AGENDA
Common Core Content Standards,
Grades 6—8: Expressions, Equations, and Functions

OVERVIEW
This two-day course focuses on the priority domains of Expressions, Equations and Functions for students in grades 6–8. The emphasis of this course is on strategies and tools to help students leverage and extend their understanding of arithmetic to problem solve using algebraic expressions.

OUTCOMES
- Develop a fundamental understanding of Common Core content focused on expressions, equations, and functions, and establish connections to Ratios and Proportional Relationships for Grades 6 and 7
- Analyze and design problem-solving activities and experiences that address and develop students' skills in the areas of Expressions, Equations, and Functions
- Connect Common Core content and the Mathematical Practices to current classroom practices
- Explore a variety of ways to organize the classroom—whole-class, small-group, and individual learning—to maximize the learning of all students

DAY ONE
WELCOME, INTRODUCTION, AND OVERVIEW
This introduction includes the course goals, an overview of the Standards for Mathematical Practice, and pertinent logistical information.

COMMUNICATING ABOUT ALGEBRAIC EXPRESSIONS
In this session, participants experience a lesson intended to help students learn to translate between words and symbols and to use properties of operations to identify equivalent expressions. Elements of classroom discussion are highlighted to demonstrate the impact of mathematical discourse on student learning.

DEVELOPING UNDERSTANDING OF SLOPE AND Y-INTERCEPT
In this session, participants collect, record, and graph data. They find iterative and explicit function rules and analyze their findings. The experience is intended to provide a hands-on investigation that brings meaning to such concepts as function, intercept, and slope. The activity provides participants with a powerful glimpse of how the structure of a problem-solving lesson can support algebraic thinking to describe and predict phenomena in the real world.

LUNCH

BRINGING MEANING TO LINEAR INEQUALITIES
In this session participants look at a real-world application for linear inequalities. They plot data and determine the inequality that best represents that data. Additionally, participants use informal and formal strategies for finding and analyzing lines of best fit, analyzing and discussing patterns of association seen in the scatter plots. Participants make connections between the graphs, inequalities, and context, to provide a complete picture of trends in the data. The standards in the Expressions and Equations and Functions domains have applications across other domains of the mathematics curriculum. In this session, participants see how algebraic reasoning and understanding of linear relationships are needed for success in the Statistics and Probability domain.

DAY ONE CLOSING AND HOMEWORK
Participants will reflect on the pedagogy, mathematics, and experiences of the day and the implications for their classroom instruction. Before dismissal, the instructor will assign an application task.

<u>**DAY TWO**</u>
OPENING AND HOMEWORK DISCUSSION
This introduction recaps mathematical content from day one, provides an opportunity to review and discuss homework, extends ideas to lead into day two, and gives participants an opportunity to share unresolved questions.

REPRESENTING QUANTITATIVE RELATIONSHIPS USING VARIABLES
Using manipulatives as tools for investigating patterns provides students with a tactile and visual experience in describing and extending patterns. Manipulatives help students "see" a pattern in different ways. This experience highlights the ways in which teachers can help students understand the mathematics of patterns through the use of manipulatives.

SOLVING SYSTEMS OF EQUATIONS USING MULTIPLE APPROACHES
An important element of problem solving is the focused opportunity to make connections between methods of finding and representing the solution. Participants engage in a contextual problem about a walking race between a sister and a brother. In small groups, they write their solutions and make presentations to the whole group. They examine student work that confirms the many different ways a contextualized problem can be solved.

LUNCH

CONSTRUCTING UNDERSTANDING OF ALGEBRAIC REPRESENTATIONS
In this session, participants engage in an experience designed to help students build their understanding of the relationships between slope and y-intercept as well as those between dependent and independent variables. They gain first-hand knowledge and understanding of how graphs tell "stories" when they are analyzed. Participants engage in a learning experience and then use the experience to consider a view of learning in which people create/construct their own understanding of mathematical concepts and relationships through interactions between their minds and concrete experiences. Teachers also identify social conventions that are necessary to communicate and record their understandings.

REFLECTION AND COURSE CLOSING
In this session, participants reflect on the experiences of the course and the ways that these experiences will impact their classroom instruction.

MATH SOLUTIONS GUIDING PRINCIPLES

Drawing upon academic work and our own classroom-grounded research and experience, Math Solutions has identified the following four instructional needs as absolutely essential to improving instruction and student outcomes:

- Robust Content Knowledge
- Understanding of How Students Learn
- Insight into Individual Learners through Formative Assessment
- Effective Instructional Strategies

These four instructional needs drive the design of all Math Solutions courses, consulting and coaching. We consider them our guiding principles and strive to ensure that all educators:

- Know the math they need to teach—know it deeply and flexibly enough to understand various solution paths and students' reasoning.
- Understand the conditions necessary for learning, what they need to provide, and what students must make sense of for themselves.
- Recognize each student's strengths and weaknesses, content knowledge, reasoning strategies, and misconceptions.
- Have the expertise to make math accessible for all students, to ask questions that reveal and build understanding, and help students make sense of and solve problems.

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