

ADVANCED ALGEBRA SYLLABUS – SEMESTER 1

Concepts and Skills	Section	State Standards
SOLVE AND APPLY EQUATIONS AND INEQUALITIES		
*Solve equations for one variable *Solve formulas for one variable	1-3	[SS12.1.4a, SS 12.3.2a, 12.3.2b, SS12.3.3a, SS 12.3.3f, SS12.3.3g, SS12.3.3h, SS12.3.3o] DK1, DK2 & DK3
*Solve inequalities	1-4	[SS12.1.4a, SS12.3.1g, SS12.3.2a, SS12.3.2b, SS12.3.3g, SS12.3.3h] DK2 & DK3
*Solve absolute value equations and inequalities	1-5	[SS12.1.4a, SS12.3.2b, SS12.3.3g, SS12.3.3h, SS12.3.3o, SS12.3.3a] DK2
INVESTIGATE FUNCTIONS AND LINEAR APPLICATIONS		
*Graph relations and identify functions	2-1	[SS12.3.1a, SS12.3.1b, SS12.3.1i] DK2 & DK3
*Write linear equations, including point slope form	2-2	[SS12.1.4a, SS12.3.1a, SS12.3.1b, SS12.3.1c, SS12.3.1d, SS12.3.1e, SS12.3.1f, SS12.3.3f] DK2 & DK3
*Use linear models to write linear equations and make predictions	2-4	[SS12.1.4a, SS12.3.2a, SS12.3.2b, SS12.3.2c] DK2 & DK3
GRAPH FUNCTIONS AND INEQUALITIES		
*Graph linear equations, including point slope form	2-2	[SS12.1.4a, SS12.3.1a, SS12.3.1b, SS12.3.1c, SS12.3.1d, SS12.3.1e, SS12.3.1f, SS12.3.3f] DK2 & DK3
*Identify and graph absolute value functions and graphs	2-5	[SS12.3.1a, SS12.3.1e] DK2 & DK3
*Analyze the families of absolute value functions	2-6	[SS12.1.4a, SS12.3.1a] DK2 & DK3
*Graph two-variable inequalities	2-7	[SS12.1.4a, SS12.3.1g, SS12.3.2a, SS12.3.2b] DK2 & DK3
SOLVE AND APPLY SYSTEMS OF EQUATIONS		
Solve and apply systems of equations graphically	3-1	[SS12.3.2a, SS12.3.3p]
Solve and apply systems of equations algebraically	3-2	[SS12.3.2a, SS12.3.3p]
SOLVE AND APPLY SYSTEMS OF INEQUALITIES		
Solve and apply systems of inequalities	3-3	[SS12.1.4a, SS12.3.2a]
Cumulative Assessment (1, 2 & 3)		
GRAPH QUADRATIC EQUATIONS		
*Identify characteristics of quadratic functions and graphs (Example 1 & 2 only)	5-1	[SS12.3.1a, SS12.3.1b, SS12.3.1d, SS12.3.1e, SS12.3.2c, SS12.3.2d] DK1, DK2 & DK3
*Graph quadratics in standard form	5-2	[SS12.3.1a, SS12.3.1b, SS12.3.1e, SS12.3.2d] DK2 & DK3
*Graph quadratics in vertex form (transformations)	5-3	[SS12.3.1a, SS12.3.1b, SS12.3.1e, SS12.3.2d] DK2 & DK3
SIMPLIFY QUADRATIC AND COMPLEX EXPRESSIONS		
Factor quadratic expressions	5-4	[SS12.3.2d, SS12.3.3e]
Identify complex numbers; Add, subtract, multiply, and divide complex numbers	5-6	[SS12.3.2d]
SOLVE AND APPLY QUADRATIC EQUATIONS		
*Find and apply max and min values of quadratic functions	5-2	[SS12.3.1a, SS12.3.2d] DK2 & DK3
Solve quadratics by factoring	5-5	[SS12.3.2d, SS12.3.3i]
Solve quadratic equations using square roots	5-5, 5-6	[SS12.1.1b, SS12.3.2d, SS12.3.3i]
Solve quadratic equations by completing the square; Rewriting equations in vertex form	5-7	[SS12.1.1b, SS12.3.2d, SS12.3.3i]
Solve quadratic equations using the quadratic formula	5-8	[SS12.1.1b, SS12.3.2d, SS12.3.3i]
CHARACTERISTICS OF POLYNOMIAL FUNCTIONS		
*Classify polynomial functions	6-1	[SS12.3.1a, SS12.3.1d, SS12.3.3c, SS12.3.3d] DK1, DK2 & DK3
*Factor polynomials	6-2	[SS12.3.1a, SS12.3.1e] DK2 & DK3
*Graph polynomials in factored form (zeroes)	6-2	[SS12.3.1a, SS12.3.1e] DK2 & DK3
*Explore Polynomial Graphs using a graphing calculator (End behavior, Multiplicity, Max, Min, Zeroes) *Extension p. 312	6-2	[SS12.3.1a, SS12.3.1e] DK2 & DK3
*Divide polynomials	6-3	[SS12.3.3l, SS12.3.3d] DK1
SOLVE POLYNOMIAL EQUATIONS		
Solve polynomial equations	6-4	[SS12.1.1b, SS12.3.3e]
Solve equations using theorems about roots	6-5	[SS12.1.1b]
Use the Fundamental Theorem of Algebra in solving polynomial equations with complex roots	6-6	[SS12.1.1b]
Cumulative Assessment (5 & 6)		
FIND AND USE PROBABILITY		
*Find experimental and theoretical probability	1-6	[SS 12.4.3b, SS 12.4.3d, SS 12.4.3e] DK1 & DK2
*Find permutations and combinations	6-7	[SS12.4.3c] DK1 & DK2
*Find the probability of multiple events	9-7	[SS12.4.3b, SS12.4.3d] DK1 & DK2

SS = State Standard * = State Standard Assessed DK = Depth of Knowledge

ADVANCED ALGEBRA SYLLABUS – SEMESTER 2

Concepts and Skills	Section	State Standards
SIMPLIFY RADICAL EXPRESSIONS		
*Understand and use the properties of exponents	p. 368 Supp	[SS12.3.3b] DK1 & DK2
*Find the nth roots and radical expressions	7-1	[SS12.1.1a, SS12.1.3a, SS12.1.3b, SS12.3.3b] DK1 & DK2
*Simplify monomial radical expressions	7-2	[SS12.1.1a, SS12.1.3a, SS12.1.3b] DK1 & DK2
*Simplify binomial radical expressions	7-3	[SS12.1.1a, SS12.1.3a, SS12.1.3b] DK1 & DK2
*Simplify expressions with rational exponents	7-4	[SS12.1.1a, SS12.1.3b] DK1 & DK2
SOLVE AND GRAPH RADICAL EQUATIONS		
Solve radical equations	7-5	
*Graph square root and other radical functions	7-8	[SS12.3.1a, SS12.3.1e, SS12.3.2d] DK2 & DK3
MODEL AND DESCRIBE STATISTICAL DATA <i>(The stats unit may be placed in any order as long as the order is used by all teachers in the school and the cumulative exam occurs prior to NeSA-M.)</i>		
*Draw and Interpret box-and-whisker plots	12-3	[SS 12.4.1d] DK2
*Find the standard deviation of a set of values	12-4	[SS 12.4.1d] DK2
*Model a set of data using a normal distribution	12-7	[SS 12.4.1d] DK2
*Describe the shape of skewed distributions	Supp	[SS 12.4.1d] DK2
Cumulative Assessment (7 & Statistics)		
GRAPH AND APPLY EXPONENTIAL AND LOGARITHMIC FUNCTIONS		
Model and understand graphs of exponential growth and decay	8-1, 8-2	[SS12.3.1e, SS12.3.2d]
*Apply models of growth and decay	8-1, 8-2	[SS12.1.3d, SS12.3.1a, SS12.3.1e, SS12.3.2d] DK2 & DK3
*Write exponential equations	8.1, 8.2	[SS12.3.1a, SS12.3.1e, SS12.3.2d] DK2 & DK3
*Graph logarithmic functions	8-3	[SS12.3.1a, SS12.3.2d] DK2 & DK3
SIMPLIFY AND SOLVE EXPONENTIAL AND LOGARITHMIC EXPRESSIONS AND EQUATIONS		
*Write and evaluating log expressions	8-3	[SS12.3.1a, SS12.3.1e, SS12.3.2d] DK2 & DK3
Use properties of logarithms	8-4	
Solve exponential and logarithmic equations	8-5	
Evaluate natural logarithmic expressions and solve equations using natural logarithms	8-6	
VARIATION		
*Use direct variation	2-3	[SS12.3.2a, SS12.3.2b] DK3
*Understand and use direct, inverse, and joint variation	9-1	[SS12.3.2a, SS12.3.2b] DK3
*Graph reciprocal function	9-2	[SS12.3.1a, SS12.3.1e, SS12.3.2d] DK2 & DK3
RATIONAL EXPRESSIONS AND EQUATIONS		
*Simplify, multiply and divide rational expressions	9-4	[SS12.1.3a, SS12.3.3k] DK1
*Add and subtract rational expressions	9-5	[SS12.1.3a, SS12.3.3j] DK1
Solve rational equations	9-6	
Cumulative Assessment (8 & 9)		
FUNCTIONS AND INVERSE RELATIONS (Placement in course to be determined by building PLC)		
Use operations with functions	7-6	[SS12.3.1b, SS12.3.3n]
Find inverse relations and functions	7-7	[SS12.3.1h]
IDENTIFY AND GENERATE SEQUENCES (Optional)		
Identify mathematical patterns and use a formula to find the nth term of a sequence	11-1	
Identify and generate arithmetic sequences	11-2	
Identify and generate geometric sequences	11-3	
WRITE AND EVALUATE SERIES (Optional)		
Write and evaluate arithmetic series and use summation notation	11-4	[SS12.3.3m]
Evaluate finite and infinite geometric series	11-5	[SS12.3.3m]

NOTES

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Select, apply, and explain methods of computation when problem solving when possible. [SS 12.1.3d]

*Check for reasonableness of computations/solutions in all application problems [SS 12.1.4a] DK1

Distinguish relevant from irrelevant information, identify missing information and find what is needed or make appropriate estimates in all application problems [SS 12.1.4b]

When possible use drawings, words, and symbols to explain the effects of operations on the magnitude of quantities. (e.g., if you take the square root of a number, will the result always be smaller than the original)

e.g., $\sqrt{\frac{1}{4}} = \frac{1}{2}$ [SS 12.1.2a]