

East Penn School District
Secondary Curriculum

A Planned Course Statement
for
Algebra II Concepts

Course # 301

Grade(s) 10 -12

Department: Mathematics

Length of Period (mins.) 41

Total Clock Hours: 126

Periods per Cycle: 6

Length of Course (yrs.) 1

Type of Offering: required ✓ elective

Credit: 1

Adopted: 6/28/10

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Description of Course #301

Course Title: Algebra II Concepts

Description: This course builds upon the skills learned in Algebra I. The course includes the study of rational and irrational numbers, complex numbers, quadratic equations, polynomials, factoring, probability and statistics, systems of equations and inequalities, and radical expressions and equations.

Goals:

- To develop proficiency in the students' ability to use algebra in solving problems while introducing students to concepts that are developed in higher mathematics.

Requirements:

- Prerequisite: Algebra I Seminar (74% to 83%) OR Algebra I CP (65% to 73%) AND successful completion of Geometry CP or Geometry Concepts.

Text: Cord, Algebra I, Globe Feron, 1998

*** *A graded project will be completed during each semester in this course.*

*** *Careers that utilize the mathematics taught in this course will be discussed during the first semester.*

Key to Levels of Achievement (Listed with each learning objective)

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|--------------------|--|
| Awareness (A): | Students are introduced to concepts, forms, and patterns. |
| Learning (L): | Students are involved in a sequence of steps and practice activities which involved further development and allow evaluation of process. |
| Understanding (U): | Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level. |
| Reinforcement (R): | Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication. |

Course Objectives –

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|---------------------------------------|-----|---|-------|---|---|------------------------|
| Quadratic Functions and Factoring | 1 | Students will model and compare values of complex numbers. | L | <ul style="list-style-type: none"> • Simplify expressions involving complex numbers • Perform operations involving complex numbers | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.1.A2.A. |
| | 2 | Students will use factoring to create equivalent forms of polynomials. | U | <ul style="list-style-type: none"> • Factor out greatest common factors • Factor quadratic expressions • Factor sum/difference of cubes • Factor by grouping | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.1.A2.B. |
| Exponential and Logarithmic Functions | 3 | Students will use exponential and calculator notation to represent any rational number. | L | <ul style="list-style-type: none"> • Exponent rules • Order of operations | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.1.A2.D. |
| | 4 | Students will understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. | U | <ul style="list-style-type: none"> • Rewrite logarithmic and exponential expressions in the inverse form • Solve logarithmic and exponential equations | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Test • Alternative Assessments | 2.1.A2.F. |
| Tools of Algebra | 5 | Students will evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. | L | <ul style="list-style-type: none"> • Use order of operations • Simplify and evaluate expressions using exponent rules • Simplify and evaluate radical expressions • Find the reciprocal, opposite, and absolute value of a quantity | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.2.A2.C. |
| | 6 | Students will develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts. | U | <ul style="list-style-type: none"> • Set up appropriate equations to solve word problems • Check answers for reasonableness when solving problems • Check for extraneous roots when solving problems • Give explanations for how problems were solved | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.5.A2.A. 3.7.12.A. |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|--|-----|---|-------|---|---|-------------------------------|
| | 7 | Students will use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results. | L | <ul style="list-style-type: none"> Solve systems of equations Graph linear inequalities Graph absolute value equations | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.5.A2.B. 3.7.12.A. |
| Linear Equations and Functions | 8 | Students will construct a line of best fit and calculate its equation for linear data. | U | <ul style="list-style-type: none"> Create scatterplots from data Find the equation of the line of best fit | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.6.A2.C. |
| | 9 | Students will make predictions based on lines of best fit. | U | <ul style="list-style-type: none"> Use the graph of the line of best fit to extrapolate and interpolate values Use the equation of the line of best fit to extrapolate and interpolate values | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.6.A2.E. |
| Data Analysis and Probability | 10 | Students will use probability to predict the likelihood of an outcome in an experiment. | U | <ul style="list-style-type: none"> Find simple probabilities Find probabilities of multiple events | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.7.A2.A. |
| | 11 | Students will compare odds and probability. | L | <ul style="list-style-type: none"> Determine odds from a probability Determine a probability from odds | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.7.A2.C. |
| | 12 | Students will use probability to make judgments about the likelihood of various outcomes. | U | <ul style="list-style-type: none"> Find number of permutations and combinations of a given situation Solve word problems involving probabilities | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Test Alternative Assessments | 2.7.A2.E. |
| Exponential and Logarithmic Functions, Quadratic Functions, Linear Equations and Functions | 13 | Students will evaluate and simplify algebraic expressions and solve and graph linear, quadratic, exponential, and logarithmic equations and solve and graph systems of equations and inequalities. | U | <ul style="list-style-type: none"> Evaluate algebraic expressions Simplify algebraic expressions Solve and graph linear equations in two variables Solve and graph linear inequalities in two variables | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.8.A2.B. Additional topic |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|---------------------------------|-----|---|-------|---|---|-----------|
| | | | | <ul style="list-style-type: none"> • Solve and graph quadratic equations • Solve and graph exponential equations • Solve and graph logarithmic equations • Solve and graph systems of linear equations in two variables • Solve and graph systems of linear inequalities in two variables | | |
| | 14 | Students will demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, quadratic, absolute value, exponential, logarithmic). | L | <ul style="list-style-type: none"> • Find the inverse of a function • Find the domain of a function • Find the range of a function • Describe what the graphs of linear, quadratic, exponential and logarithmic functions would look like without graphing • Determine the number of solutions of a quadratic function without solving • Perform operations with functions including composition of functions | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.8.A2.D. |
| Inequalities and Absolute Value | 15 | Students will demonstrate an understanding and apply properties of absolute value functions. | U | <ul style="list-style-type: none"> • Solve absolute value equations and inequalities • Graph absolute value functions and inequalities | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | |
| Systems of Linear Equations | 16 | Students will use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. | U | <ul style="list-style-type: none"> • Modeling and solving application problems • Completing linear programming problems | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.8.A2.E. |
| | 17 | Students will interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model. | U | <ul style="list-style-type: none"> • Check for extraneous solutions • Interpret results and verify if solutions are reasonable | <ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments | 2.8.A2.F. |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|---------------------------------------|-----|---|-------|---|---|--------------------------|
| | 18 | Students will use algebraic techniques to determine if two lines are parallel and / or perpendicular; find points of intersections. | R | <ul style="list-style-type: none"> Solve systems of linear equations Rewrite equations in slope-intercept form Find the slope of a line Compare slopes of lines | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.9.A2.A. |
| | 19 | Students will determine and interpret maximum and minimum values of a function over a specified interval. | L | <ul style="list-style-type: none"> Find the vertex of a quadratic equation Find the minimum/maximum value of a quadratic equation | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.11.A2.A. |
| Exponential and Logarithmic Functions | 20 | Students will analyze and interpret rates of growth/decay. | L | <ul style="list-style-type: none"> Write and solve equations involving population growth/decay Write and solve equations involving compound interest | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.11.A2.B. 13.3.11.D. |
| Powers, Roots, and Radicals | 21 | Students will perform operations and simplify radical expressions. | L | <ul style="list-style-type: none"> Simplify radical expressions Add, subtract, multiply and divide radical expressions Write expressions as both radical and rational exponent Solve equations involving radicals | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.1.A2.A 2.2.A2.F |
| Rational Equations and Functions | 22 | Students will demonstrate an understanding of rational functions. | L | <ul style="list-style-type: none"> Simplify rational expressions Perform operations with rational expressions Solve equations with rational expressions State restrictions on domain and check for extraneous solutions | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.8.A2.D |
| Tools of Algebra | 23 | Students will solve a formula for a given variable using algebraic processes. | U | <ul style="list-style-type: none"> Solve literal equations | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.3.A2.C |
| Discrete Mathematics | 24 | Students will recognize, describe and generalize patterns using sequences and series to predict long-term outcomes | A | <ul style="list-style-type: none"> Recognize arithmetic sequences and use appropriate formulas to solve for terms and sums Recognize geometric sequences and use appropriate formulas to solve for terms and sums | <ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments | 2.8.A2.C |

