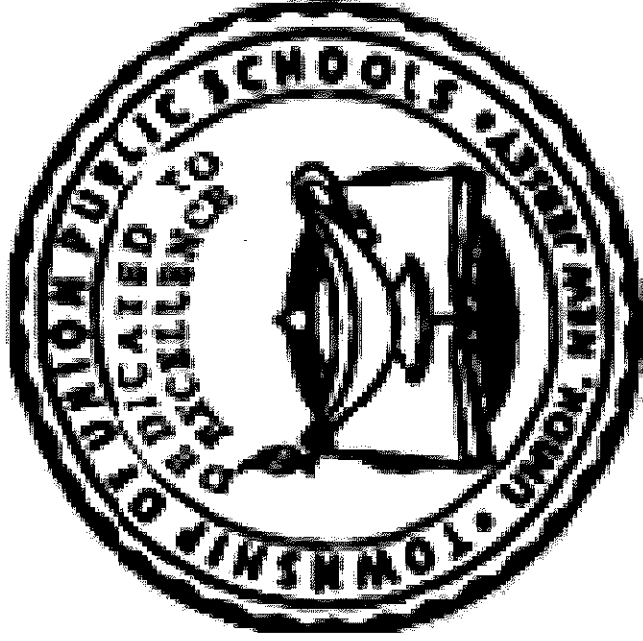
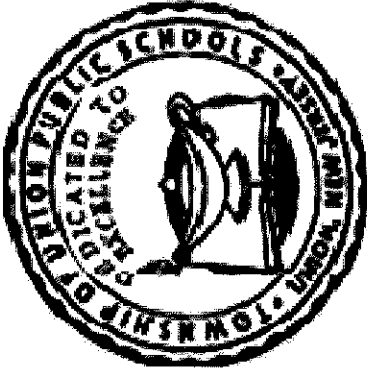


TOWNSHIP OF UNION PUBLIC SCHOOLS



Algebra I
Curriculum Guide 2015

Curriculum Guide Approved June 2015



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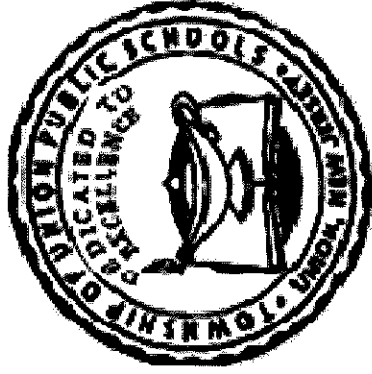
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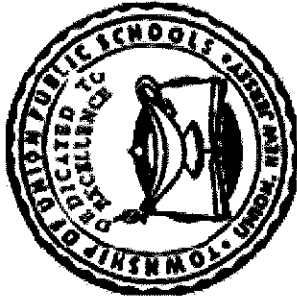
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District Mission Statement

The Township of Union Board of Education believes that every child is entitled to an education, designed to meet his or her individual needs, in an environment that is conducive to learning. State standards, federal and state mandates, and local goals and objectives, along with community input, must be reviewed and evaluated on a regular basis to ensure that an atmosphere of learning is both encouraged and implemented. Furthermore, any disruption to or interference with a healthy and safe educational environment must be addressed, corrected, or, when necessary, removed, in order for the district to maintain the appropriate educational setting.

District Philosophy Statement

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is the formulation of a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.



Statement of District Goals

- ❖ Develop reading, writing, speaking, listening, and mathematical skills.
- ❖ Develop a pride in work and a feeling of self-worth, self-reliance, and self discipline.
- ❖ Acquire and use the skills and habits involved in critical and constructive thinking.
- ❖ Develop a code of behavior based on moral and ethical principals.
- ❖ To be able to work with others cooperatively.
- ❖ Acquire a knowledge and appreciation of the historical record of human achievement and failures and current societal issues.
- ❖ Acquire a knowledge and understanding of the physical and biological sciences.
- ❖ Efficient and effective participation in economic life and the development of skills to enter a specific field of work.
- ❖ Appreciate and understand literature, art, music, and other cultural activities.
- ❖ Develop an understanding of the historical and cultural heritage.
- ❖ Develop a concern for the proper use and/or preservation of natural resources.
- ❖ Develop basic skills in sports and other forms of recreation.

Course Description

Algebra I will help mathematics students to build a strong conceptual foundation. The focus of the class will be what algebra really is: patterns and functions. The main topics of the class will include equivalence, representation and modeling with variables, linearity, and the connections between algebra and geometry, probability, and statistics. Students taking Algebra I will use many tools and forms of technology to help students grasp a firm understanding of the core ideas: calculators, computers, spreadsheets, algebra tiles, etc.

Recommended Textbooks

Prentice Hall Mathematics Algebra I 2009

Course Proficiencies

Students will be able to...

- 1) Model real-life situations using expressions and equations.
- 2) Identify functions, use function notation and perform function operations.
- 3) Solve linear equations and inequalities.
- 4) Find domain and range of functions.
- 5) Solve and graph absolute value inequalities.
- 6) Model real-life situations using direct, indirect and joint variation.
- 7) Use sampling methods to estimate populations and recognize bias surveys.
- 8) Write and graph linear equations given certain conditions.
- 9) Solve systems of equations algebraically and graphically.
- 10) Solve quadratics using formula, graphing, factoring and completing the square.
- 11) Add, subtract and multiply complex numbers.
- 12) Extend the properties of exponents to rational exponents.
- 13) Use properties of radicals in order to simplify and evaluate expressions containing radicals and various indexes.
- 14) Evaluate and simplify expressions written in either exponential or radical form.
- 15) Find real and complex roots using long and synthetic division.
- 16) Simplify rational expressions and solve rational equations.
- 17) Use properties of logs to simplify expressions and solve equations.
- 18) Apply formulas of geometric and arithmetic sequences and series.
- 19) Calculate probability, odds, combinations and permutations of given events.
- 20) Demonstrate knowledge of matrices.
- 21) Extend the domain of trigonometric functions using the unit circle.
- 22) Prove and apply trigonometric identities.
- 23) Identify the conic section from its equation.

Curriculum Units

Unit 1: Relationships Between Quantities and Reasoning with Equations

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Reason quantitatively and use units to solve problems	A.SSE.1
2	Interpret the structure of expressions. <i>A.SSE.1: focus on linear, quadratic, and an introduction to exponential expressions.</i>	A.SSE.1
3	Create equations that describe numbers or relationships. <i>A.CED.1 is limited to quadratic equations. A.CED.4 excludes cases that require extraction of roots or inverse functions.</i>	A.CED.1 A.CED.2 A.CED.4
4	Understand solving equations as a process of reasoning and explain the reasoning.	A.REI.1
5	Solve equations and inequalities in one variable.	A.REI.1

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
 2. Reason abstractly and quantitatively.
 3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
 8. Look for and express regularity in repeated reasoning.
- All of the content presented at this grade level has connections to the standards for mathematical practices.*

Bold type identifies possible starting points for connections to the SLOs in this unit.

Code #	Common Core State Standards
NO1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
NO2	Define appropriate quantities for the purpose of descriptive modeling.
NO3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
ASSE1	Interpret expressions that represent a quantity in terms of its context. <ol style="list-style-type: none"> a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i>
ACE1D	Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear functions.</i>

A.CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A.CED.2	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</i>
A.REI.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 solution method.
A.REI.1	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Math/Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Italic type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

CCSS #	Assessments
NQ1.NQ2.NQ3.A.SSE.1.A.CED.1.A.CED.2.A.REI.1.A.REI.3	Fun in the Sun Car Rental Project
NQ1.A.SSE.1.A.CED.2	A. Solve for F : $C = \frac{5}{9}(F - 32)$ B. Find F when C is 30° .
NQ1.NQ2.A.CED.1.A.CED.2.A.REI.1	The Sophomore class is planning a picnic. The cost of a permit to use a city park is \$250. To pay for the permit, there is a fee of \$.75 for each sophomore and \$1.25 for each guest who is not a sophomore. Two hundred sophomores plan to attend. Write and solve an inequality to find how many guests must attend for the sophomores to pay for the permit.

Unit 2: Linear Relationships

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Solve systems of equations.	A.REI.5, A.REI.6
2	Represent and solve equations and inequalities graphically.	A.REI.10, A.REI.11, A.REI.12
3	Create equations that describe numbers or relationships.	A.CED.1
4	Understand the concept of a function and use function notation.	F.IF.3, F.IF.2, F.IF.3
5	Interpret functions that arise in applications in terms of the context.	F.IF.5
6	Analyze functions using different representations.	F.IF.7, F.IF.9

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Italic type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

Selected Opportunities for Connection to Mathematical Practices

8. Make sense of problems and persevere in solving them.
9. Reason abstractly and quantitatively.
10. Construct viable arguments and critique the reasoning of others.
11. Model with mathematics.
12. Use appropriate tools strategically.
13. Attend to precision.
14. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Code #	Common Core State Standards
A.REI.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
A.REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
A.REI.6	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.6	Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., by using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
A.CED.3	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
A.CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>
FP.1	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 $y = f(x)$.
FP.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.5	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. <i>For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.</i>
F.IF.6	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i>
F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima
F.IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i>

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

CCSS #	Assessments
A.REI.5, A.REI.6, A.CED.1, A.REI.11, A.CED.2	Purchasing a Sedan versus a Hybrid Vehicle: Students must pick a car with a sedan version in order to decide if the hybrid car is worth the price. Students must investigate gas prices, create equations, graph, and solve systems of equations to determine their answer.
A.REI.5, A.REI.6, F.IF.7	Solve the systems of equations using all three methods: $y = 4x - 3$ and $y = -\frac{1}{4}x + 2$
F.IF.7, F.IF.9	Given a quadratic function represented by a graph and a linear function represented by a table, find the solutions and the minima/maxima on a specific interval.
F.IF.2, F.IF.3	A student thinks that the relation $\{(4, 3), (-3, 8), (7, -2), (1, 3)\}$ is not a function because two values in the domain have the same range value. What is the student's error?

<p>F.IF.1, F.IF.4, F.IF.5 F.IF.2, F.IF.3</p>	<p>A store bought a case of disposable camera for \$300. The store's profit p on the cameras is a function of the number c of camera sold. Find the range of the function $p = 6c - 300$ when the domain is $\{0, 15, 50, 62\}$. Explain why -40 cannot be in the domain.</p>
<p>A.REI.2, A.CED.3</p>	<p>If gold paper costs \$5 per roll and blue paper costs \$3 per roll, how many rolls of gold and blue paper can you buy if your budget only allows you to spend at most \$48.</p> <ol style="list-style-type: none"> Write a linear inequality that describes the situation. Graph the linear inequality Write three possible solutions to the problem. <p>d. Is the point $(-2, 5)$ a solution to the inequality. Is it a solution to the problem?</p>

Unit 3: Expressions and Equations

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	<p>Interpret the structure of expressions.</p> <p><i>A.SSE.1: focus on linear, quadratic, and an introduction to exponential expressions.</i> <i>A.SSE.2: focus on polynomial expressions</i></p>	<p>A.SSE.1, A.SSE.2</p>
2	<p>Write expressions in equivalent forms to solve problems.</p> <p><i>A.SSE.3 is limited to real numbers.</i></p>	<p>A.SSE.3</p>
3	<p>Perform arithmetic operations on polynomials.</p>	<p>A.APR.1</p>
4	<p>Create equations that describe numbers or relationships.</p>	<p>A.CED.1, A.CED.2, A.CED.4</p>

5	Solve equations and inequalities in one variable.
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Major Content Supporting Content: Additional Content (Identified by PARCC Model Content Frameworks).
Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

Selected Opportunities for Connection to Mathematical Practices
<p>15. Make sense of problems and persevere in solving them.</p> <p>16. Reason abstractly and quantitatively.</p> <p>17. Construct viable arguments and critique the reasoning of others.</p> <p>18. Model with mathematics.</p> <p>19. Use appropriate tools strategically.</p> <p>20. Attend to precision.</p> <p>21. Look for and make use of structure.</p> <p>8. Look for and express regularity in repeated reasoning.</p> <p><i>All of the content presented at this grade level has connections to the standards for mathematical practices.</i></p> <p>Bold type identifies possible starting points for connections to the SLOs in this unit.</p>

Code #	Common Core State Standards
ASSE1	<p>Interpret expressions that represent a quantity in terms of its context.</p> <p>a. Interpret parts of an expression, such as terms, factors, and coefficients.</p> <p>b. Interpret complicated expressions by viewing one or more of their parts as a single entity.</p> <p><i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i></p> <p>Use the structure of an expression to identify ways to rewrite it.</p>
ASSE2	<p><i>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 $(x^2 - y^2)(x^2 + y^2)$.</i></p>

<p style="text-align: center;">ACED</p>	<p>Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>a. Factor a quadratic expression to reveal the zeros of the function it defines.</p> <p>B. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p> <p>c. Use the properties of exponents to transform expressions for exponential functions.</p> <p><i>For example, the expression $1.15t$ can be rewritten as $(1.15)^{1/12 \cdot 12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i></p>
<p style="text-align: center;">ACED</p>	<p>Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</p> <p>Create equations and inequalities in one variable and use them to solve problems.</p>
<p style="text-align: center;">ACED</p>	<p><i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i></p> <p>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p>
<p style="text-align: center;">ACED</p>	<p>Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</p> <p><i>For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</i></p>
<p style="text-align: center;">ACED</p>	<p>Solve quadratic equations in one variable.</p> <p>Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.</p> <p>b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.</p>

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

CCSS #	Assessments
A.SSE.1	Determine the vertex of the function. State if the function has a minimum/maximum based on the coefficients of $f(x) = 4x^2 - 4x + 8$
A.REI.4 A.SSE.3 A.CED.2	An owl is circling a field at a height of 70 feet and sees a mouse. The owl folds its wings and begins to dive with an initial speed of 6 feet per second. Estimate the time the mouse has to escape. The model for the height of the owl at time, t is $h = -16t^2 - 6t + 70$
A.SSE.2 A.CED.1 A.CED.4 A.REI.4 A.CED.3	Solve for r : $V = \frac{1}{3}\pi r^2 h$
A.SSE.3 A.CED.1 A.REI.4	Solve for x : $(3x - 7) = 0$ Find the roots: $5x^2 - 2x - 10 = -13$
A.SSE.3 A.REI.4	Complete the square: $x^2 + 14x + \underline{\hspace{2cm}}$.
A.APR.1 A.SSE.1	Let $f(x) = 2x^2 + 3$ and $g(x) = 5x + 7$. Find: A. $f(x) + g(x)$ B. $f(x) \cdot g(x)$ C. $g(x) - f(x)$

Unit 4: Functions and Modeling

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Understand the relationship between zeros and factors of polynomials.	A.APR.3
2	Extend the properties of exponents to rational exponents.	N.RN.1, N.RN.2, N.RN.3
3	Interpret functions that arise in applications in terms of the context. <i>F.IF.4 and F.IF.5 are limited to linear and quadratic functions.</i>	F.IF.4, F.IF.5, F.IF.6
4	Analyze functions using different representations.	F.IF.7
5	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. <i>F.IF.9 is limited to linear and quadratic functions.</i>	F.IF.8, F.IF.9
6	Build a function that models a relationship between two quantities.	F.BF.1
7	Build new functions from existing functions.	F.BF.3
8	Construct and compare linear, quadratic, and exponential models and solve problems.	F.LE.1, F.LE.2, F.LE.3
9	Interpret expressions for functions in terms of the situation they model.	F.IE.1

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

Selected Opportunities for Connection to Mathematical Practices

- 22. Make sense of problems and persevere in solving them.
- 23. Reason abstractly and quantitatively.
- 24. Construct viable arguments and critique the reasoning of others.
- 25. Model with mathematics.
- 26. Use appropriate tools strategically.
- 27. Attend to precision.
- 28. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Code #	Common Core State Standards
A.APR.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
N.RN.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.</i>
N.RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
N.RN.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a non-zero rational number and an irrational number is irrational.
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.

	<p><i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i></p>
F.F.7	<p>Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p> <p><i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function</i></p>
F.F.7	<p>Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.</p>
F.F.8	<p>Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p>
F.F.8	<p>Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p> <p>b. Use the properties of exponents to interpret expressions for exponential functions.</p> <p><i>For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.</i></p>
F.F.9	<p>Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</p> <p><i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p>
F.BF.1	<p>Write a function that describes a relationship between two quantities.</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p>
F.BF.3	<p>Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both</p>

	positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i>
F.LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
F.LE.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
F.LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
F.LE.5	Interpret the parameters in a linear or exponential function in terms of a context.

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

CCSS #	Assessments
A.APR.3	Given $x^2 + 12x - 28 = 0$, state the factors and solutions.
N.RN.1, N.RN.2	Evaluate $25^{1/2}$ and rewrite in radical form.
F.LE.2	

<p>F.IF.4 F.LE.1 F.LE.5 F.IF.9 F.IF.7</p>	<p>Given a graph with a quadratic function, exponential function, and linear function, state which represents the given situation the best.</p>
<p>F.LE.2 F.BF.1</p>	<p>Given the following increasing numerical pattern, determine the type of relationship that exists (linear quadratic or exponential), and justify your conclusion: -3, -1, 5, 23, 77, ...</p>
<p>E.BF.3</p>	<p>Describe the difference between the graphs of: a. $f(x) = 5x^2$ and $g(x) = 10x^2$ b. $f(x) = 5x + 2$ and $g(x) = 5x$</p>
<p>F.BF.1</p>	<p>Given 3, 6, 9, .. a. create an explicit formula b. find the 24th term</p>
<p>F.LE.1 F.LE.5 F.IF.6 F.IF.8</p>	<p>If a population of a town follows a linear growth trend describe the slope as a rate of change and set up the appropriate axes and labels to graph a five year representation.</p>
<p>F.IF.7 F.IF.8</p>	<p>Graph $f(x) = 2x^2 + 6x + 4$ a. State if the function has a maximum or minimum. b. Find the axis of symmetry. c. Find the vertex. d. State the solutions.</p>
<p>N.RN.3</p>	<p>True or false. If false, explain why and provide an example. a. The sum of two rational numbers is irrational. b. The difference of two rational numbers is rational. c. The product of two rational numbers is irrational.</p>

Unit 5: Descriptive Statistics

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Summarize, represent, and interpret data on a single count or measurement variable.	S.ID.1, S.ID.2, S.ID.3, S.ID.4
2	Summarize, represent, and interpret on two categorical and quantitative variables.	S.ID.5, S.ID.6
3	Interpret linear models.	S.ID.7, S.ID.8, S.ID.9

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

Selected Opportunities for Connection to Mathematical Practices

29. Make sense of problems and persevere in solving them.
30. Reason abstractly and quantitatively.
31. Construct viable arguments and critique the reasoning of others.
32. Model with mathematics.
33. Use appropriate tools strategically.
34. Attend to precision.
35. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Common Core State Standards

Code #	
S.ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
S.ID.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
S.ID.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
S.ID.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
S.ID.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
S.ID.6	<p>Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.</p> <p>b. Informally assess the fit of a function by plotting and analyzing residuals.</p> <p>c. Fit a linear function for a scatter plot that suggests a linear association.</p>
S.ID.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
S.ID.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
S.ID.9	Distinguish between correlation and causation.

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).

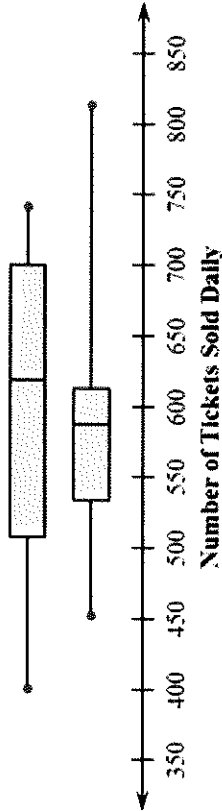
Bold type indicates grade level fluency requirements. (Identified by PARCC Model Content Frameworks).

CCSS #

S.ID.6

Given a table of data, graph the scatter plot. Find the line of best fit and state its equation.
The local movie theater tracked the number of tickets sold for two movies each day for one week. The manager plotted the data on the box plots shown below.

Tickets Sold for Two Movies



Answer true or false

- A. The mean number of tickets sold for Movie 1 is greater than the mean number of tickets sold for Movie 2.
- B. The interquartile range of the number of tickets sold for Movie 1 is greater than the interquartile range for the number of tickets sold for Movie 2.
- C. The median number of tickets sold for Movie 1 is greater than the median number of tickets sold for Movie 2

S.ID.1,

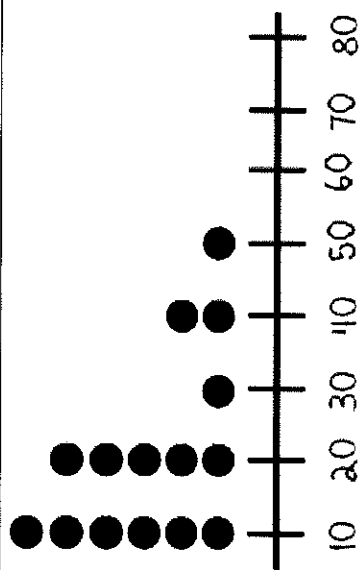
S.ID.2,

S.ID.3,

S.ID.4,

S.ID.5

Mr. Smith asked his students how many minutes they studied for their History Test over the weekend. The students then marked a dot on the graph as shown below.



Minutes

- A. If one more student came to the board and put a dot on 20 minutes, explain if the median would increase, decrease, or stay the same.
- B. If one more student came to the board and put a dot on 40 minutes, explain if the mean would increase, decrease, or stay the same.

Juniors and seniors were asked if they plan to attend college immediately after graduation, seek full-time employment, or choose some other option. A random sample of 100 students was selected from those who completed the survey. Scott started to calculate the row conditional relative frequencies to the nearest thousandth.

1. Complete the calculations of the row conditional relative frequencies. Round your answers to the nearest thousandth.

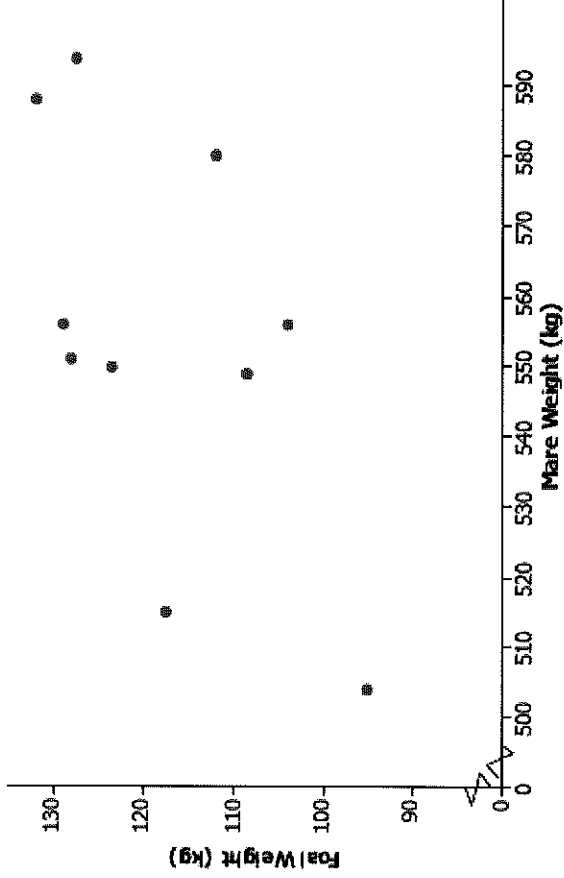


	Plan to Attend College	Plan to seek Full-Time Employment	Other Options	Totals
Seniors	$\frac{25}{55} \approx 0.455$	$\frac{10}{55} \approx 0.182$		$\frac{55}{55} = 1.000$
Juniors			$\frac{5}{45} \approx 0.111$	$\frac{45}{45} = 1.000$
Totals	$\frac{60}{100} = 0.600$	$\frac{15}{100} = 0.150$	$\frac{25}{100} = 0.250$	$\frac{100}{100} = 1.000$

2. Are the row conditional relative frequencies for juniors and seniors similar, or are they very different?
3. Do you think there is a possible association between grade level (junior or senior) and after high school plan? Explain your answer.



Below is a scatter plot of foal birth weight and mare's weight Below is a scatter plot of foal birth weight and mare's weight



a. The equation of the least squares line for the data is:

$$y = -19.6 + 0.248x, \text{ where } x = \text{mare's weight (in kg)} \text{ and } y = \text{foal's birth weight (in kg)}$$

- a. What foal birth weight would you predict for a mare who weighs 520 kg?
- b. How would you interpret the value of the slope in the least-squares line?

c. Does it make sense to interpret the value of the y -intercept in this context? Explain why or why not.

Pacing Guide – Course

Unit 1: 39 Days

Unit 2: 45 Days

Unit 3: 39 Days

Unit 4: 39 Days

Unit 5: 18 Days