Module 3: Reasoning Algebraically

TOPIC 2: TWO-STEP EQUATIONS AND INEQUALITIES

Students begin this topic by reasoning with bar models to write and solve equations from problem situations. Next, they use a double number line with variable expressions. Throughout these reasoning exercises, the meaning of a solution to an equation is reinforced. Students check their solutions with substitution and write equations from solutions. Students then use inverse operations to solve equations. Students extend their understanding of solving equations to solving one- and two-step inequalities and graphing the solution sets on number lines.

Where have we been?

Students first encountered variable equations and used models to solve one-step equations in grade 6. Work in this topic builds on students' knowledge of expressions and equations to introduce two-step equations.

Where are we going?

In grade 8 and beyond, students will be expected to solve a wide variety of linear equations and inequalities, eventually using their knowledge of equations, inequalities, and solutions to solve nonlinear equations and inequalities. Reasoning about solutions to equations will continue to build students' number sense, an important goal of mathematics education.

Using Number Lines to Compare Variable Quantities

Double number lines were used in grades 6 and 7 to generate equivalent ratios. They are used in this topic to model and solve a two-step equation. This model shows the steps for solving the equation $2j + 10 = 46$. The expression $2j$ must be located 10 to the left of $2j + 10$, and this location must be equal to 36, which is 10 to the left of 46. The value of $1j$ is half the value of $2j$ and also half the value of 36. Therefore, $j = 18$.
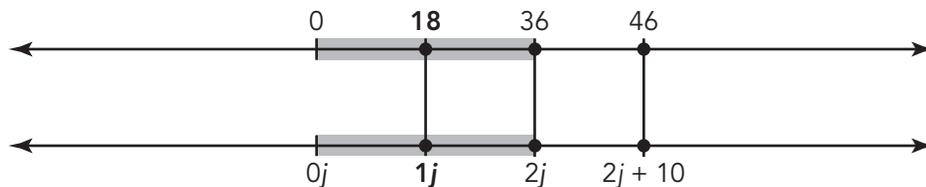
Myth: "Just give me the rule. If I know the rule, then I understand the math."
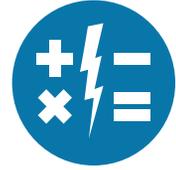
Memorize the following rule: *All quars are elos.* Will you remember that rule tomorrow? Nope. Why not? Because it has no meaning. It isn't connected to anything you know. What if we change the rule to: *All squares are parallelograms.* How about now? Can you remember that? Of course you can, because now it makes sense.

Learning does not take place in a vacuum. It **must be** connected to what you already know. Otherwise, arbitrary rules will be forgotten.

#mathmythbusted

Talking Points

You can further support your student's learning by making sure they eat right and get enough sleep. Healthy bodies make for healthy minds, and both diet and sleep have significant effects on learning.

Key Terms

equation

An equation is a mathematical sentence you create by placing an equals sign, =, between two expressions to show that the expressions have the same value.

literal equation

A literal equation is an equation in which the variables represent specific measures. Common literal equations occur in measurement and geometry concepts.

inequality

An inequality is any mathematical sentence that has an inequality symbol. The solution set of an inequality is all values that make the inequality statement true.