Algebra 1 Honors Unit 1: Relationships Between Quantities & Reasoning with Equations & Inequalities

Unit #:	APSDO-00017741	Duration:	5.0 Week(s)	Date(s):	

Team:
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Grades:
8, 8 (Honors), 9

Subjects:
Mathematics

Unit Focus

In this unit, Honors students will be able to classify numbers. They will translate verbal expressions and sentences. Students will solve one-variable linear equations in various forms, including fractional numbers, multi-step. and absolute value. Honors students will solve literal equations and one-variable inequalities, expressing the solution graphically and algebraically using set and interval notation. Honors students will understand that a problem can have one solution, no solution, or infinitely many, as well as how to apply linear equations and inequalities for complex problem solving. Primary instructional materials for this unit include Algebra I, Glencoe/McGraw Hill, 2014. Secondary resources will be added to ensure the complexity, sophistication, and authenticity of the types of problems for our Honors students.

Stage 1: Desired Results - Key Understandings

Established Goals

Common Core
Mathematics: 8

- Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).

Transfer

T1 (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution.
T2 (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense.
T3 (T51) Examine alternate methods to accurately and efficiently solve problems.
T4 (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.
T5 (T20) Compose and decompose numbers to establish relationships, perform operations, and solve problems.
T6 (T21) Perform operations in a conventional order within the real and complex number system.

CCSS.MATH.CONTENT.8.EE.C.7A

- Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
  CCSS.MATH.CONTENT.8.NS.A.1
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
  CCSS.MATH.CONTENT.8.EE.C.7B
- Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., pi2). For example, by truncating the decimal expansion of sqrt2, show that sqrt2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
  CCSS.MATH.CONTENT.8.NS.A.2

Mathematics: 9

- 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.
  CCSS.MATH.CONTENT.HSA.CED.A.1
- Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a

T7 (T22) Describe and/or solve problems using algebraic expressions, equations, inequalities, and functions.

Meaning

Understandings

U1 (U202) The application of specific properties and order of operations can simplify expressions, solve equations, and combine functions.
U2 (U203) Certain mathematical manipulations preserve the relationship in an expression or equation, even though they change the representation.
U3 (U205) Expressions, equations, inequalities, and functions use symbols to represent quantities, operations, and their relationships.
U4 (U502) Effective problem solvers identify and apply an appropriate model, tool, or strategy.
U5 (U520) Effective arguments are based on logical mathematical thinking.
U6 (U550) Attention to detail, such as specifying units of measure and labeling, leads to clarity in expressing mathematical information.
U7 (U560) Patterns and structures are characterized by consistent relationships.

Essential Questions

Q1 (Q200) What rule or pattern can help me simplify the expression or solve this problem?
Q2 (Q201) How can I represent this information in symbols/equations/models?
Q3 (Q204) What is the value of this number/ relationship and how can I represent it in different ways?
Q4 (Q206) How do I evaluate this function or solve the equation? (Gr. 6-12)
Q5 (Q503) What strategies/approaches are best for this problem?
Q6 (Q520) Does the argument/thought process/logic make sense?
Q7 (Q550) Did I use clear language (symbols, labels, terms, units of measure and significant digits) to explain my reasoning to others?
Q8 (Q563) How does being fluent with basic facts and rules help me solve a complex problem?
Q9 (Q561) How does understanding the pattern/structure help me solve the problem?

Acquisition of Knowledge and Skill

Knowledge

Skills

S1

classify numbers

S2

Translate verbal expressions and equations

solution method. *CCSS.MATH.CONTENT.HSA.REI.A.1* • Define appropriate quantities for the purpose of descriptive modeling. *CCSS.MATH.CONTENT.HSN.Q.A.2* • Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. *CCSS.MATH.CONTENT.HSA.REI.A.2* • Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. *CCSS.MATH.CONTENT.HSF.IF.A.2* • Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. *CCSS.MATH.CONTENT.HSA.REI.B.3* • Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *CCSS.MATH.CONTENT.HSA.CED.A.4* • Attend to precision. *CCSS.MATH.MP.6* • Construct viable arguments and critique the reasoning of others. *CCSS.MATH.MP.3* • Look for and make use of structure. *CCSS.MATH.MP.7* • Make sense of problems and persevere in solving them. *CCSS.MATH.MP.1*		**S3** Solve one-variable linear equations in the form of one-step, multi-step, variables on both sides, absolute value, and basic rational equations **S4** Solve literal equations **S5** Solve one-variable linear inequalities and express the solution graphically and algebraically using set and interval notation **S6** Understand that a problem can have one solution, no solution, or infinitely many **S7** Understand how to apply linear equations and inequalities for problem solving

Stage 2: Assessment Evidence

Other Evidence

Coding	Code	Description
T/U/Q/K/S	OE1	**Untitled**

• T2 • T4 • T5 • T7 • U1 • U3 • U4 • U5 • U6 • U7 • S3 • S4 • S6 • S7		**Due** Oct. 31, 2014 **Other Evidence** Summative Assessment 2A: Unit Test Honors **Resources** RES1 Unit 2A Summative Honors Download File
T/U/Q/K/S • T2 • T4 • T5 • T7 • U1 • U3 • U4 • U5 • U6 • U7 • S5 • S6 • S7	OE2	**Untitled** **Due** Nov. 7, 2014 **Other Evidence** Summative Assessment 2B: Unit Test Honors **Resources** RES2 Summative Assessment Unit 2B Honors Download File

Stage 3: Learning Plan

Coding	Code	Description of Learning Activity
T/U/Q/K/S • Q1 • Q2	LA1	**Duration:** 1.0 Day(s) **Learning Activity**

• Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S7		**Learning Activity** **Learning Activity** Lesson 1 (2-2) To solve one-step equations by applying the properties of equality for addition, subtraction, multiplication and division
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S7	LA2	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Lesson 2 (2-3) To solve multi-step equations by applying the properties of equality
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S7	LA3	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Formative Assessment (2-2, 2-3)
T/U/Q/K/S • Q1 • Q2 • Q3	LA4	**Duration:** 1.0 Day(s) **Learning Activity**

• Q4 • Q6 • Q7 • Q8 • S3 • S6 • S7		**Learning Activity** Lesson 3 (2-4) To solve equations with variables on both sides
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S6 • S7	LA5	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Lesson 4 (2-5) To solve equations involving absolute value
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S6 • S7	LA6	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Formative Assessment (2-4,2-5)
T/U/Q/K/S • Q1 • Q2	LA7	**Duration:** 1.0 Day(s) **Learning Activity**

• Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S7		**Learning Activity** Lesson 5 (2-6) To compare ratios and solve proportions
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S4 • S7	LA8	**Duration:** 2.0 Day(s) **Learning Activity** **Learning Activity** Lesson 6 (2-8) To define and solve literal equations
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S7	LA9	**Duration:** 2.0 Day(s) **Learning Activity** **Learning Activity** Lesson 7 (2-9) To solve mixture problems using weighted averages
T/U/Q/K/S • Q1 • Q2 • Q3	LA10	**Duration:** 1.0 Day(s) **Learning Activity**

• Q4 • Q6 • Q7 • Q8 • S3 • S4 • S7		**Learning Activity** Formative Assessment (2-6, 2-8, 2-9)
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S7	LA11	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Lesson 8 (5-1) To solve linear inequalities by using addition and subtraction
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S7	LA12	**Duration:** 2.0 Day(s) **Learning Activity** **Learning Activity** Lesson 9 (5-2) To solve linear inequalities by using multiplication and division
T/U/Q/K/S • Q1	LA13	**Duration:** 1.0 Day(s)

• Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S7		**Learning Activity** **Learning Activity** Lesson 10 (5-3) To solve linear inequalities involving multi-step and the distributive property
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S7	LA14	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Formative Assessment (5-1, 5-2, 5-3)
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S6 • S7	LA15	**Duration:** 1.5 Day(s) **Learning Activity** **Learning Activity** Lesson 11 (5-4) To solve compound inequalities: union and intersections
	LA16	

T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S6 • S7		**Duration:** 1.5 Day(s) **Learning Activity** **Learning Activity** Lesson (5-5) To solve & graph absolute value inequalities
T/U/Q/K/S • Q1 • Q2 • Q3 • Q4 • Q6 • Q7 • Q8 • S3 • S5 • S6 • S7	LA17	**Duration:** 1.0 Day(s) **Learning Activity** **Learning Activity** Formative Assessment (5-4, 5-5)