

Math Planned Course: Honors Pre-Calculus Grades 10 – 12

Unit: Functions and Graphs

Content curriculum Standard: **Use a graphing utility to analyze and predict graphs of functions, and combinations of functions for the use of real world application.**

State Curriculum Standards:

2.2.11F Demonstrate skills for using computer spreadsheet and scientific graphing calculators.

2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.

2.7.11E Solve problems involving independent simple and compound events.

2.8.11A Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.

2.8.11E Use equations to represent curves such as lines.

2.8.11J Demonstrate the connection between algebraic equations and the geometry of relations in the coordinate plane.

2.8.11K Select, justify, and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y- intercepts, graphing by transformations, and the use of a graphing calculator.

2.8.11L Write the equations of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.

2.8.11O Determine the domain and range of a relation, given a graph or set of ordered pairs.

2.8.11Q Represent functional relationships in tables, charts, and graphs.

2.8.11T Analyze and categorize functions by their characteristics.

2.8.11M Given a set of data points, write an equation for a line of best fit.

2.8.11R Analyze and categorize functions by their characteristics.

ISTE Standards:

1. Creativity and Innovation

3. Research and Information Fluency

4. Critical Thinking, Problem Solving, and Decision Making

6. Technology Operations and Concepts

PSSA Anchors:

M11.A.1.1.1 Find the square root of an integer using either a calculator or estimation (integer may or may not be a perfect square – answer may be a range of values)

M11.B.2.2.3 Estimate area, perimeter or circumference of an irregular figure

M11.B.2.2.4 Find the measurement of a missing length given the perimeter, circumference, area, or volume.

M11.C.3.1.2 Relate slope to perpendicularity and/or parallelism.

M11.D.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.

M11.D.1.1.2 Determine if a relation is a function given a set of points or a graph.

M11.D.1.1.3 Identify the domain, range or inverse of a relation.

M11.D.2.1.1 Solve compound inequalities and/or graph their solution sets on a number line.

M11.D.2.1.2 Identify or graph functions, linear equations or linear inequalities on a coordinate plane.

M11.D.2.1.3 Write, solve and/or apply a linear equation.

M11.D.2.2.1 Add, subtract, and/or multiply polynomial expressions

M11.D.3.1.1 Identify, describe, and/or use constant or varying rates of change.

M11.D.4.1.1 Match the graph of a given function to its table or equation.

M11.E.1.1.1 Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots, scatter plots, line/double line, bar/double bar and circle graphs.

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M11.E.1.1.2 Answer questions based on displayed data .

M11.E.4.2.1 Draw, find and/or write an equation for a line of best fit for a scatter plot.

M11.E.4.2.2 Make predictions using the equations or graphs of best-fit lines of scatter plots.

M11.A.2.2.1 Simplify/evaluate expressions involving positive and negative exponents, roots and/or absolute value.

Pacing (number of days): **12 – 16 days**

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Course Content	Student Performances	Resources	Assessments
<p>A. Graphs and Graphing Utility</p> <p>B. Lines in the Plane</p> <p>C. Linear Models and Scatter Plots</p> <p>D. Functions and Their Graph</p> <ul style="list-style-type: none"> • Radical equation • Absolute value • Equations/inequalities <p>E. Properties of Graphs</p> <p>F. Shifting, Reflecting, and Stretching Functions</p> <p>G. Combination and Composition of Functions</p> <p>H. Inverse Functions</p> <p>I. Spiral Review</p> <ul style="list-style-type: none"> • Algebraic concept anchors Not covered in the curriculum 	<ul style="list-style-type: none"> • Determining the viewing window necessary that shows all features of the graph • Writing equations of lines given information and using the graphing calculator to check if the graph of the equation matches the information • Graph the function and name the domain and range • Determining the viewing window necessary that shows all features of the graph • Guess which operation created the following new function from two other given functions • Create new functions by: <ul style="list-style-type: none"> • Adding • Subtracting • Multiplying • Dividing • Composition • Inverses • Find the domain and range of new function • Create new functions by finding the composition of two functions then find the domain and range of new function • Check inverses graphically and algebraically • Find the inverse of an equation if it exists 	<ul style="list-style-type: none"> • <u>Pre-Calculus with Limits: A Graphing Approach</u> (Houghton Mifflin, 2008) • Texas Instruments Graphing Calculator (84) • <u>Exploring Algebra, Pre-Calculus and Statistics With the TI-83 Graphing Calculator</u> (Venture Publishing, 1997) <p>Remediation</p> <ul style="list-style-type: none"> • Peer tutoring • After school tutoring • Computer aided tutorials • Supplemental worksheets <p>Enrichment</p> <ul style="list-style-type: none"> • Creating functions by combining and composing functions • Use the graphing calculator to graph the combined and composed function and analyze the relationship • Internet research <ul style="list-style-type: none"> • Student projects/student presentations 	<ul style="list-style-type: none"> • Question and answer session on the prerequisite content • Checklist of the prerequisite content • Homework on all content taught • Self-evaluation • Teacher-generated activities on each course content • Teacher-generated quiz assessing content • Problem-solving experiences relating to text • Unit test consisting of: <ul style="list-style-type: none"> • Short answer part • Problem solving • Real world application • Real world application project • Students working in groups write a real world problem pertaining to the standard and solve it using methods learned

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Unit: **Polynomial and Rational Functions**

Content Standard: **Solve quadratic, polynomial, and rational equations/inequalities graphically and algebraically for use in real world application.**

State Curriculum Standards:

- 2.2.11A Develop and use computation concepts, operations, and procedures on real numbers in problem-solving situations**
- 2.2.11C Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.**
- 2.2.11F Demonstrate skills for using computer spreadsheets and scientific graphing calculators.**
- 2.5.11A Select and use appropriate mathematical concepts and techniques from different area of mathematics and apply them to solving non-routine and multi-step problems.**
- 2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing, and other types of mathematical representations, predictions, concepts, procedures, generalizations, ideas and results.**
- 2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.**
- 2.8.11D Formulate expressions, equations, and inequalities to model routine and non-routine problem situations.**
- 2.8.11N Solve linear and quadratic both symbolically and graphically.**
- 2.8.11J Demonstrate the connection between algebraic equations and inequalities and the geometry of relations in the coordinate plane.**
- 2.9.11G Solve problems using analytic geometry.**

ISTE Standards:

- 1. Creativity and Innovation**
- 3. Research and Information Fluency**
- 4. Critical Thinking, Problem Solving, and Decision Making**
- 6. Technology Operations and Concepts**

PSSA Anchors:

- M11.A.1.1.1 Find the square root of an integer using either a calculator or estimation (integer may or may not be a perfect square)**
- M11.A.1.1.2 Express numbers and/or simplify expressions using scientific notation**
- M11.A.1.1.3 Simplify square roots (e.g., the square root of 24)**
- M11.A.1.2.1 Find the Greatest Common Factor (GCF) for sets of monomials and/or factor polynomial expressions using the greatest common monomial factor**
- M11.A.1.3.1 Locate/identify irrational numbers at the approximate location on a number line.**
- M11.A.1.3.2 Compare and/or order any real numbers (rational and irrational may be mixed**
- M11.B.2.3.1 Describe how a change in the linear dimension of a figure affects its perimeter, circumference, area or volume**
- M11.D.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.**
- M11.D.1.1.2 Determine if a relation is a function given a set of points or a graph.**
- M11.D.1.1.3 Identify the domain, range or inverse of a relation.**
- M11.D.4.1.1 Match the graph of a given function to its table or equation.**
- M11.E.1.1.1 Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots, scatter plots, line/double line, bar/double bar and circle graphs.**
- M11.E.1.1.2 Answer questions based on displayed data .**

Pacing (number of days):

12 – 16 days

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Course Content	Student Performances	Resources	Assessments
<p>A. Quadratic Functions</p> <p>B. Polynomial Functions</p> <p>C. Intercepts, Zeros, and Solutions of Functions</p> <p>D. Complex Numbers</p> <p>E. Rational Functions</p> <p>F. Quadratic Models</p> <p>G. Application Word Problems</p> <p>H. Spiral Review</p> <ul style="list-style-type: none"> • Data analysis and probability anchors Not covered in the curriculum 	<ul style="list-style-type: none"> • Solving quadratic equations graphically and algebraically • Solving radical and rational equations and rational inequalities • Finding characteristics of a quadratic graph • Writing equations of parabolas • Determine the shape of higher order polynomial functions • Solving higher degree polynomial algebraically and graphically • Solving word problems that are real world applications • Determine the asymptotes of rational functions • Analyze the graph of rational functions 	<ul style="list-style-type: none"> • <u>Pre-Calculus with Limits: A Graphing Approach</u> (Houghton Mifflin, 2008) • Texas Instruments Graphing Calculator (84) • <u>Exploring Algebra, Pre-Calculus and Statistics With the TI-83 Graphing Calculator</u> (Venture Publishing, 1997) • Supplemental worksheets • Student projects/student presentations <p><u>Remediation</u></p> <ul style="list-style-type: none"> • Peer tutoring • After school tutoring • Computer-aided tutorials • Supplemental worksheets <p><u>Enrichment</u></p> <ul style="list-style-type: none"> • Create a real-world application problem relevant to this unit • Internet research • Student projects/student presentations 	<ul style="list-style-type: none"> • Question and answer session on the prerequisite content • Checklist with prerequisite content • Homework on all content taught • Self-evaluation • Teacher-generated quiz assessing content • Problem-solving experiences relating to content • Daily content-related activities • Teacher generated Unit test consisting of: <ul style="list-style-type: none"> • Short answer • Problem solving • Real world application • Real world application project • Student activities relating to the content • Jigsaw unit review • Project on Units 1, 2, and 3 that consist of only real world application

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Unit: **Exponential and Logarithmic Functions**

Content Standard: **Solving exponential and logarithmic equations algebraically and graphically for the use of real world application.**

State Curriculum Standards:

- 2.1.11 Use operations such as opposite, reciprocal, absolute value, raising to a power, finding roots and logarithms.**
- 2.211C Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.**
- 2.211F Demonstrate skills for using computer spreadsheet and scientific and graphing calculator.**
- 2.4.11E Demonstrate mathematical solutions to problems in the physical sciences.**
- 2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.**
- 2.8.11N Solve exponential equations both symbolically and graphically.**
- 2.8.11S Analyze properties and relationships of functions (exponential and logarithmic).**
- 2.8.11T Analyze and categorize functions by their characteristics.**
- 2.6.11C Graph and interpret rates of growth/decay.**
- 2.6.11C Determine the regression equation of best fit (exponential or logarithmic).**
- 2.6.11D Make predictions using interpolations, extrapolation, regression, and estimation, and using technology.**

ISTE Standards:

- 1. Creativity and Innovation**
- 3. Research and Information Fluency**
- 4. Critical Thinking, Problem Solving, and Decision Making**
- 6. Technology Operations and Concepts**

PSSA Anchor:

- M11.A.1.3.1 Locate/identify irrational numbers at the approximate location on a number line.**
- M11.A.2.1.1 Solve problems using operations with rational numbers including rates and percents**
- M11.A.2.2.1 Simplify/evaluate expressions involving positive and negative exponents, roots and/or absolute value.**
- M11.A.2.2.2 Simplify/evaluate expressions involving multiplying with exponents, powers of powers, and powers of products.**
- M11.D.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.**
- M11.D.1.1.2 Determine if a relation is a function given a set of points or a graph.**
- M11.D.1.1.3 Identify the domain, range or inverse of a relation.**
- M11.D.4.1.1 Match the graph of a given function to its table or equation.**
- M11.E.1.1.1 Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots, scatter plots, line/double line, bar/double bar and circle graphs.**
- M11.E.1.1.2 Answer questions based on displayed data**

Pacing (number of days): **10 – 14 days**

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Course Content	Student Performance	Resources	Assessments
<p>A. Exponential Functions and Their Graphs</p> <p>B. Growth/Decay (Real World Application)</p> <p>C. Compounded Interest (Real World Application)</p> <p>D. Properties of Logarithms</p> <p>E. Exponential and Logarithmic Equations</p> <p>F. Application of Exponential and Logarithmic Functions</p> <p>G. Exponential and Logarithmic Models</p> <p>H. Spiral Review</p> <ul style="list-style-type: none"> • Numbers and operations anchors Not covered in the curriculum 	<ul style="list-style-type: none"> • Simplify and solve exponential equations algebraically and graphically • Simplify and solve logarithmic equations algebraically and graphically • Investment for retirement • Solving Growth/decay problems • Using the graphing calculator to enter the statistical data • Determine whether an exponential or a logarithmic equation will give the best fit equation 	<ul style="list-style-type: none"> • Pre-Calculus with Limits: A Graphing Approach (Houghton Mifflin, 2008) • Texas Instruments Graphing Calculator (84) • Macintosh computer • <u>Exploring Algebra, Pre-Calculus and Statistics With the TI-83 Graphing Calculator</u> (Venture Publishing, 1997) • <u>Problem Solving With The TI-83</u> (Venture Publishing, 1997) • <u>Exploring Advanced Algebra with The TI-83</u> (Brendan Kelly Publishing Inc., 1998) • <u>Exploring Functions With the TI-83</u> (Brendan Kelly Publishing Inc., 1998) <p><u>Remediation</u></p> <ul style="list-style-type: none"> • Peer tutoring • After school tutoring • Computer aided tutorials • Supplemental worksheets <p><u>Enrichment</u></p> <ul style="list-style-type: none"> • Create a real-world application problem relevant to this unit • Laboratory experiment on decay 	<ul style="list-style-type: none"> • Question and answer on pre-requisite material • Teacher-generated assessments that will include application problems as well as computation problems • Teacher-generated quizzes • Teacher-generated test consisting of short answer and application problems • Student activities relating to the content • Student homework • Fitting a model to data project • Retirement project • A graphical approach to compound interest project

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		<ul style="list-style-type: none">• Internet research• Student projects/presentations	
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Unit: Trigonometric Functions

Content Standard: **Use Trigonometric functions to model and solve real-life problems.**

State Curriculum Standards:

2.3.11B Measure and Compare angles in degree and radians.

2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.

2.8.11O Determine the domain and range of a relation, given a graph or set of ordered pairs.

2.8.11Q Represent functional relationships in tables, charts, and graphs.

2.8.11S Analyze properties and relationships of functions (trigonometric).

2.8.11T Analyze and categorize functions by their characteristics.

2.9.11D Identify corresponding parts in congruent triangles to solve problems.

2.10.11A Use graphing calculators to display to display periodic and circular functions, describe properties of the graph.

2.10.11B Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean theorem.

ISTE Standards:

1. Creativity and Innovation

3. Research and Information Fluency

4. Critical Thinking, Problem Solving, and Decision Making

6. Technology Operations and Concepts

PSSA Anchor:

M11.A.1.3.1 Locate/identify irrational numbers at the approximate location on a number line.

M11.A.2.1.3 Identify and/or use proportional relationships in problem solving settings

M11.B.2.1.1 Measure and/or compare angles in degrees

M11.C.1.1.1 Identify and/or use the properties of a radius, diameter, chord, tangent, and/or secant of a circle.

M11.C.1.1.2 Recognize or use the properties of arcs, semicircles, inscribed angles and/or central angles

M11.C.1.2.1 Identify and/or use properties of triangles. (median, altitudes, bisectors, side/angle relationships)

M11.C.1.2.2 Identify and/or use properties of quadrilaterals. (parallel sides, diagonals, bisectors, congruent sides/angles, supplementary angles)

M11.C.1.2.3 Identify and/or use properties of isosceles and equilateral triangles.

M11.C.1.4.1 Find the measure of a side of a right triangle using the Pythagorean Theorem

M11.D.1.1.3 Identify the domain, range or inverse of a relation.

M11.D.4.1.1 Match the graph of a given function to its table or equation.

Pacing (number of days): **18 – 20 days**

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Course Content	Student Performances	Resources	Assessments
<p>A. Radian and Degree Measures</p> <p>B. Trigonometric Functions: The Unit Circle</p> <p>C. Right Triangles Trigonometry</p> <p>D. Trigonometry Functions of any Angle</p> <p>E. Graphs of Sine and Cosine Functions</p> <p>F. Graphs of Secant and Cosecant Functions</p> <p>G. Graphs of Tangent and Cotangent Functions</p> <p>H. Inverse Trigonometric Functions</p> <p>I. Applications and Models</p> <p>J. Spiral Review</p> <ul style="list-style-type: none"> Measurement anchors Not covered in the curriculum 	<ul style="list-style-type: none"> Find the measure of an angle both in radian and degree measure Name co-terminal angles of a given angle Solve right triangles Solve real world problems using right triangles Graph sine, cosine, secant, cosecant, tangent and cotangent functions Use trigonometric graphs to solve real world problems Analyze trigonometric graphs Solving real world problems using trigonometry 	<ul style="list-style-type: none"> <u>Pre-Calculus with Limits: A Graphing Approach</u> (Houghton Mifflin, 2008) Texas Instruments Graphing Calculator (84) Macintosh computer <u>Exploring Algebra, Pre-Calculus and Statistics With the TI-83 Graphing Calculator</u> (Venture Publishing, 1997) <u>Problem Solving With The TI-83</u> (Venture Publishing, 1997) <u>Exploring Advanced Algebra with The TI-83</u> (Brendan Kelly Publishing Inc., 1998) <u>Exploring Functions With the TI-83</u> (Brendan Kelly Publishing Inc., 1998) <p><u>Remediation</u></p> <ul style="list-style-type: none"> Peer tutoring After school tutoring Computer-aided tutorials Supplemental worksheets <p><u>Enrichment</u></p> <ul style="list-style-type: none"> Create a real world application problem relevant to this unit 	<ul style="list-style-type: none"> Question and answer on pre-requisite material Teacher-generated assessments that will include application problems as well as computation problems Teacher-generated quizzes Teacher-generated test consisting of short answer and application problems Student activities relating to the content Student homework Career-related trigonometric application Trigonometric art graphing project

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		<ul style="list-style-type: none">• Internet research• Student projects/student presentations	
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Unit: **Analytic Trigonometry and Additional Topics**

Content Standard: **Use trigonometric identities and formulas to solve trigonometric equations for real-world application.**

State Curriculum Standards:

2.4.11E Demonstrate mathematical solutions to problem in the physical sciences.

2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing, and other types of mathematical representations, predictions, concepts, procedures, generalizations, ideas, and results.

2.5.11C Present mathematical procedures and results clearly, systematically, succinctly, and correctly.

2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.

2.9.11E Solve problems involving inscribed and circumscribed polygons.

ISTE Standards:

1. Creativity and Innovation

3. Research and Information Fluency

4. Critical Thinking, Problem Solving, and Decision Making

6. Technology Operations and Concepts

PSSA Anchors:

M11.A.1.1.3 Simplify square roots (e.g., the square root of 24)

M11.A.1.2.1 Find the Greatest Common Factor (GCF) for sets of monomials and/or factor polynomial expressions using the greatest common monomial factor.

M11.A.2.1.2 Solve problems using direct and inverse proportions.

M11.A.2.1.3 Identify and/or use proportional relationships in problem solving settings

M11.B.2.1.1 Measure and/or compare angles in degrees.

M11.D.2.2.2 Factor algebraic expressions, including difference of squares and trinomials.

M11.D.2.2.3 Simplify algebraic fractions

Pacing (number of days): **10 – 14 days**

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Course Content	Student Performance	Resources	Assessments
<p>A. Fundamental Identities</p> <ul style="list-style-type: none"> • Reciprocal • Quotient • Pythagorean • Co-Function • Even/odd <p>B. Verifying Trigonometric Identities</p> <p>C. Trigonometric Equations</p> <p>D. Sum and Difference Formulas</p> <p>E. Multiple-Angle Formula</p> <p>F. Law of Sines</p> <ul style="list-style-type: none"> • Area of an oblique triangle <p>G. Law of Cosines</p> <ul style="list-style-type: none"> • Heron's Area formula <p>H. Spiral Review</p> <ul style="list-style-type: none"> • Geometry anchors Not covered in the curriculum 	<ul style="list-style-type: none"> • Use fundamental trigonometric identities to evaluate trigonometric functions and simplify trigonometric expressions • Verify trigonometric identities • Use standard algebraic techniques and inverse trigonometric functions to solve trigonometric equations • Rewrite and evaluate trigonometric functions using formulas: <ul style="list-style-type: none"> • Sum and difference • Multiple-angle • Use Law of Sines and Law of Cosines to solve oblique triangles • Find areas of oblique triangles 	<ul style="list-style-type: none"> • <u>Pre-Calculus with Limits: A Graphing Approach</u> (Houghton Mifflin, 2008) • <u>TI 84 graphing calculator</u> • <u>Exploring Functions With the TI-83</u> (Brendan Kelly Publishing Inc., 1998) • <u>Exploring Functions With the TI-83</u> (Brendan Kelly Publishing Inc., 1998) <p><u>Remediation</u></p> <ul style="list-style-type: none"> • Peer tutoring • After school tutoring • Computer aided tutorials • Supplemental worksheets <p><u>Enrichment</u></p> <ul style="list-style-type: none"> • Create a real world application problem relevant to this unit • Use trigonometry to find lengths of areas that cannot be measured • Internet research • Student projects/student 	<ul style="list-style-type: none"> • Questions and answers on pre-requisite material • Teacher-generated assessments that will include application problems as well as computation problems • Teacher-generated quizzes • Teacher-generated tests consisting of short answer, computation, and application problems • Student activities relating to the content • Student homework • Career related trigonometric application • Projectile motion project • Student activities relating to the content • Student homework

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		presentations	
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Unit: **Linear Models and Systems of Equations**

Content Standard: **Solve systems of equations and inequalities for real world applications.**

State Curriculum Standards:

- 2.8.11D Formulate expressions, equations, inequalities, systems of equations, system of inequalities, and matrices to model routine and non-routine problem situation.**
- 2.8.11F Identify whether systems of equations and inequalities are consistent or inconsistent.**
- 2.8.11G Analyze and explain system of equation, systems of inequalities and matrices.**
- 2.8.11H Select and use an appropriate strategy to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software.**
- 2.8.11I Use matrices to organize and manipulate data, including matrix addition, subtraction, and multiplication.**
- 2.9.11G Solve problems using analytic geometry.**

ISTE Standards:

- 1. Creativity and Innovation**
- 3. Research and Information Fluency**
- 4. Critical Thinking, Problem Solving, and Decision Making**
- 6. Technology Operations and Concepts**

PSSA Anchors:

- M11.D.2.1.1 Solve compound inequalities and/or graph their solution sets on a number line.**
- M11.D.2.1.2 Identify or graph functions, linear equations or linear inequalities on a coordinate plane.**
- M11.D.2.1.3 Write, solve and/or apply a linear equation.**
- M11.D.2.1.4 Write and/or solve systems of equations using graphing, substitution and/or elimination.**

Pacing (number of days): **4 – 6 days**

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Course Content	Student Performance	Resources	Assessments
<p>A. Systems of Equations</p> <ul style="list-style-type: none"> • Linear • Quadratic <p>B. Linear Programming</p> <p>C. Matrices</p> <p>D. Determinant</p> <p>E. Matrix Equations</p> <p>F. Real World Applications</p>	<ul style="list-style-type: none"> • Solve a system of two equations, two unknowns: <ul style="list-style-type: none"> • Algebraically • Graphically • Linear programming project • Solving real world problems using system of equations <ul style="list-style-type: none"> • Find sums, products and determinants of matrices • Solve systems of equation using a graphing • Solve systems of equation using matrix equation 	<ul style="list-style-type: none"> • <u>Pre-Calculus with Limits: A Graphing Approach</u> (Houghton Mifflin, 2008) • Texas Instruments Graphing Calculator (84) • <u>Exploring Algebra, Pre-Calculus and Statistics With the TI-83 Graphing Calculator</u> (Venture Publishing, 1997) • <u>Problem Solving With The TI-83</u> (Venture Publishing, 1997) • <u>Exploring Advanced Algebra with The TI-83</u> (Brendan Kelly Publishing Inc., 1998) • <u>Exploring Functions With the TI-83</u> (Brendan Kelly Publishing Inc., 1998) 	<ul style="list-style-type: none"> • Teacher-generated assessments that will include application problems as well as computation problems • Student activities relating to the content • Solving system of equation project • Application project <p><u>Remediation</u></p> <ul style="list-style-type: none"> • Peer tutoring • After school tutoring • Computer aided tutorials • Supplemental worksheets <p><u>Enrichment</u></p> <ul style="list-style-type: none"> • Create a real world application problem relevant to this unit • Internet research • Student projects/student presentations

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Unit: **Conic Equations**

Content Standard: **Define, graph, and identify characteristics of all four conic and polar equations.**

State Curriculum Standard:

2.8.11E Use equations to represent curves such as lines, circles, ellipses, parabola, and hyperbolas.

ISTE Standards:

- 1. Creativity and Innovation**
- 3. Research and Information Fluency**
- 4. Critical Thinking, Problem Solving, and Decision Making**
- 6. Technology Operations and Concepts**

PSSA Anchor:

M11.D.4.1.1 Match the graph of a given function to its table or equation.

M11.D.2.2.1 Add, subtract, and/or multiply polynomial expressions.

M11.D.2.2.2 Factor algebraic expressions, including difference of squares and trinomials.

M11.D.2.2.3 Simplify algebraic fractions.

Pacing (number of days): **4 – 6 days**

Math Planned Course: Honors Pre-Calculus Grades 10 – 12

Course Content	Student Performance	Resources	Assessments
<p>A. Circle Equation</p> <p>B. Parabola Equation</p> <p>C. Ellipse Equation</p> <p>D. Hyperbola Equation</p> <p>E. Systems of Quadratic Equations</p>	<ul style="list-style-type: none"> • Derive and apply the circle equation • Derive and apply the parabola equation • Derive and apply the ellipse equation • Derive and apply the hyperbola equation 	<ul style="list-style-type: none"> • <u>Pre-Calculus with Limits: A Graphing Approach</u> (Houghton Mifflin, 2008) • Texas Instruments Graphing Calculator (84) • Macintosh computer • <u>Exploring Algebra, Pre-Calculus and Statistics With the TI-83 Graphing Calculator</u> (Venture Publishing, 1997) • <u>Exploring Advanced Algebra with The TI-83</u> (Brendan Kelly Publishing Inc., 1998) 	<ul style="list-style-type: none"> • Student presentations • Teacher observation • Teacher-generated activities <p><u>Remediation</u></p> <ul style="list-style-type: none"> • Peer tutoring • After school tutoring • Computer aided tutorials • Supplemental worksheets <p><u>Enrichment</u></p> <ul style="list-style-type: none"> • Create a real world application problem relevant to this unit • Internet research • Student projects/student presentations