# Accelerated GSE Algebra 1 /Geometry A

2015-2016

## Unit One Information

EOCT Domain & Weight:

Algebra (includes Number and Quantity) 60%

Curriculum Map: Relationships Between Quantities & Expressions

Content Descriptors:

Concept 1: Use Properties of rational and irrational numbers
Concept 2:Reason Quantitatively & Use Units to Solve Problems
Concept 3: Interpret the Structure of Expressions
Concept 4: Perform arithmetic operations of polynomials

Content from Frameworks:

Relationships Between Quantities & Expressions

Unit Length: Approximately 12 days

Georgia Milestones Study Guide for Unit 1

# TCSS – Accelerated GSE Algebra 1/Geometry A – Unit 1
# Curriculum Map

***Unit Rationale***

*Students will interpret the structure of expressions and solve problems related to unit analysis. Students will address properties of rational and irrational numbers and operations with polynomials in preparation for working with quadratic functions later in the course. Content addressed in Unit 1 will provide a solid foundation for all subsequent units.*

***Prerequisites****: As identified by the GSE Frameworks*

- ✓ ***Order of operations***
- ✓ ***Algebraic properties***
- ✓ ***Number sense***
- ✓ ***Computation with whole numbers and integers***
- ✓ ***Measuring length and finding perimeter and area of rectangles and squares***
- ✓ ***Volume and capacity***

***Length of Unit***

***12Days***

| ***Concept 1*** | ***Concept 2*** | ***Concept 3*** | ***Concept 4*** |
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| ***Use properties of rational and irrational numbers*** | ***Reason quantitatively and use units to solve problems*** | ***Interpret the structure of expressions*** | ***Perform arithmetic operations on polynomials.*** |
| ***GSE Standards*** | ***GSE Standards*** | ***GSE Standards*** | ***GSE Standards*** |
| **MGSE9-12.N.RN.2**<br>Rewrite expressions involving radicals ~~and rational exponents using the properties of exponents~~. (i.e., simplify and/or use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots).<br><br>**MGSE9-12.N.RN.3**<br>Explain why the sum or product of rational numbers is rational; why the sum of a rational number and irrational number is irrational; and why the product of a nonzero rational number and an irrational number is irrational. | **MGSE9-12.N.Q.1**<br>Use units of measure (linear, area, capacity, rates and time) as a way to understand problems:<br>a. Identify, use and record appropriate units of measure within context, within data displays, and on graphs;<br>b. Convert units and rates using dimensional analysis (English-to-English and Metric-to Metric without conversion factor provided and between English and Metric with conversion factor)<br>c. Use units within multi-step problems and formulas; interpret units of input and resulting units of output.<br><br>**MGSE9-12.N.Q.2**<br>Define appropriate quantities for the purpose of descriptive modeling. Given a situation, context or problem, students will determine, identify and | **MGSE9-12.A.SSE.1**<br>Interpret expressions that represent a quantity in terms of context.<br><br>**MGSE9-12.A.SSE.1a**<br>Interpret parts of an expression, such as terms, factors, and coefficients, in context.<br><br>**MGSE9-12.A.SSE.1b**<br>Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors. | **MGSE9-12.A.APR.1**<br>Add, subtract, and multiply polynomials. Understand that polynomials form a system analogous to the integers in that they are closed under operations. |

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| | use appropriate quantities for representing the situation.<br><br>**MGSE9-12.N.Q.3**<br>Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. For example, money situations are generally reported to the nearest cent (hundredth). Also, an answers' precision is limited to the precision of the data given. | | |
| ***Lesson Essential Question*** | ***Lesson Essential Question*** | ***Lesson Essential Question*** | ***Lesson Essential Question*** |
| • Why is the sum or product of rational numbers rational?<br>• Why is the sum of a rational number and irrational number irrational?<br>• Why is the product of a nonzero rational number and an irrational number irrational? | • How do I choose and interpret units of measure in context? | • How do I interpret parts of an expression in terms of context?<br><br>• How can polynomials be used to express realistic situations? | • How are polynomial operations related to operations in the real number system? |
| ***Vocabulary*** | ***Vocabulary*** | ***Vocabulary*** | ***Vocabulary*** |
| • Algebra<br>• Coefficient<br>• Constant Term<br>• Expression<br>• Factor<br>• Integer<br>• Irrational Number<br>• Radical<br>• Radicand<br>• Rational Number<br>• Term<br>• Variable<br>• Whole number | • Capacity<br>• Circumference<br>• Perimeter<br>• Pythagorean Theorem<br>• Volume | • Binomial Expression<br>• Monomial Expression<br>• Polynomial function<br>• Standard form of a polynomial<br>• Trinomial | • Associative property of addition $(a + b) + c = a + (b + c)$<br>• Commutative property of addition $a + b = b + a$<br>• Additive identity property of 0 $a + 0 = 0 + a = a$<br>• Existence of additive inverses For every a there exists $–a$ so that $a + (–a) = (–a) + a = 0$.<br>• Associative property of multiplication $(a \times b) \times c = a \times (b \times c)$<br>• Commutative property of multiplication $a \times b = b \times a$<br>• Distributive property of multiplication over addition $a \times (b + c) = a \times b + a \times c$ |

# TCSS – Accelerated GSE Algebra 1/Geometry A – Unit 1

| *Sample Assessment Items* | *Sample Assessment Items* | *Sample Assessment Items* | *Sample Assessment Items* |
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| **MGSE9-12.N.RN.2**<br>Which expression is equivalent to $-\sqrt{27} - 3\sqrt{45} - \sqrt{20} + 2\sqrt{45}$<br>a. $3\sqrt{3} - 5\sqrt{5}$<br>b. $-3\sqrt{3} - 5\sqrt{5}$<br>c. $-\sqrt{7} - \sqrt{45}$<br>d. $-\sqrt{27} - \sqrt{20} - \sqrt{45}$<br><br>**MGSE9-12.N.RN.3**<br>Which statement is true about the value of $(\sqrt{27} - 3) \cdot 9$?<br>a. It is rational, because the product of two rational numbers is rational.<br>b. It is rational, because the product of a rational number and an irrational number is rational.<br>c. It is irrational, because the product of two irrational numbers is irrational.<br>d. It is irrational, because the product of an irrational number and a rational number is irrational. | **MGSE9-12.N.Q.1**<br>A pipe is leaking at the rate of 8 fluid ounces per minute. How many gallons is the pipe leaking per hour?<br>a. .02 gal/h<br>b. 3.75 gal/h<br>c. 17.07 gal/ h<br>d. 3,840 gal/h<br><br>**MGSE9-12.N.Q.2**<br>You want to model the speed of a motorcycle. Which units would be appropriate for measuring this quantity?<br>a. Kilometers per mile<br>b. Kilometers per hour<br>c. Minutes per hour<br>d. Hours per meter<br><br>**MGSE9-12.N.Q.3**<br>A carpenter is designing a bookcase that has shelves that should be 115cm with a tolerance of 0.6cm (115cm ± 0.6cm). A set of six shelves had lengths of 115.2cm, 114.9cm, 115.0cm, 114.3cm, 114.7cm and 115.7cm. Which of the shelves are not within the specified tolerance?<br>a. Only the 114.3cm shelf.<br>b. Only the 115.7cm shelf.<br>c. Both the 114.3 and 115.7cm shelves.<br>d. All of the shelves are within the tolerance. | **MGSE9-12.A.SSE.1**<br>A company uses two different sized trucks to deliver sand. The first truck can transport $x$ cubic yards, and the second $y$ cubic yards. The first truck makes S trips to a job site, while the second makes $T$ trips.<br>Which expression represents the total amount of sand (in cubic yards) being delivered to a job site by both trucks?<br>a. $S + T$<br>b. $x + y$<br>c. $xS + yT$<br>d. $(xS + yT)/(S+T)$<br><br>**MGSE9-12.A.SSE.1a**<br>Lee deposits $1,200 into an account that pays 5% annual interest. What is his ending balance after 4 years? Use the formula $A = [P(1 + r)]^t$ where $A$ = ending balance, $P$ is the amount deposited ($1,200), $r$ is the percent interest (.05), and $t$ is the number of years (4).<br>a. $ 987.24<br>b. $1,300.56<br>c. $1,458.61<br>d. $6,075.00<br><br>**MGSE9-12.A.SSE.1b**<br>Old Navy is having a sale in which all T-shirts are $10. The sales tax is 5%. If Bryce buys $n$ T-shirts during this sale, the total cost of his purchase will be $10n + 0.05(10n)$. What does $0.05(10n)$ in this context represent?<br>a. The expression $0.05(10n)$ | **MGSE9-12.A.APR.1**<br>A train travels at a rate of (4x + 5) miles per hour. How many miles can it travel at that rate in (x – 1) hours?<br>a. 3x – 4 miles<br>b. 5x – 4 miles<br>c. $4x^2 + x - 5$ miles<br>d. $4x^2 - 9x - 5$ miles |

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| | | represents the price of each T-shirt.<br><br>b. The expression 0.05(10*n*) represents the total tax on Bryce's purchase.<br><br>c. The expression 0.05(10*n*) represents the cost of Bryce's purchase before tax.<br><br>d. The expression 0.05(10*n*) represents the total cost of Bryce's purchase. | |
| ***Resources – Concept 1*** | ***Resources – Concept 2*** | ***Resources – Concept 3*** | ***Resources – Concept 4*** |
| ❖ Instructional Strategies and Common Misconceptions<br><br>❖ Simplifying Radicals (power point)<br><br>❖ Radicals practice (worksheet)<br><br>❖ Radical tic-tac-toe worksheet | ❖ Instructional Strategies and Common Misconceptions<br><br>❖ Vocabulary/I Can Graphic Organizer for Unit 1<br><br>***These tasks were taken from the GSE Frameworks.***<br>❖ How Much is a Penny Worth? (A.NQ.1) – extend problem<br>❖ Ice Cream Van (A.NQ.1)<br>❖ Traffic Jam (A.NQ.1, A.NQ.3)<br>❖ Felicia's Drive (A.NQ.1, A.NQ.3) Harvesting the Fields (A.NQ.1, A.CED.1) – extend problem | ❖ Instructional Strategies and Common Misconceptions<br><br>❖ Vocabulary notes<br><br>❖ Delivery Truck Problem (activator)<br><br>***These tasks were taken from the GSE Frameworks.***<br>❖ Mixing Candies Task (A.SSE.1)<br><br>❖ Animal Populations Task (A.SSE.1&2)<br><br>***Textbook Resources***<br>❖ Holt McDougal – Explorations in Core Math p5-12 and 23-38 (A.SSE.1) | ❖ Instructional Strategies and Common Misconceptions<br>❖ Simplifying Rational Match Up (Practice)<br>❖ Teaching Model (Eureka)<br><br>***These tasks were taken from the GSE Frameworks.***<br>❖ Polynomial Patterns<br><br>❖ Modeling – in context |

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| | ❖ World Record Airbag pages 30-34 (N.Q.1,2,3)<br>***Textbook Resources***<br>❖ Holt McDougal – Explorations in Core Math p35-40 (A.NQ.3) **Reflect* questions are recommended | | |
| ***Differentiated Activities– Concept 1*** | ***Differentiated Activities– Concept 2*** | ***Differentiated Activities – Concept 3*** | ***Differentiated Activities – Concept 4*** |
| ❖ Classifying Rational and Irrational Numbers (FAL)<br>❖ Evaluating Statements about Rational and Irrational Numbers (FAL) | | ❖ Verbal and Algebraic Expressions (highly recommended) | ❖ Interpreting Algebraic Expressions FAL (highly recommended)<br>❖ Polynomial Application Task<br>❖ Polynomial Tiered Assignment (recommended) |

## At the end of Unit 1 student's should be able to say "I can…"

- ✓ Interpret units of measure in context.
- ✓ Interpret parts of an expression in terms of context.
- ✓ Relate polynomial operations to the real number system.
- ✓ Use polynomials to express realistic situations.
- ✓ Simplify radicals and justify simplification of radicals using visual representations.
- ✓ Use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots.
- ✓ Understand why the sum or product of rational numbers is rational.
- ✓ Understand why the sum of a rational number and irrational number is irrational.

- ✓ Understand why the product of a nonzero rational number and an irrational number is irrational.
- ✓ Understand that results of operations performed between numbers from a particular number set does not always belong to the same set. For example, the sum of two irrational numbers $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$ is 4, which is a rational number; however, the sum of a rational number 2 and irrational number $\sqrt{3}$ is an irrational number $(2 + \sqrt{3})$.