Module 3: Reasoning Algebraically

TOPIC 1: ALGEBRAIC EXPRESSIONS

In this topic, students represent variable expressions on a number line and evaluate algebraic expressions. Then they apply the Distributive Property as a strategy to write equivalent expressions, and they use it to factor linear expressions in a variety of ways. Finally, students combine like terms, including like linear terms, and use properties of operations to add and subtract expressions.

Where have we been?

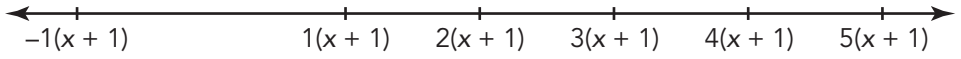
This topic combines students' knowledge of expressions and negative numbers on a number line to develop number line models for variable expressions. Students are then expected to evaluate algebraic expressions, as they did in grade 6, with rational numbers, using operations they learned in previous lessons in this course.

Where are we going?

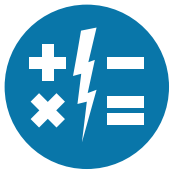
Visualizing simple variable expressions on a number line will carry through the entire topic to help students develop a concrete idea of operating on and with algebraic expressions. Students will need this fluency throughout the remainder of this course, as they solve equations in grade 8, and as they expand and factor polynomial expressions in high school.

Using Number Lines to Compare Variable Quantities

Algebraic expressions can be represented on number lines. Knowing the location of $1(x + 1)$, which is simply $x + 1$, for example, allows us to determine the locations of all the other expressions shown. The expression $0(x + 1)$, or just 0, would be between $-1(x + 1)$ and $1(x + 1)$.



Myth: "I learn best when the instruction matches my learning style."



If asked, most people will tell you they have a learning style – the expressed preference in learning by seeing images, hearing speech, seeing words, or being able to physically interact with the material. Some people even believe that it is the teacher's job to present the information in accordance with that preference.

However, it turns out that the best scientific evidence available does not support learning styles. In other words, when an auditory learner receives instruction about content through a visual model, they do just as well as auditory learners who receive spoken information.

Students may have a preference for visuals or writing or sound, but sticking to their preference doesn't help them learn any better. Far more important is ensuring the student is engaged in an interactive learning activity and that the new information connects to the student's prior knowledge.

#mathmythbusted

Talking Points

You can support your student's learning by resisting the urge, as long as possible, to get to the answer in a problem that your student is working on. Students will learn the algebraic shortcuts that you may know about, but only once they have experience in mathematical reasoning. This may seem to take too long at first. But if you practice asking good questions instead of helping your student arrive at the answer, they will learn to rely on their own knowledge, reasoning, patience, and endurance when struggling with math.

Key Terms

algebraic expression
An algebraic expression is a mathematical phrase that has at least one variable, and it can contain numbers and operation symbols.

linear expression
A linear expression is any expression in which each term is either a constant or the product of a constant and a single variable raised to the first power.

coefficient
A coefficient is a number that is multiplied by a variable in an algebraic expression.

like terms
Like terms are parts of an algebraic expression that have the same variable raised to the same power.