ACC: Unit 1: Number Systems

Content Area: **Mathematics**
Course(s): **Math 6 Accelerated**
Time Period: **September**
Length: **7 weeks**
Status: **Published**

Unit Summary

The goal for this unit is to develop students' understanding of number systems and their applications to real life problem solving.

Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.7.NS.A.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
MA.7.NS.A.1a	Describe situations in which opposite quantities combine to make 0.
MA.7.NS.A.1d	Apply properties of operations as strategies to add and subtract rational numbers.
MA.6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
MA.7.NS.A.2a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
MA.7.NS.A.2b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number.If p and q are integers, then $–(p/q) = (–p)/q = p/(–q)$. Interpret quotients of rational numbers by describing real-world contexts.
MA.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

MA.6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
MA.7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
MA.6.NS.C.6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
MA.6.NS.C.6b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.NS.C.7	Understand ordering and absolute value of rational numbers.
MA.6.NS.C.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts.
MA.6.NS.C.7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
MA.6.NS.C.7d	Distinguish comparisons of absolute value from statements about order.
MA.7.EE.B.4a	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
MA.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
MA.6.G.A	Solve real-world and mathematical problems involving area, surface area, and volume.
MA.6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
MA.6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
MA.6.4.5.6 F.1	Use technology to gather, analyze, and communicate mathematical information.
MA.6.4.5.6 F.2	Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information.
MA.6.4.5.6 F.4	Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

CAEP.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.
TECH.8.1.8	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.8.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.8.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.8.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
TECH.8.1.8.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.8.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.
TECH.8.1.8.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.8.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.8.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.2.8.D.CS2	Use and maintain technological products and systems.

Student Learning Objectives

- Students will learn to apply and extend previous understandings of numbers to the system of rational numbers.
- Students will learn to compare and order rational numbers.
- Students will learn integers purpose in real world situations.
- Students will learn to interpret and make comparsions between absolute values in real world situations.
- Students will learn the process associated with each integer operation.
- Students will learn how to utilize a coordinate plane to graph ordered pairs under specific conditions.

Essential Questions

- Where do you see rational numbers in your world?
- In what ways can rational numbers be used?

- How are integers and whole numbers alike and different?
- How can real life problems be solved using integers?

Enduring Understandings

- Students will understand that there are specific rules when adding, subtracting, multiplying, and dividing integers and rational numbers.
- Students will understand that are specific procedures to fluently solve addition, subtraction, multiplication, and division problems involving integers.
- Students will understand that numbers allow us to compare and establish relationships between quantities in the real world.
- Students will understand that there are specific uses and attributes of the coordinate grid system to solve mathematical and real life problems.
- Students will understand that there is spatially reason with shapes, leading to logical reasoning about transformations.

Application

- Students will be able to independently use their mathematical knowledge to solve integer problems.

Skills

Students will be skilled at:

- Ordering and comparing rational numbers.
- Interpreting and solving real world problems involving integers (all operations).
- Interpreting and using absolute value to solve integer problems.
- Graphing ordered pairs on the coordinate plane.
- Determining distances between ordered pairs.
- Determining area of polygons located on the coordinate grid.
- Reflecting ordered pairs on the coordinate grid.
- Ordering and comparing integers using inequality symbols and number lines.
- Adding integers using number line, chip jar, and absolute value.
- Subtracting integers using number line, chip jar, and additive inverse property.
- Multiplying integers using number line and chip jar.
- Dividing integers using chip jar.
- Solving real world problems involving integers all operations.
- Graphing ordered pairs in the coordinate plane.
- Determining the distance between ordered pairs using absolute value.
- Drawing and determining the measurement of a polygon on a coordinate grid using rational numbers and algebra.
- Calculating the area of polygon located on the coordinate plane.
- Reflecting ordered pairs across axes and use proper notation.