

# MP1a-Expressions, Equations, and Functions

Content Area: **Math**  
Course(s): **Math 8 Algebra 1 Honors**  
Time Period: **Marking Period 1**  
Length: **MP1**  
Status: **Published**

## Essential Questions

---

- How can mathematical ideas be represented?

## Big Ideas

---

- Reason quantitatively and use units to solve problems.
- Interpret the structure of expressions.
- Create equations that describe numbers or relationships.
- Solve equations and inequalities in one variable.
- Represent and solve equations and inequalities graphically.
- Understand the concept of a function and use function notation.
- Interpret functions that arise in applications in terms of the context.
- Analyze functions using different representations.

## Technology Integration

---

- 8.1.8.A.5 Create a database query, sort and create a report and describe the process, and explain the report results.
- 8.1.8.B.1 Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).
- 8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
- 8.1.8.C.1 Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries.

Activity:

The ant game is used during [Arithmetic Sequence](#) practice in station rotation. Students are given the opportunity to practice solving arithmetic sequences in a game to meet the learning objective of solving

arithmetic sequences.

### **Career Education Integration**

---

- 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
- 9.2.8.B.4 Evaluate how traditional and nontraditional careers have evolved regionally, nationally, and globally.
- 9.2.8.B.5 Analyze labor market trends using state and federal labor market information and other resources available online.
- 9.2.8.B.6 Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.

Connection:

Students are expected to apply ratios and proportions to real world situations – this can be applied to a variety of career choices. Students can create equations based upon different labor market trends and career path decisions.

- N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

### **Enduring Understandings**

---

#### **Seeing Structure in Expressions**

A.SSE.1a [M] Interpret parts of an expression, such as terms, factors, and coefficients.

A.SSE.1b [M] Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret  $P(1+r)^n$  as the product of  $P$  and a factor not depending on  $P$ .

A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see  $x^4 - y^4$  as  $(x^2)^2 - (y^2)^2$ , thus recognizing it as a difference of squares that can be factored as  $(x^2 - y^2)(x^2 + y^2)$ .

#### **Creating Equations**

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

### **Reasoning with Equations & Inequalities**

A.REI.10 [M] Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

### **Interpreting Functions**

F.IF.1 [M] Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ . The graph of  $f$  is the graph of the equation  $y = f(x)$ .

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

### **Mathematical Practices Focus**

---

1. Make sense of problems and persevere in solving them. Lessons, 0-1, 1-8, 2-4, 3-4, 4-5, 5-4, 6-4, 7-5, 8-8, 9-3, 10-5, 11-1, 12-4
2. Reason abstractly and quantitatively. Lessons 1-3, 2-1, 3-3, 4-1, 5-1, 6-5, 7-2, 8-5, 9-1, 10-3, 11-8, 12-2
3. Construct viable arguments and critique the reasoning of others. Lessons 1-3, 2-5, 3-5, 4-2, 5-5, 6-1, 7-4, 8-1, 9-2, 10-4, 11-2, 12-1
4. Model with mathematics. Lessons 1-1, 2-9, 3-2, 4-5, 5-1, 6-5, 7-6, 8-7, 9-7, 10-4, 11-7, 12-5
5. Use appropriate tools strategically. Lessons 1-7, 2-4, 3-2, 4-4, 5-6, 6-1, 7-5, 8-2, 9-6, 10-6, 11-8, 12-3

6. Attend to precision. Lessons 1-3, 2-8, 3-4, 4-2, 5-2, 6-6, 7-4, 8-9, 9-5, 10-11, 11-6, 12-2
7. Look for and make use of structure. Lessons 1-2, 2-5, 3-6, 4-1, 5-5, 6-3, 7-7, 8-6, 9-6, 10-2, 11-2, 12-8
8. Look for and express regularity in repeated reasoning. Lessons 1-4, 2-7, 3-1, 4-1, 5-4, 6-1, 7-1, 8-4, 9-3, 10-2, 11-5, 12-6