



Pine Grove Area

SCHOOL DISTRICT

MATHEMATICS

TRIGONOMETRY/PRE-CALCULUS

November 19, 2009

I. PHILOSOPHY

The Trigonometry/Pre-Calculus course of the Pine Grove Area School District has been structured to systematically introduce and reinforce the language of mathematics along with the use of fundamental operations, measurement, probability, statistics, algebra, and geometry. These skills will be practiced using many “real-world” application problems, including ones which will provide opportunities for “hands-on” learning. The course will allow for the accommodation of many learning styles, motivational levels, and academic abilities.

II. CORE CONCEPTS

1. **Trigonometric Functions and Graphs**- Identify, graph, define properties of, and apply in problem-solving situations.
2. **Trigonometric Equations & Identities**- Define various trigonometric identities, evaluate expressions involving identities, and solve trigonometric equations.
3. **Right Triangle Trigonometry**- Identify and apply definitions of various trigonometric functions in problem-solving situations relating to right triangles.
4. **Exponential Functions**- Define properties of exponential functions and apply in problem-solving situations.
5. **Logarithmic Functions**- Define properties of logarithmic functions and apply in problem-solving situations.
6. **Conic Sections**- Identify, graph, define properties of, and apply in problem-solving situations.
7. **Sequences & Series**- Define rules/properties of sequences/series (both arithmetic and geometric) and apply in problem-solving situations.

III. COURSE OF STUDY

- A. Course Name: Trigonometry/Pre-Calculus
- B. Grade Level: 10-12
- C. Length of Course: Full Year
- D. Academic Level: College Preparatory
- E. Credits: 1.08
- F. Prerequisites: Algebra I, II, Geometry
- G. Course Description: The first half of this course will deal with the six trigonometric functions, their definitions, and their graphs. Students will solve problems involving right and oblique triangles, as well as transform and verify trigonometric identities. The solving of trigonometric equations is also introduced, as well as finding the areas of triangles, circular segments, and sectors. The second half of the course will require students to solve problems relating to conic sections, exponential and logarithmic functions, and sequence and series.

IV. CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 1: Trigonometric Functions and Graphs

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply them in solving problems related to various trigonometric functions.

CURRICULUM STANDARD:			
PA State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.2.11F</p> <ul style="list-style-type: none"> Demonstrate skills for using computer spreadsheets and scientific and graphing calculators. 	<p>Teacher will guide students to:</p> <p>Graph and recognize the graphs of each of the various functions by using technology.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> student use of graphing calculators student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.3.11B</p> <ul style="list-style-type: none"> Measure and compare angles in degrees and radians. 	<p>Teacher will guide students to:</p> <p>Recognize characteristics associated with each of the various angle measurements.</p> <p>Convert angle measurements from degrees to radians and vice versa.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> student group work student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 1: Trigonometric Functions and Graphs

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply them in solving problems related to various trigonometric functions.

CURRICULUM STANDARD:

PA State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.5.11B</p> <ul style="list-style-type: none"> ▪ 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. 	<p>Teacher will guide students to:</p> <p>Recognize characteristics associated with each of the various functions.</p> <p>Apply the characteristics associated with each of the various functions in helping to solve problems relating to them.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.9.11F</p> <p>Use the properties of angles, arcs, chords, tangents, and secants to solve problems involving circles.</p>	<p>Teacher will guide students to:</p> <p>Recognize characteristics associated with each of the various functions.</p> <p>Apply the characteristics associated with each of the various functions in helping to solve problems relating to them.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 1: Trigonometric Functions and Graphs

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply them in solving problems related to various trigonometric functions.

CURRICULUM STANDARD:

PA State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.10.11A</p> <ul style="list-style-type: none">Use graphing calculators to display periodic and circular functions; describe properties of the graphs.	<p>Teacher will guide students to:</p> <p>Recognize characteristics associated with each of the various functions.</p> <p>Apply the characteristics associated with each of the various functions in helping to solve problems relating to them.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">student use of graphing calculatorsstudent board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 2: Trigonometric Equations & Identities

MAJOR OBJECTIVE: Define various trigonometric identities, evaluate expressions involving identities, and solve trigonometric equations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.4.11A</p> <ul style="list-style-type: none"> ▪ Use direct proofs, indirect proofs or proof by contradiction to validate conjectures. 	<p>Teacher will guide students to:</p> <p>Recognize various trigonometric identities and evaluate expressions involving them.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student group work - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.1.11A</p> <ul style="list-style-type: none"> ▪ Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms). 	<p>Teacher will guide students to:</p> <p>Solve trigonometric equations.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student group work - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 2: Trigonometric Equations & Identities

MAJOR OBJECTIVE: Define various trigonometric identities, evaluate expressions involving identities, and solve trigonometric equations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.2.11A</p> <ul style="list-style-type: none">Develop and use computation concepts, operations and procedures with real numbers in problem solving situations.	<p>Teacher will guide students to:</p> <p>Solve trigonometric equations.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student group work- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 3: Right Triangle Trigonometry

MAJOR OBJECTIVE: Identify and apply definitions of various trigonometric functions in problem-solving situations relating to right triangles.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.5.11B</p> <ul style="list-style-type: none"> ▪ 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. 	<p>Teacher will guide students to:</p> <p>Recognize definitions associated with the various trigonometric functions and apply them in solving problems relating to right triangles.</p> <p>Recognize the Law of Sines and the Law of Cosines and apply them in solving problems relating to non-right triangles.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student group work - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.11.11B</p> <ul style="list-style-type: none"> ▪ Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem. 	<p>Teacher will guide students to:</p> <p>Recognize definitions associated with the various trigonometric functions and apply them in solving problems relating to right triangles.</p> <p>Recognize the Law of Sines and the Law of Cosines and apply them in solving problems relating to non-right triangles.</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student group work - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.1.11A</p> <ul style="list-style-type: none"> ▪ Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms). 	<p>Teacher will guide students to:</p> <p>Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.2.11A</p> <p>Develop and use computation concepts, operations and procedures with real numbers in problem solving situations.</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.2.11C Construct and apply mathematical models, including lines and curves of best fit, to estimated values of related quantities.</p>	<p>Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.2.11F Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.</p>	<p>Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.4.11A Use direct proofs, indirect proofs or proof by contradiction to validate conjectures.	Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.5.11B 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.	Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.6.11B Use appropriate technology to organize and analyze data taken from the local community.</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student use of graphing calculators- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.6.11C Determine the regression equation of best fit (e.g., linear, quadratic, exponential).</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student use of graphing calculators- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11N Solve linear, quadratic, and exponential equations both symbolically and graphically.	Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.8.11Q Represent functional relationships in tables, charts, and graphs.	Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11R Create and interpret functional models.	Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.8.11S Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).	Teacher will guide students to: Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 4: Exponential Functions

MAJOR OBJECTIVE: Define properties of exponential functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.8.11T</p> <ul style="list-style-type: none"> ▪ Analyze and categorize functions by their characteristics. 	<p>Teacher will guide students to:</p> <p>Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.11.11C</p> <p>Graph and interpret rates of growth/decay.</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of exponential functions and apply them to various problem-solving situations (graphing, solving exponential equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 5: Logarithmic Functions

MAJOR OBJECTIVE: Define properties of logarithmic functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.1.11A</p> <ul style="list-style-type: none"> ▪ Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms). 	<p>Teacher will guide students to:</p> <p>Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.2.11A</p> <p>Develop and use computation concepts, operations and procedures with real numbers in problem solving situations.</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none"> - student use of graphing calculators - student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 5: Logarithmic Functions

MAJOR OBJECTIVE: Define properties of logarithmic functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.2.11F Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.	Teacher will guide students to: Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.4.11A Use direct proofs, indirect proofs or proof by contradiction to validate conjectures.	Teacher will guide students to: Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 5: Logarithmic Functions

MAJOR OBJECTIVE: Define properties of logarithmic functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.5.11B 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.	Teacher will guide students to: Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.8.11Q Represent functional relationships in tables, charts, and graphs.	Teacher will guide students to: Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 5: Logarithmic Functions

MAJOR OBJECTIVE: Define properties of logarithmic functions and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.8.11S</p> <ul style="list-style-type: none">Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).	<p>Teacher will guide students to:</p> <p>Recognize properties of logarithmic functions and apply them to various problem-solving situations (graphing, solving logarithmic equations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student use of graphing calculators- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 6: Conic Sections

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.2.11A Develop and use computation concepts, operations and procedures with real numbers in problem solving situations.</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student use of graphing calculators- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>
<p>PA Standard 2.2.11F Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.</p>	<p>Teacher will guide students to:</p> <p>Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student use of graphing calculators- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 6: Conic Sections

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.5.11B 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.</p>	<p>Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none"> - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.8.11E Use equations to represent curves (e.g., lines, circles, ellipses, parabolas, hyperbolas).</p>	<p>Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none"> - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 6: Conic Sections

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11Q Represent functional relationships in tables, charts, and graphs.	Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.8.11R Create and interpret functional models.	Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 6: Conic Sections

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.8.11S Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).</p>	<p>Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.8.11T Analyze and categorize functions by their characteristics.</p>	<p>Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 6: Conic Sections

MAJOR OBJECTIVE: Identify, graph, define properties of, and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.9.11F Use the properties of angles, arcs, chords, tangents, and secants to solve problems involving circles.</p>	<p>Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.9.11H Construct a geometric figure and its image using various transformations.</p>	<p>Teacher will guide students to: Recognize properties of conic sections (parabolas, circles, ellipses, and hyperbolas) and apply them to various problem-solving situations (graphing, writing equations, transformations, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 7: Sequences & Series

MAJOR OBJECTIVE: Define rules/properties of sequences/series (both arithmetic and geometric) and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.2.11A Develop and use computation concepts, operations and procedures with real numbers in problem solving situations.</p>	<p>Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.2.11F Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.</p>	<p>Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 7: Sequences & Series

MAJOR OBJECTIVE: Define rules/properties of sequences/series (both arithmetic and geometric) and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.5.11B 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.</p>	<p>Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.8.11B Give examples of patterns that occur in data from other disciplines.</p>	<p>Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 7: Sequences & Series

MAJOR OBJECTIVE: Define rules/properties of sequences/series (both arithmetic and geometric) and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.9.11E Solve problems involving inscribed and circumscribed polygons.	Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials
PA Standard 2.9.11G Solve problems using analytic geometry.	Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)	Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none">- student use of graphing calculators- student board work Student notebooks/written work	Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 7: Sequences & Series

MAJOR OBJECTIVE: Define rules/properties of sequences/series (both arithmetic and geometric) and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.11.11A Determine the maximum and minimum values of a function over a specified interval.</p>	<p>Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none"> - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>
<p>PA Standard 2.11.11D Determine sums of finite sequences of numbers and infinite geometric series.</p>	<p>Teacher will guide students to: Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of: Whole class/small group discussions Teacher observations of: <ul style="list-style-type: none"> - student use of graphing calculators - student board work Student notebooks/written work</p>	<p>Textbook resources Computer programs/websites Notebooks Graphing Calculators Manipulatives Supplemental materials</p>

CONTENT: Trigonometry/Pre-Calculus

CORE CONCEPT 7: Sequences & Series

MAJOR OBJECTIVE: Define rules/properties of sequences/series (both arithmetic and geometric) and apply in problem-solving situations.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.11.11E Estimate areas under curves using sequences of areas.</p>	<p>Teacher will guide students to:</p> <p>Recognize rules/properties of sequences and series (arithmetic and geometric) and apply them to various problem-solving situations (writing formulas, finding terms, sums, and areas under curves, applied problems, etc...)</p>	<p>Teacher evaluation of:</p> <p>Whole class/small group discussions</p> <p>Teacher observations of:</p> <ul style="list-style-type: none">- student use of graphing calculators- student board work <p>Student notebooks/written work</p>	<p>Textbook resources</p> <p>Computer programs/websites</p> <p>Notebooks</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Supplemental materials</p>

V. EXPECTED LEVELS OF ACHIEVEMENT

A. Students are expected to reach the proficient level of achievement, including all of the skills noted in the specific content area of this curriculum.

B. The grading system for Trigonometry/Pre-Calculus class is as follows:

Grading Scale	
A	90%-100%
B	80%-89%
C	70%-79%
D	60%-69%
F	0%-59%

C. Each student's grade will be determined at the conclusion of each marking period. Progress notes will be issued halfway through each marking period for those students who are performing below **70%**.