SOUTHERN LEHIGH SCHOOL DISTRICT
5775 Main Street
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Scope and Sequence for **Algebra III**

Standards for Mathematical Practice:	
MP1 Make sense of problems and persevere in solving them. **MP2** Reason abstractly and quantitatively. **MP3** Construct viable arguments and critique the reasoning of others. **MP4** Model with mathematics.	**MP5** Use appropriate tools strategically. **MP6** Attend to precision. **MP7** Look for and make use of structure. **MP8** Look for and express regularity in repeated reasoning.

N.CN – Number and Quantity – The Complex Number System

CCSSM	PA Core Standards for Mathematics
Perform arithmetic operations with complex numbers. **N.CN.3** (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers. **Represent complex numbers and their operations on the complex plane.** **N.CN.4** (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	**CC.2.1.HS.F.2** Apply properties of rational and irrational numbers to solve real world or mathematical problems. **CC.2.1.HS.F.6** Extend the knowledge of arithmetic operations and apply to complex numbers. **CC.2.1.HS.F.7** Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.

N.VM – Number and Quantity – Vector & Matrix Quantities

CCSSM	PA Core Standards for Mathematics
Perform operations on matrices and use matrices in applications **N.VM.6** (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network. **N.VM.7** (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled. **N.VM.8** (+) Add, subtract, and multiply matrices of appropriate dimensions. **N.VM.9** (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties. **N.VM.10** (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse. **N.VM.12** (+) Work with 2 × 2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.	Intentionally left blank.

A.REI – Algebra – Reasoning with Equations & Inequalities

CCSSM	PA Core Standards for Mathematics
Solve systems of equations. **A.REI.9** (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).	Intentionally left blank.

F.IF – Functions – Interpreting Functions

CCSSM	PA Core Standards for Mathematics
Analyze functions using different representations. **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. **d** (+) Graph rational functions, identify zeros and asymptotes when suitable factorizations are available, and showing end behavior.	**CC.2.2.HS.D.6** Extend the knowledge of rational functions to rewrite in equivalent forms.

F.BF – Functions – Building Functions

CCSSM	PA Core Standards for Mathematics
Build a function that models a relationship between two quantities. **F.BF.1** Write a function that describes a relationship between two quantities. **c.** (+) Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time*.	**CC.2.2.HS.C.3** Write functions or sequences that model relationships between two quantities.
Build a new functions from existing functions. **F.BF.3** 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 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. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.* **F.BF.4** Find inverse functions. **b.** (+) Verify by composition that one function is the inverse of another. **c.** (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. **d.** (+) Produce an invertible function from a non-invertible function by restricting the domain. **F.BF.4** (+) Produce an invertible function from a non-invertible function by restricting the domain.	**CC.2.2.HS.C.4** Write functions or sequences that model relationships between two quantities.

G.GPE – Geometry – Expressing Geometric Properties with Equations

CCSSM	PA Core Standards for Mathematics
Translate between the geometric description and the equation for a conic section. **G.GPE.3** (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.	**CC.2.3.HS.A.10** Translate between the geometric description and the equation for a conic section.