

STRATFORD PUBLIC SCHOOLS

Stratford, Connecticut



“Tantum eruditi sunt liberi”
Only The Educated Are Free

College Algebra Curriculum

Adopted by the Board of Education on June 25, 2012

Irene Cornish
Superintendent

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Assistant Superintendent

DISTRICT MISSION

The mission of the Stratford Public Schools is to develop a community of learners in which students acquire the knowledge, skills and confidence to meet the challenges of a changing and increasingly diverse 21st century society.

DISTRICT CORE VALUES

Students will acquire content knowledge, strengthen higher-order thinking, and develop character in order to address 21st century challenges.

BUNNELL HIGH SCHOOL BELIEFS

We believe teachers must work collaboratively in support of student learning and to model collaboration as a social skill with students. We believe that a rigorous curriculum for all students, an acceptance of diversity, and a culture that actively welcomes all learners will contribute to a more knowledgeable community and society. We believe in the value of a strong education as a means of preparing students for work and life in the remainder of the 21st century.

STRATFORD HIGH SCHOOL BELIEFS

- a safe, positive school climate that embraces diversity is essential to ensure respect and opportunity for each individual
- students should understand the world beyond their community in order to contribute to a global society
- parents and students must share responsibility and work in partnership with the school in order to improve academic performance and to develop lifelong learners
- students should use technology effectively to acquire, process, and deliver information

BUNNELL HIGH SCHOOL and STRATFORD HIGH SCHOOL

LEARNING EXPECTATIONS

All students will...

- use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. (Academic)
- work independently and collaboratively to solve problems and accomplish goals. (Civic-Social)
- communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. (Academic)
- demonstrate innovation, flexibility and adaptability in thinking patterns, work habits and working/learning conditions. (Academic)
- effectively apply the analysis, synthesis and evaluation processes that enable productive problem solving. (Academic)
- value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. (Civic-Social)
- show competence in all core academic subjects and other fields of interest, including the ability to clearly and effectively communicate content information in multiple formats. (Academic)

COLLEGE ALGEBRA UNIT PLANS # 1 – 7

Stratford Public Schools

College Algebra Unit #1

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| <p>Unit Name: Unit 1 Equations and Inequalities Est. # of Weeks: (2 weeks)</p> <p>Synopsis: This unit is a general review of classification of numbers and solving equations and inequalities. In addition, interval notation will be introduced.</p> | |
| STUDENT LEARNING GOALS | |
| <p>Content-Specific Powered Standards Algebraic Reasoning: Patterns And Functions</p> <ul style="list-style-type: none"> ➤ Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies | <p><u>Interdisciplinary Standards (Technology Integration)</u> <u>Interdisciplinary Standards (Technology Integration)</u></p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr/> <p>Key Vocabulary</p> <ul style="list-style-type: none"> ➤ Variable, algebraic expression, equation, set builder notation, subsets, natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers, absolute value, linear equation, solving an equation, linear inequalities, interval notation, solving linear inequalities, compound inequalities |
| <p>Enduring Understandings: Students should...</p> <p>1.1 .Understand and describe patterns and functional relationships</p> <p>a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.</p> <p>1.2 Represent and analyze quantitative relationships in a variety of ways</p> <p>a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.</p> <p>1.3 Use operations, properties, and algebraic symbols to determine equivalence and solve problems</p> <p>a. Solve problems using a variety of algebraic methods.</p> | <p>Essential Questions</p> <ul style="list-style-type: none"> ➤ How can numbers be classified? ➤ How can algebraic operations be used to solve equations and inequalities? ➤ How can a range of numbers be expressed? ➤ How can equations and inequalities be used to describe data and physical phenomena and solve a variety of problems? |

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| <p><u>21st Century Skills and Expectations</u></p> <ol style="list-style-type: none"> 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. | <ol style="list-style-type: none"> 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. |
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| <p>Learning Objectives: Students will:</p> <ul style="list-style-type: none"> ➤ Recognize subsets of real numbers ➤ Use inequality symbols ➤ Use absolute value to express distance ➤ Solve linear equations in one variable algebraically and graphically ➤ Solve linear equations containing fractions ➤ Use interval notation ➤ Solve linear inequalities ➤ Solve compound inequalities |
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| ASSESSMENT PLAN | |
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| <p>Summative Assessment(s)/Performance Based Assessments including 21st Century Learning</p> <ul style="list-style-type: none"> ➤ Chapter assessment ➤ Unit assessment | <p>Formative and Diagnostic Assessment(s)</p> <ul style="list-style-type: none"> ➤ Diagnostic Assessment to determine previous knowledge of parabolas and distance / midpoint formulas. ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review |

| LEARNING PLAN COMPONENTS |
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| <ul style="list-style-type: none"> ○ <u>Algebra & Trigonometry</u>, Blitzer, Section P1, 1.2, and 1.7 ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials |

**Stratford Public Schools
College Algebra Unit #2**

Unit Name: Unit 2 Functions and their Graphs

Est. # of Weeks: (3 weeks)

Synopsis: This unit is a general overview of functions. In this unit, students will learn the vocabulary of functions and how to use functions to solve problems.

STUDENT LEARNING GOALS

Content-Specific Powered Standards

Algebraic Reasoning: Patterns And Functions

- Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies

Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use

Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application

Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation

Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management

Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary

- Relation, function, domain, range, vertical line test, independent variable, dependent variable, function notation, intercepts, increasing intervals, decreasing intervals, relative maximum, relative minimum

Enduring Understandings: Students should...

1.4 Understand and describe patterns and functional relationships

a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.

1.5 Represent and analyze quantitative relationships in a variety of ways

a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.

1.6 Use operations, properties, and algebraic symbols to determine equivalence and solve problems

- a. Solve problems using a variety of algebraic methods

Essential Questions

- What is a function?
- How do functions relate to the real world?
- How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?

21st Century Skills and Expectations

Rubric: Critical Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.

4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.

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| <p>2. Work independently and collaboratively to solve problems and accomplish goals.</p> <p>3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.</p> | <p>5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.</p> <p>6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior.</p> |
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| <p>Learning Objectives: Students will:</p> <ul style="list-style-type: none"> ➤ Find the domain and range of a relation ➤ Determine whether a relation is a function ➤ Identify the independent and dependent variables of a relation ➤ Identify a function, given an equation, list of ordered pairs, or graph ➤ Evaluate a function ➤ Use and understand function notation ➤ Graph functions by plotting points ➤ Obtain information about a function from its graph ➤ Identify the domain and range of a function from its graph ➤ Identify intercepts from a function's graph |
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| ASSESSMENT PLAN |
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| <p>Summative Assessment(s)/Performance Based Assessments including 21st Century Learning</p> <ul style="list-style-type: none"> ➤ Chapter assessment ➤ Unit assessment ➤ PBA #1 Skidding Distance | <p>Formative and Diagnostic Assessment(s)</p> <ul style="list-style-type: none"> ➤ Diagnostic Assessment to determine previous knowledge of parabolas and distance / midpoint formulas. ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review |
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| LEARNING PLAN COMPONENTS |
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| <ul style="list-style-type: none"> ○ <u>Algebra & Trigonometry</u>, Blitzer, Section 2.1 – 2.2 ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials |
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Stratford Public Schools
College Algebra Unit #3

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| Unit Name: Linear Functions and Their Graphs | | Est. # of Weeks: (3 weeks) |
| <p>Synopsis: This unit extends the study of functions to a detailed study of linear functions. Different critical properties of linear functions and the different forms of these will be explored and used to solve problems.</p> | | |
| STUDENT LEARNING GOALS | | |
| <p>Content-Specific Powered Standards Algebraic Reasoning: Patterns And Functions</p> <ul style="list-style-type: none"> ➤ Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies | <p>Interdisciplinary Standards (Technology Integration)</p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr style="border-top: 1px dashed black;"/> <p>Key Vocabulary</p> <ul style="list-style-type: none"> ➤ Linear function, slope, horizontal, vertical, intercepts, slope-intercept form, point-slope form, general form, parallel lines, perpendicular lines, scatter plots, regression line, correlation | |
| <p>Enduring Understandings: Students should...</p> <p>1.7 .Understand and describe patterns and functional relationships</p> <p>a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.</p> <p>1.8 Represent and analyze quantitative relationships in a variety of ways</p> <p>a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.</p> <p>1.9 Use operations, properties, and algebraic symbols to determine equivalence and solve problems</p> <p>a. Solve problems using a variety of algebraic methods.</p> <p>4.1 Collect, organize and display data using appropriate statistical and graphical methods.</p> <p>a. Create the appropriate visual or graphical representation of real data.</p> | <p>Essential Questions</p> <ul style="list-style-type: none"> ➤ What is a linear function? ➤ How can linear functions be expressed? ➤ How can linear functions and models be used to describe data and physical phenomena and solve a variety of problems? | |

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| <p>21st Century Skills and Expectations Rubric: Critical Skills</p> <ol style="list-style-type: none"> 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. | <ol style="list-style-type: none"> 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. |
| <p>Learning Objectives: Students will:</p> <ul style="list-style-type: none"> ➤ Calculate the slope of a line ➤ Write the slope-intercept form of a line ➤ Write the point-slope form of a line ➤ Identify and graph horizontal and vertical lines ➤ Recognize and use the general form of a line's equation ➤ Graph lines using a table of values ➤ Graph lines using the two intercept method ➤ Graph lines using the $y = mx + b$ form ➤ Graph lines and find critical properties using a graphing calculator ➤ Model data with linear functions and make predictions ➤ Find slopes of parallel and perpendicular lines | |
| <p>ASSESSMENT PLAN</p> | |
| <p>Summative Assessment(s)/Performance Based Assessments including 21st Century Learning</p> <ul style="list-style-type: none"> ➤ Chapter assessment ➤ Unit assessment | <p>Formative and Diagnostic Assessment(s)</p> <ul style="list-style-type: none"> ➤ Diagnostic Assessment to determine previous knowledge of parabolas and distance / midpoint formulas. ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review |
| <p>LEARNING PLAN COMPONENTS</p> | |
| <ul style="list-style-type: none"> ○ <u>Algebra & Trigonometry</u>, Blitzer, Sections 2.3, 1.1, 1.3, and 2.4 ○ Note: section 1.1 will be reviewed for plotting basics, both manual and on the calculator ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials | |

Stratford Public Schools
College Algebra Unit #4

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| Unit Name: Quadratic Equations | Est. # of Weeks: (4 weeks) |
| Synopsis: This unit should be a general overview of quadratic equations and their solutions, using different techniques. The use of quadratic equations in problem solving will also be studied. | |

STUDENT LEARNING GOALS

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| <p>Content-Specific Powered Standards Algebraic Reasoning: Patterns And Functions</p> <ul style="list-style-type: none"> ➤ Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies | <p><u>Interdisciplinary Standards (Technology Integration)</u></p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr style="border-top: 1px dotted black;"/> <p>Key Vocabulary</p> <ul style="list-style-type: none"> ➤ Quadratic equation, general form of quadratic, second-degree polynomial, zero-product property, factoring, square-root property, completing the square, quadratic formula, discriminant |
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| <p>Enduring Understandings: Students should...</p> <p>1.10. Understand and describe patterns and functional relationships</p> <p>a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.</p> <p>1.11 Represent and analyze quantitative relationships in a variety of ways</p> <p>a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.</p> <p>1.12 Use operations, properties, and algebraic symbols to determine equivalence and solve problems</p> <p>b. Solve problems using a variety of algebraic methods.</p> <p>4.1 Collect, organize and display data using appropriate statistical and graphical methods.</p> <p>a. Create the appropriate visual or graphical representation of real data.</p> | <p>Essential Questions</p> <ul style="list-style-type: none"> ➤ What are the characteristics of a parabola? ➤ How do you graph a parabola? ➤ How to solve problems involving quadratic functions? |
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| <p>21st Century Skills and Expectations Rubric: Critical Skills</p> <ol style="list-style-type: none"> 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. | <ol style="list-style-type: none"> 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. |
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| <p>Learning Objectives: Students will:</p> <ul style="list-style-type: none"> ➤ Identify quadratic equations and put them in standard form ➤ Solve quadratic equations by factoring ➤ Solve quadratic equations by the square root property ➤ Solve quadratic equations using the quadratic formula ➤ Use the discriminant to determine the number and type of solutions ➤ Solve problems modeled by quadratic equations |
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| ASSESSMENT PLAN | |
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| <p>Summative Assessment(s)/Performance Based Assessments including 21st Century Learning</p> <ul style="list-style-type: none"> ➤ Chapter assessment ➤ Unit assessment | <p>Formative and Diagnostic Assessment(s)</p> <ul style="list-style-type: none"> ➤ Diagnostic Assessment to determine previous knowledge of parabolas and distance / midpoint formulas. ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review |

| LEARNING PLAN COMPONENTS |
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| <ul style="list-style-type: none"> ○ <u>Algebra & Trigonometry</u>, Blitzer, Section 1.5 ○ Section P5 will be reviewed as necessary for factoring principals ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials |

Stratford Public Schools
College Algebra Unit #5

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| Unit Name: Polynomial Functions Est. # of Weeks: (4 weeks) | |
| Synopsis: This unit will look at polynomial functions and functions that consist of quotients of polynomials. The students will learn to identify polynomial functions, recognize characteristics of graphs, and graph polynomial functions. | |
| STUDENT LEARNING GOALS | |
| Content-Specific Powered Standards Algebraic Reasoning: Patterns And Functions ➤ Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies | <u>Interdisciplinary Standards (Technology Integration)</u> Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources. Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests. Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information. Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions. Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management. |
| Key Vocabulary ➤ Polynomial function of degree n , smooth, continuous, end behavior, leading coefficient test, zeros, roots, solution, even multiplicity, odd multiplicity, turning point, long division, synthetic division, remainder theorem, factor theorem, asymptote, boundary point, | |
| Enduring Understandings: Students should... 1.13. Understand and describe patterns and functional relationships a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions. 1.14 Represent and analyze quantitative relationships in a variety of ways a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations. 1.15 Use operations, properties, and algebraic symbols to determine equivalence and solve problems c. Solve problems using a variety of algebraic methods. 4.1 Collect, organize and display data using appropriate statistical and graphical methods. a. Create the appropriate visual or graphical representation of real data. | Essential Questions ➤ <i>What is a polynomial function?</i> ➤ <i>How do you graph a polynomial function?</i> ➤ <i>How do you factor to find the zeros of polynomial functions?</i> |

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| <p>21st Century Skills and Expectations Rubric: Critical Skills</p> <ol style="list-style-type: none"> 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. | <ol style="list-style-type: none"> 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. |
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| <p>Learning Objectives: Students will:</p> <ul style="list-style-type: none"> ➤ Identify polynomial functions ➤ Recognize characteristics of graphs of polynomial functions ➤ Determine end behavior ➤ Use factoring to find zeros of polynomial functions ➤ Identify zeros and multiplicities ➤ Understand the relationship between degree and turning points ➤ Graph polynomial functions |
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| ASSESSMENT PLAN | |
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| <p>Summative Assessment(s)/Performance Based Assessments including 21st Century Learning</p> <ul style="list-style-type: none"> ➤ Chapter assessment ➤ Unit assessment | <p>Formative and Diagnostic Assessment(s)</p> <ul style="list-style-type: none"> ➤ Diagnostic Assessment to determine previous knowledge of parabolas and distance / midpoint formulas. ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review |

| LEARNING PLAN COMPONENTS |
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| <ul style="list-style-type: none"> ○ <u>Algebra & Trigonometry</u>, Blitzer, Section 1.5 ○ Section P5 will be reviewed as necessary for factoring principals ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials |

Stratford Public Schools
College Algebra Unit #6

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| Unit Name: Conic Sections Est. # of Weeks: (3 weeks) | |
| Synopsis: This unit will look at two types of conic sections: parabolas and circles. The general forms of the equations and graphs of these functions and their applications in problem solving will be studied. | |
| STUDENT LEARNING GOALS | |
| Content-Specific Powered Standards Algebraic Reasoning: Patterns And Functions ➤ Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies | <u>Interdisciplinary Standards (Technology Integration)</u> Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources. Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests. Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information. Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions. Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management. |
| Key Vocabulary ➤ Quadratic function, parabola, vertex, axis of symmetry, standard form, $ax^2 + bx + c$ form, maximum / minimum values, distance formula, midpoint formula, standard form of equation of a circle, general form of equation of circle | |
| Enduring Understandings: Students should... 1.16. Understand and describe patterns and functional relationships a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions. 1.17 Represent and analyze quantitative relationships in a variety of ways a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations. 1.18 Use operations, properties, and algebraic symbols to determine equivalence and solve problems d. Solve problems using a variety of algebraic methods. 4.1 Collect, organize and display data using appropriate statistical and graphical methods. a. Create the appropriate visual or graphical representation of real data. | Essential Questions ➤ What is the graph of a quadratic function and how can it be used to solve problems? ➤ How can the equation of a circle be found? ➤ How can you distinguish between the equation of a parabola and the equation of a circle? |

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| 21st Century Skills and Expectations Rubric: Critical Skills 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. | | 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. |
| Learning Objectives: Students will: ➤ Identify quadratic functions in either standard or $ax^2 + bx + c$ form ➤ Recognize and calculate characteristics of parabolas ➤ Graph parabolas ➤ Determine a quadratic function's minimum or maximum value ➤ Solve problems involving a quadratic function's min or max ➤ Find the distance between two points ➤ Find the midpoint of a line segment ➤ Write the standard form of a circle's equation ➤ Find the center and radius of a circle from either form of the equation or a graph. ➤ Graph circles from either form of the equation ➤ Convert the general form of a circle to the standard form | | |
| ASSESSMENT PLAN | | |
| Summative Assessment(s)/Performance Based Assessments including 21st Century Learning ➤ Chapter assessment ➤ Unit assessment | Formative and Diagnostic Assessment(s) ➤ Diagnostic Assessment to determine previous knowledge of parabolas and distance / midpoint formulas. ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review | |
| LEARNING PLAN COMPONENTS | | |
| ○ <u>Algebra & Trigonometry</u> , Blitzer, Sections 3.1 and 2.8 ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials | | |

Stratford Public Schools
College Algebra Unit #7

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| Unit Name: Exponential and Logarithmic Functions | Est. # of Weeks: If time permits |
| <p>Synopsis: This unit is an introduction to exponential and logarithmic functions. The students will learn how these two types of functions are related, how they may be evaluated and graphed, how they may be used to solve problems, and some common applications.</p> | |

STUDENT LEARNING GOALS

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| <p>Content-Specific Powered Standards Algebraic Reasoning: Patterns And Functions</p> <ul style="list-style-type: none"> ➤ Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies | <p><u>Interdisciplinary Standards (Technology Integration)</u></p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr style="border-top: 1px dashed black;"/> <p>Key Vocabulary</p> <ul style="list-style-type: none"> ➤ Exponential function, base of exponential, compound interest, logarithmic functions, base of log, common log, natural log, change of base property |
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| <p>Enduring Understandings: Students should...</p> <p>1.19. Understand and describe patterns and functional relationships</p> <p>a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.</p> <p>1.20 Represent and analyze quantitative relationships in a variety of ways</p> <p>a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.</p> <p>1.21 Use operations, properties, and algebraic symbols to determine equivalence and solve problems</p> <p>e. Solve problems using a variety of algebraic methods.</p> <p>4.1 Collect, organize and display data using appropriate statistical and graphical methods.</p> <p>a. Create the appropriate visual or graphical representation of real data.</p> | <p>Essential Questions</p> <ul style="list-style-type: none"> ➤ How can exponential functions be used to solve real-life problems? ➤ How are exponential functions and logarithmic functions related? ➤ How can logarithmic functions be used to solve real-life problems? ➤ How can you convert between these two types of functions? |
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| <p>21st Century Skills and Expectations Rubric: Critical Skills</p> <ol style="list-style-type: none"> 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. | <ol style="list-style-type: none"> 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. |
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| <p>Learning Objectives: Students will:</p> <ul style="list-style-type: none"> ➤ Evaluate exponential functions ➤ Graph exponential functions ➤ Evaluate functions with base e ➤ Use compound interest formulas ➤ Convert between exponential and logarithmic forms ➤ Evaluate logarithmic functions ➤ Graph logarithmic functions ➤ Find domain of log functions ➤ Use common and natural logs ➤ Use the change of base property to evaluate logs ➤ Solve applied problems involving exponential and log equations |
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ASSESSMENT PLAN

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| <p>Summative Assessment(s)/Performance Based Assessments including 21st Century Learning</p> <ul style="list-style-type: none"> ➤ Chapter assessment ➤ PBA #2 The National Debt | <p>Formative and Diagnostic Assessment(s)</p> <ul style="list-style-type: none"> ➤ Diagnostic Assessment to determine previous knowledge of exponents and their properties ➤ Verbal assessments ➤ Informal assessments of class work ➤ Weekly quiz ➤ Homework review |
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LEARNING PLAN COMPONENTS

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| <ul style="list-style-type: none"> ○ <u>Algebra & Trigonometry</u>, Blitzer, Sections 4.1 – 4.4 ○ Supplement with section P2 to reinforce properties of exponents ○ TI-83 Graphing Calculator ○ Supplementary SAT Preparatory Materials |
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