

# Alg II Syllabus (Second Semester)

## Unit 10: Exponential functions

Lesson 1: Exponential functions (variables in the exponent)

Lesson 2: Exponential functions; the natural number  $e$ ; exponential inequalities

Lesson 3: \*Applications of exponential functions

Unit 10 cumulative review

Unit 10 review

Unit 10 test

## Unit 11: \*Logarithms

Lesson 1: Logarithm fundamentals

Lesson 2: Inverse of exponential function, log function, log graphs

Lesson 3: Logarithm theorems

Lesson 4: Solving log equations

Lesson 5: Change of base

Using logs to solve exponential equations & inequalities

Lesson 6: \*Logarithm inequalities

Lesson 7: \*Applications of logarithms

Unit 11 cumulative review

Unit 11 review

Unit 11 test

## Unit 12: Rational expressions

Lesson 1: Dividing polynomials; the remainder theorem

Lesson 2: Simplifying rational expressions (multiplying & dividing)

Lesson 3: Adding and subtracting rational expressions

Lesson 4: \*Factoring  $a^3 - b^3$ , more rational expressions

Lesson 5: Complex fractions

Lesson 6: Direct and inverse variation

Lesson 7: \*Rational and irrational numbers; classifying roots

Unit 12 cumulative review

Unit 12 review

Unit 12 test

**Unit 13: Regression**

Lesson 1: Linear regression

Lesson 2: Higher order regression

Unit 13 cumulative review

Unit 13 test

**Unit 14: \*Complex numbers**

Lesson 1: Imaginary number fundamentals;  
Adding and subtracting complex numbers

Lesson 2: Multiplying and dividing complex numbers

Lesson 3: Quadratic equations with complex number solutions

Unit 14 cumulative review

Unit 14 review

Unit 14 test

**Unit 15: Permutations, combinations, probability, and statistics**

Lesson 1: Fundamental principle of counting, factorial, permutations

Lesson 2: Permutations formula, special permutations

Lesson 3: Combinations

Lesson 4: Sample space, probability

Lesson 5: Fundamental principle of counting revisited  
Theoretical vs experimental probability

Lesson 6: Statistics

Lesson 7: Statistics with a graphing calculator

Unit 15 cumulative review

Unit 15 review

Unit 15 test

### **Unit 16: Parent functions**

Lesson 1: Quadratic parent function

Lesson 2: Cubic parent function

Lesson 3: Given a graph, determine the function

Lesson 4: Square root parent function

Lesson 5: Exponential parent function

Lesson 6: Logarithm parent function

Lesson 7: Reciprocal ( $1/x$ ) parent function

Unit 16 cumulative review

Unit 16 review

Unit 16 test

### **Unit 17: Conic sections**

Lesson 1: Circle

Lesson 2: Parabola (directrix and focus)

Lesson 3: \*Ellipse (foci, major & minor axes)

Lesson 4: \*Hyperbola (foci, asymptotes, major & minor axes)

Lesson 5: \*Recognizing conic sections

Unit 17 cumulative review

Unit 17 review

Unit 17 test

### **Unit 18: \*Matrices and determinants**

Lesson 1: Introduction to matrices (adding, subtracting, equality, scalar mult.)

Lesson 2: Matrix multiplication, mixed operations

Lesson 3: Determinants,, inverses, identity matrix

Lesson 4: Matrix and determinant operations on the calculator

Lesson 5: Expressing a system of equations as a matrix eq. Solving systems

Lesson 6: Solving systems of equations with Cramer's rule.

Unit 18 cumulative review

Unit 18 review

Unit 18 test

### **Semester II summary**

Semester review/Semester test

### **Enrichment Topics**

**Topic A:** Analysis of absolute value inequalities

**Topic B:** Linear Programming

**Topic C:** Point-slope and intercept forms of a line

**Topic D:** The summation operator,  $\Sigma$

**Topic E:** An unusual look at probability

**Topic F:** Rotations

**Topic G:** Absolute value parent functions

**Topic H:** Dimension changes affecting perimeter, area, and volume

**Topic I:** Algebraic solution to three equations in three variables

**Topic J:** Algebraic solution to quadratic systems of equations.

**Topic K:** Derivation of the sine law

**Topic L:** Derivation of the cosine law

**Topic M:** Tangent composite function derivations

**Topic N:** Locating the vertex of a standard-form parabola

**Topic O:** Algebraic manipulation of inverse trig functions

**Topic P:** Logarithm theorem derivations

**Topic Q:** Arithmetic and geometric sum formulas

**Topic R:** Converting general form conics to standard form

**Topic S:** Conic section applications