**Algebra II MAT 330**

**(Common Core)**

**Resource(s) used:**

**Primary: Teacher Made Lessons**

**Secondary: eMathInstruction (online resource)**

**Secondary: EngageNY (online resource)**

Algebra II Common Core is the third and final high school credit bearing Regents course offered in the New York State Sequence. Students must have also passed both the NYS Regents Algebra I Common Core and Geometry Common Core courses and exams prior to enrollment. Students can earn their third or fourth credits in mathematics by successfully completing the course. The fundamental purpose of this course is to build upon knowledge of linear, quadratic and exponential functions. Students extend their repertoire of functions to include polynomial, rational and radical functions. Students work with expressions that define the functions and continue to expand and hone their abilities to model situations and solve the equations. These include solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. Students will also make inferences and conclusions from data and see how the visual displays and summary statistics they learned in earlier grades relate to different types of data like probability and distributions. The NYS Mathematical Practice Standards will be applied throughout the course and, together with the NYS Content Standards, students will experience mathematics as a coherent, useful and logical subject that makes use of their ability to make sense of real world situations. A class period of instruction consists of 47 minutes each day, five days a week for a length of 40 weeks.

**Final Assessment:** Students are required to take the NYS Regents Common Core Exam in Algebra II. Successful completion of this exam is part of the requirement for a Regents with Distinction Diploma in NYS.

**10-Week Marking Period**

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| **Lesson** | **Topic(s)** | **Common Core NY State Standards** |
| **0** | Review: Mathematical Language | A.SSE.1a, A.SSE.1b |
| **1** | Review: Function Notation, Adding and Subtracting Polynomials | A.SSE.2, A.APR.1 |
| **2** | Review: Factoring Polynomials | A.APR.2, A.APR3 |
| **3** | Using Synthetic Substitution to Evaluate Functions | A.APR.4 |
| **4** | Multiplication of Polynomials | A.REI.11 |
| **5** | Division of Polynomials – Reverse Tabular Method | A.APR.6, F.IF.4 |
| **6** | Division of Polynomials – Long Division | A.APR.6, F.IF.4 |
| **7** | Practice – Operations on Polynomials | A.APR.6, F.IF.4 |
| **8** | Factoring – Common Binomial and Grouping  (Apply to Trinomials where a>1) | A.SSE.2, F.IF.8a |
| **9** | Factoring – Higher Degree Polynomials and Factoring “Completely” | A.SSE.2, F.IF.8a |
| **10** | Practice – Factoring Polynomials | F.IF.4, F.BF.3 |
| **11** | Solving Polynomial Equations | A.CED.2, F.IF.4 |
| **12** | Using Synthetic Division to Factor Higher-Degree Polynomials | A.APR.2, F.IF.7c |
| **13** | Sketching Graphs of Polynomial Functions, Including Multiplicity | A.REI.11 |
| **14** | The Graphs of Polynomial Functions | F.IF.4, F.IF.7c |
| **15** | Solving Equations Graphically | A.CE.1, F.IF.4 |
| **16** | Even vs. Odd DEGREE of a Polynomial | A.APR.1 |
| **17** | Even and Odd Functions | F.IF.4, F.IF.5 |
| **18** | Simplifying Rational Expressions | A.SSE.2 |
| **19** | Multiplying and Dividing Rational Expressions | A.SSE.2 |
| **20** | Adding and Subtracting Rational Expressions | A.SSE.2 |
| **21** | Solving Rational Equations | A.SSE.2, A.REI.2 |
| **22** | More with Rational Equations  (OLD Word Problems) | A.SSE.2, A.REI.2 |
| **23** | Practice – Rational Expressions and Equations | F.IF.7b, F.BF.3 |
| **24** | Simplifying, Adding, and Subtracting Radicals | F.IF.7b, F.BF.3 |
| **25** | Multiplying Radicals | F.IF.7b, F.BF.3 |
| **26** | Dividing Radicals and Rationalizing a Denominator | F.IF.7b, F.BF.3 |
| **27** | Solving Radical Equations | A.CED.3 |
| **28** | Solving Systems of Equations in Two Variables, Graphically (Intersect Command) | A.CED.1 |
| **29** | Solving Systems of Equations in Two Variables, Algebraically | A.CED.1 |
| **30** | Solving Linear Systems of Equations in Three Variables, Algebraically | F.IF.9, A.CED.3, A.REI.11 |
| **31** | Graphing Quadratic Equations | A.SSE.1b, A.CED.4 |

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**20-Week Marking Period**

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| **Lesson** | **Topic(s)** | **Common Core NY State Standards** |
| **32** | The Definition of a Parabola  (Using Focus and Directrix to Write Equation) | A.SSE.1b, A.CED.2 |
| **33** | Introduction to Imaginary Numbers,  (Operations on Imaginary #’s and Powers of *i*) | N.CN.1, N.CN.2 |
| **34** | Operations on Complex Numbers and Graphing Complex Numbers (*a +bi* form) | N.CN.7, N.CN.8 |
| **35** | Complex Solutions to Equations | N.CON.2, N.CN.8 |
| **36** | Using the Discriminant to Predict the Nature of the Solutions of Quadratics | N.CN.7, N.CN.8, A.SSE.1a |
| **37** | Polynomial Functions with Complex Roots | N.CN.8 |
| **38** | The Fundamental Theorem of Algebra | N.CN.9 |
| **39** | Intro to Trig Functions: Angles as Rotations, Coterminal Angles and Reference Angles | F.TF.1 |
| **40** | Trigonometric Functions in the Quadrants | F.TF.1, F.TF.2 |
| **41** | Special Right Triangles | F.TF.8 |
| **42** | Introduction to the Unit Circle | F.TF.2, F.TF.1 |
| **43** | The Reciprocal Trigonometric Functions  (Secant, Cosecant and Cotangent) | F.TF.8 |
| **44** | Radian Measure | F.TF.1, F.TF.2, F.TF.5 |
| **45** | Proving Algebraic and Trigonometric Identities  (and Solving with Pythagorean Identities) | F.TF.8 |
| **46** | Graphing the Sine and Cosine Functions in DEGREES | F.TF.8 |
| **47** | Graphing the Sine and Cosine Functions in RADIANS | F.BF.3, F.TF.5 |
| **48** | Amplitude, Frequency and Period | F.BF.3, F.TF.5, F.TF.8 |
| **49** | Transformations of Sine and Cosine Graphs | F.BF.3, F.TF.5, F.TF.8 |
| **50** | Applications of Sine and Cosine Graphs | A.CED.2, F.TF.8 |
| **51** | Using the Calculator to Graph Trigonometric Functions | F.BF.3, F.IF.7e, F.TF.5 |
| **52** | Graph of the Tangent Functions AND Even and Odd Trigonometric Functions | A.CED.2, F.TF.8 |

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**30-Week Marking Period**

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| **Lesson** | **Topic(s)** | **Common Core NY State Standards** |
| **53** | Working with Integer Exponents | F.BF.1b |
| **54** | Scientific Notation | A.REI.11 |
| **55** | Rational Exponents | A.CED.1, F.LE.4 |
| **56** | Properties of Radicals and Exponents | A.CED.1, F.LE.4 |
| **57** | Exponential Functions | F.IF.7e |
| **58** | Introduction to Logarithms | F.LE.4, F.BF.3 |
| **59** | Solving Exponential Equations | F.LE.4 |
| **60** | Graphing Exponential Functions | F.LE.4, F.IF.7e |
| **61** | Properties of Logarithms | F.LE.4 |
| **62** | Solving Logarithmic Equations | F.LE.4 |
| **63** | Newton’s Law of Cooling | A.SSE.2 |
| **64** | Log Functions as Inverses of Exponential Functions | F.LE.4 |
| **65** | Graphing Logarithmic Functions, Transformations of Logarithmic Functions | F.IF.7e, F.IF.8b |
| **66** | Financial Math | S.ID.4 |
| **67** | Summation (Sigma Notation) | S.ID.4 |
| **68** | Geometric Sequences  (Explicit and Recursive Definitions) | S.ID.4 |
| **69** | Geometric Series and Geometric Series as Exponential Functions | A.SSE.4 |
| **70** | Introduction to Probability and Using Two-Way Tables | S.MD.6, S.MD.7 |
| **71** | Venn Diagrams | S.IC.2, S.IC.4, S.IC.5 |
| **72** | Probability Rules and Independence | S.MD.6, S.MD.7 |
| **73** | Conditional Probability and Independence | S.MD.6, S.MD.7 |
| **74** | Statistics on the Calculator | S.ID.4, S.IC.1 |

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**40-Week Marking Period**

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| **Lesson** | **Topic(s)** | **Common Core NY State Standards** |
| **75** | Types of Statistical Studies-Population vs. Sample | S.IC.3, S.IC.4 |
| **76** | The Normal Distribution | S.ID.4 |
| **77** | Variability in the Sample Proportion | S.ID.4, S.IC.1 |
| **78** | Margin of Error in the Population Proportion | S.IC.4 |
| **79** | Variability in the Sample Mean | S.IC.4 |
| **80** | Margin of Error in Population Mean, Evaluating Reports | S.IC.4, S.IC.5 |
| **81** | Experiments and Role of Random Assignment | S.IC.5 |
| **82** | Drawing Conclusions Using Data From an Experiment | S.IC.6 |