got it? Good.

Some believe that the brain stores memories in pristine form. Memories last for a long time and do not change—like a recording. Without looking back at the original list, was apple on it?

If you answered “yes,” then go back and look at the list. You'll see that apple does not appear, even though it seems like it should. In other words, memory is an active, reconstructive process that takes additional information, like the category of words (e.g., fruit), and makes assumptions about the stored information.

This simple demonstration suggests memory is not like a recording. Instead, it is influenced by prior knowledge and decays over time. Therefore, students need to see and engage with the same information multiple times to minimize forgetting (and distortions).

### #mathmythbusted

## Talking Points

You can further support your student's learning by asking questions about the work they do in class or at home. Your student is learning to represent relationships involving the equivalence of values in a variety of ways.

## Questions to Ask

- How does this problem look like something you did in class?
- Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
- Does your answer make sense? How do you know?
- Is there anything you don't understand? How can you use today's lesson to help?

## Key Term

### unit rate of change

The unit rate of change is the amount that the dependent value changes for every one unit that the independent value changes.