Algebra 3 / Trigonometry Curriculum Guide

Content Area: **Mathematics**
Course(s):
Time Period:
Length: **Full Year**
Status: **Published**

Course Overview

This course begins with a review of basic Algebraic concepts and an in- depth study of varies functions and their properties and graphs. Real world problem solving are fundamental bearings of the course. The idea of trigonometric functions and identities are stressed. In addition, students will explore concepts related to statistics and probability.

In order to prepare for global competition and high expectations for all, Sayreville War Memorial HS students must have increased opportunities for mathematical experiences that extend critical thinking and reasoning. Specifically, access to higher mathematics is essential. Algebra III/ Trigonometry is a course intended for students who have completed any level of Algebra 2. This course is recommended for juniors who wish to take Pre-Calculus during their senior year and college-bound seniors who want to strengthen their essential algebra skills and basic Trigonometry. This course will enhance the higher-level thinking skills developed in Algebra 2 through a more in-depth study of those concepts and exploration of some Pre-Calculus and Statistics concepts.

In order to demonstrate a cohesive and complete implementation plan the following general suggestions are provided:

- Various formative assessments are encouraged to provide an ongoing method of determining the students' current level of understanding of the material presented.
- Homework, when assigned should be relevant and reflective of the current teaching taking place in the classroom.
- Organizational strategies should be in place that allow the students to take the information gained in the classroom and put in in terms that are relevant to them.

- Instruction should be differentiated to allow students the best opportunity to learn.
- Assessments should be varied and assess topics of instruction delivered in class.
- Modifications to the curriculum should be included that address students with Individualized Educational Plans (IEP), English Language Learners (ELL), and those requiring other modifications (504 plans).

Course Name, Length, Date of Revision and Curriculum Writer

Algebra3/Trigonometry
5 Credits - Full Year

Date Curriculum Approved/ Revised: R. Abadir & S. Magaw 2018

Standards Revised: L.Buonpane & J.Evans 2025

Table of Contents

Unit 1 - Linear Relations and Functions

Content Area: **Mathematics**
Course(s):
Time Period: **1st Marking Period**
Length: **13 days**
Status: **Published**

Summary of the Unit

In this unit, students will be able to analyze graphs of relations and functions, determine if relations are functions, use function notation, and write and graph linear equations. Students will be able to find and interpret the meaning of the slope of a line in order to solve real-world problems. Students will be able to make connections between the study of linear functions and real world word problems situations.

Enduring Understandings

Relations and functions can be represented numerically, graphically, algebraically, and/or verbally.

Functions can be identified using a variety of techniques, including the Vertical Line Test. There are many forms of linear equations, and the most useful form depends on what you are trying to accomplish (i.e., graph, or find intercepts). The slope of a line indicate the rate of change of vertical units over horizontal units.

Essential Questions

What are the important defining characteristics and representations of a function?
How do you find the slope of a line and use it to write an equation of the line?
How is the graph of a function used to determine the key elements of that function?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/	Suggested	General	Instructional	Suggested

Selection	Timeline per topic	Objectives	Activities	Benchmarks/ Assessments
Relations and Functions	2 days	Analyze graphs of relations and functions. Determine if a relation is a function.	• Present relations and functions in multiple representations, and use the definition of function or Vertical Line Test to determine if a relation is a function. • Introduce function notation and how to use it. Indicate that *f(x)* is not the only way to write function notation (i.e. *g(a)*, *C(d)*, *A(r)*) and that *f(x) means y.*	Check student responses. Assess understanding via oral participation. Circulate to check student work. Classwork assigned. Homework assigned. Use Q & A for Closure. Exit cards.

Slope	2 days	Find and use the slope of a line given linear equation, graph, or points on the graph. Recognize and convert equation to slope and y-intercept form.	• Encourage students to recall slope formula, and slope and y-intercept form of linear equation. • Enhance student's understanding of slope by Indicating that slope is a rate of change.	
Standard form of linear equations	2 days	Recognize and convert linear equation to standard form.	• Model writing linear equations in standard form.	

Graphing linear equations and functions	2 days	Graph a linear function using intercepts. Determine if two lines are parallel, perpendicular, or neither. Graph parallel and perpendicular lines.	• Graph a linear equation using the intercepts method. • Discuss what makes lines parallel, perpendicular, or neither. • Use knowledge of parallel and perpendicular lines to graph	
Writing linear equations	3 days	Write equations of lines given a slope and *y*-intercept, a point and a slope, or two points.	• Provide students with examples of each type of problem, and tips on where to start. • Have students practice in small groups.	

Applications on linear functions	2 days	Recognize and solve word problems that deal with supply and demand, and cost functions. Recognize and solve problems that deal with direct and inverse variation.	• Model several problems on each type and relate each word problem situation to linear functions. • Help students make connections to real world situations.	

Standards

MATH.9-12.A.CED	Creating Equations
MATH.9-12.F.IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.
MATH.9-12.F.IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MATH.9-12.F.IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
MATH.9-12.A.REI.A	Understand solving equations as a process of reasoning and explain the reasoning

MATH.9-12.F.IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
MATH.9-12.F.IF.B.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

Consistent with individual plans, when appropriate. Such as using Google Translate, and or Implementing 504 and special modifications listed on the student's IEP.

Special Education:

- Visual Aids and Manipulatives: Use graphing tools, color-coded notes, and hands-on materials to help students understand linear relationships.
- Step-by-Step Instructions: Break down tasks into smaller, manageable steps and provide written and verbal instructions.
- Frequent Check-ins: Regularly check for understanding and provide immediate feedback to ensure students stay on track.

MLL (Multilingual Learners):

- Bilingual Resources: Provide materials in both the student's native language and English to aid comprehension.
- Visual Supports: Use charts, diagrams, and visual aids to illustrate concepts and vocabulary.
- Peer Support: Pair ELL students with peers who are proficient in both languages to foster collaborative learning.

Gifted Students:

- Advanced Problems: Offer more challenging problems that require higher-order thinking and deeper analysis.
- Independent Projects: Encourage independent research projects or presentations on related advanced topics.
- Flexible Grouping: Allow gifted students to work in small groups to explore complex concepts and share their findings.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators,

Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 2 - Systems of Equations and Inequalities

Content Area: **Mathematics**
Course(s):
Time Period: **1st Marking Period**
Length: **15 Days**
Status: **Published**

Summary of the Unit

In this unit, students will be able to solve systems of linear equations graphically or algebraically and interpret the meaning of the point of intersection. Students will extend their study to include the finding the point of intersection of three planes as well as solving linear programing problems.

Enduring Understandings

The solution to a linear system of equations represents the point of intersection of the two lines and has meaning based on the context of the original question.

Graphing can be used to identify optimal solution to real world word problem by applying linear programming concept.

Essential Questions

How do you use substitution and graphing to solve systems of equations?
How do you use elimination to solve systems of equations?
How do you solve systems of linear equations in more than two variables?
What process would you use to optimize the objective function?
What is the feasible region, and how does it contribute to identifying solutions to a problem?
How might the number of constraints affect possible solutions?
How would you apply what you have learned in systems of inequalities to linear programming?
What are some real-world situations that can be solved using linear programming?

Summative Assessment and/or Summative Criteria

Summative Assessment and Criteria for Unit 2: Systems of Equations and Inequalities

Summative Assessment Options:

- Unit Test or Quizzes
    - Format: Multiple choice, short answer, and extended response questions.
    - Content:
        - Solving systems of equations using graphing, substitution, and elimination methods.
        - Analyzing and solving systems of inequalities.
        - Application problems involving real-world scenarios.
    - Criteria:
        - Accuracy in solving equations and inequalities.
        - Correct application of methods.
        - Clear and logical reasoning in extended responses.
- Project:
    - Format: Individual or group project.
    - Content:
        - Research and present a real-world problem that can be solved using systems of equations or inequalities.
        - Develop a detailed explanation of the problem and the steps taken to solve it.
        - Create visual aids such as graphs or diagrams to support findings.
    - Criteria:
        - Relevance and complexity of the chosen problem.

        - Thoroughness and accuracy of the solution process.
        - Quality and clarity of the presentation and visual aids.

- Performance Task:
    - Format: Practical application task.
    - Content:
        - Students are given a set of real-world problems requiring the use of systems of equations and inequalities.
        - They must solve these problems and justify their solutions.
    - Criteria:
        - Correct identification and setup of equations/inequalities.
        - Accuracy in solving and graphing solutions.
        - Justification and explanation of the solution process.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Systems of Two Linear Equations and Inequalities in Two Variables	5 days	Given a system of linear equations in two variables, approximate solutions graphically and confirm algebraically. Solve systems by substitution or elimination. Graph a system of linear inequalities (determine whether the line is dashed or solid, and shade the correct half-planes lightly, and shade the solution set dark). Solve systems of two	• Review and reteach the graphing, elimination, and substitution techniques and the importance of the "check" • Demonstrate how to use the graphing calculator to find the solution to a system of equations. • Discuss what "no solution" or "infinitely many" solutions looks like and means. • Relate graphing a	Assess understanding via oral participation. Check student graphs. Circulate to check student work. Check for correct use of graphing calculator. Check translations of word problems into algebra. Classwork assigned.

		equations in two variables that involve word problems.	system of inequalities back to graphing just one linear inequality. • Demonstrate how to use the graphing calculator to confirm the solutions to a system of inequalities. • Provide multiple examples of word problems involving systems, such as number, money, geometry and age problems. Review common errors in translating word problems into algebra.	Homework assigned. Use Q & A for Closure. Exit cards.
Systems of three Linear Equations in three Variables	5 days	Given a system of linear equations in three variables, solve by elimination and check.	• Demonstrate solving systems of three variables by elimination to make it into a system of 2x2 and the back substitute. • Provide time for independent practice in small groups or	Assess understanding via oral participation Circulate to check student work Classwork assigned.

			individually.	Homework assigned. Use Q & A for Closure. Students craft their very own word problems the require a 3x3 system to be solved, students submit for a grade.
Linear Programming and Word Problems Applications	5 days	Given a system of inequalities, graph, find vertices of feasible region, and identify maximum or minimum of the objective function. Given a linear programming word problem, students translate into algebra and use graphing technique to find optimal solution.	• Demonstrate and explain graphing systems of inequalities and use feasible region to find max/min of targeted function. • Allow time for independent practice in pairs. • Discuss real world word problems and reaching optimal solution by applying linear programming. • Students practice independently in small groups.	Check student graphs. Circulate to check student work. Classwork assigned. Homework assigned. Use Q & A for Closure.

Standards

MATH.9-12.A.REI.C.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
MATH.9-12.A.REI.C.6	Solve systems of linear equations algebraically (include using the elimination method) and graphically, focusing on pairs of linear equations in two variables.
MATH.9-12.A.REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
MATH.9-12.A.REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
MATH.9-12.A.REI.D.12	Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Special Education:

- Simplified Instructions: Break down the steps for solving systems of equations and inequalities into smaller, manageable parts. Use clear, concise language.
- Graphic Organizers: Use visual aids such as flow charts and graphic organizers to help students understand the sequence of solving equations.
- Frequent Check-ins
  Regularly check for understanding and provide immediate feedback. Use formative assessments to gauge progress and address misconceptions promptly.

MLL (Multilingual Learners):

- Language Support: Provide bilingual resources and glossaries of key terms in both English and the student's native language to support understanding.
- Visual Supports: Use visual aids, such as diagrams, charts, and graphic organizers, to explain complex concepts.
- Peer Assistance: Pair ELL students with peers who are proficient in both languages to foster collaborative learning and support language development.

Gifted Students:

- Advanced Problems: Offer more challenging and complex problems that require higher-order thinking skills and deeper analysis.
- Independent Projects: Encourage gifted students to work on independent or group projects that explore real-world applications of systems of equations and inequalities.
- Enrichment Activities: Provide opportunities for gifted students to engage in enrichment activities, such as math competitions, where they can f urther develop their problem-solving skills.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 3 - Polynomial Expressions and Functions

Content Area: **Mathematics**
Course(s):
Time Period: **2nd Marking Period**
Length: **17 Days**
Status: **Published**

Summary of the Unit

In this unit, students learn and apply properties of exponents as they simplify expressions involving powers and add, subtract, and multiply polynomials. They learn methods to factor and solve polynomial equations, including the Remainder and Factor Theorems. Using intercepts and other methods, they graph polynomial functions.

Enduring Understandings

Operations may be performed on polynomials.

The graph of a polynomial can be used to find real zeros and describe end behavior.

Polynomial functions can be evaluated by direct substitution, or by the Remainder Theorem.

The Factor Theorem can be used to quickly determine whether a given x-value is a zero of the function.

Essential Questions

How do polynomial functions model real-world problems and their solutions?

How do you use properties of exponents to evaluate and simplify expressions?

How do you evaluate a polynomial function?
How do you graph a polynomial function?
How do you add, subtract, and multiply polynomials?

How do you factor polynomial expressions?
How do you Use factoring to solve polynomial equations?
How do you Divide polynomials and relate the result to the factor theorem?

How do you find the rational zeros of a polynomial function?
How do you Use the fundamental theorem of algebra to determine the number of zeros of a polynomial function?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

Summative Assessment Options:

- Unit Test:
    - Format: Multiple choice, short answer, and extended response questions.
    - Content:
        - Identifying polynomial expressions and their degrees.
        - Performing operations on polynomials (addition, subtraction, multiplication, and division).
        - Factoring polynomials and solving polynomial equations.
        - Analyzing and graphing polynomial functions.
    - Criteria:
        - Accuracy in performing polynomial operations.
        - Correct identification and classification of polynomial expressions.
        - Clear and logical reasoning in extended responses.
        - Precision in graphing polynomial functions.
- Project:
    - Format: Individual or group project.
    - Content:

        - Research and present real-world applications of polynomial expressions and functions.
        - Develop a detailed explanation of the problem and the steps taken to solve it using polynomial functions.
        - Create visual aids such as graphs or diagrams to support findings.
    - Criteria:
        - Relevance and complexity of the chosen problem.
        - Thoroughness and accuracy of the solution process.
        - Quality and clarity of the presentation and visual aids.
- Performance Task:
    - Format: Practical application task.
    - Content:
        - Students are given a set of real-world problems requiring the use of polynomial expressions and functions.
        - They must solve these problems and justify their solutions.
    - Criteria:
        - Correct identification and setup of polynomial equations/functions.
        - Accuracy in solving and graphing solutions.
        - Justification and explanation of the solution process.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Use Properties of Exponents	3 days	Simplify expressions using properties of exponents. As time permits, review scientific notation.	• Review properties of exponents and provide sample problems of increasing level of difficulty. • Include a	Assess student recall of these topics, and review where needed. Check student responses. Classwork

			word problem using scientific notation, as time permits.	assigned. Homework assigned. Closure using Q & A. Exist Cards.
Add, Subtract, Multiply & Divide Polynomials	4 days	Add, subtract, and multiply polynomials. Divide polynomials using both long and synthetic division techniques.	• Review how to add, subtract, and multiply polynomials, including special products through example problems. • Demonstrate long division and synthetic division. • Explain when each division technique can be applicable and the importance of using a place holder. • Discuss what it means to have a remainder in a division problem.	Assess student recall of these topics, and review where needed. Check student responses. Monitor student's independent work. Classwork assigned. Homework assigned. Closure using Q & A. Exist Cards.
Apply the Remainder and Factor Theorems	2 days	Evaluate functions using synthetic substitution. Use remainder and factor theorems to	• Compare traditional substitution and synthetic substitution methods for evaluation	Assess understanding via oral participation Circulate to check

		identify factors of polynomials.	functions. • Practice identifying factors of a function by applying remainder factor theorem.	student work Monitor student's independent work. Classwork assigned. Homework assigned. Closure using Q & A. Exist Cards.
Factor and Solve Polynomial Equations	5 days	Review Factoring techniques Such as greatest common factor, grouping, difference of two squares, sum and difference of two cubes, and factoring trinomials.	• Review all factoring techniques and introduce sum/difference of cubes pattern. • Review Zero Product Property, and its use in solving polynomial equations. • Remind students to "check". 1. Allow time for	Assess student understanding of new factoring pattern. Monitor student's independent work. Classwork assigned. Homework assigned

			independent practice.	
Sketch Graphs of Polynomial Functions and Analyze End Behavior.	3 days	Use knowledge of x-intercepts and end behavior to sketch graphs of polynomial functions	• Examine given graphs and analyze their end behavior. • Use knowledge of x-intercepts, degree, and leading coefficient to sketch graphs of given functions.	Check student graphs. Circulate to check student work. Classwork assigned. Homework assigned. Closure using Q & A. Exist Cards.

Standards

MATH.9-12.A.APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
MATH.9-12.N.RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
MATH.9-12.A.APR.B.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the

	remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $x - a$ is a factor of $p(x)$.
MATH.9-12.N.RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
MATH.9-12.A.APR.B.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
MATH.9-12.A.APR.C.4	Prove polynomial identities and use them to describe numerical relationships.
MATH.9-12.A.REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MATH.9-12.A.REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
MATH.9-12.A.REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
MATH.9-12.A.SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Special Education:

- Simplified Instructions: Break down the steps for polynomial operations into smaller, manageable parts. Use clear, concise language and provide step-by-step guides.
- Graphic Organizers: Use visual aids such as flow charts and graphic organizers to help students understand the process of simplifying, adding, subtracting, multiplying, and dividing polynomials.
- Frequent Check-ins:
  Regularly check for understanding and provide immediate feedback. Use formative assessments to gauge progress and address misconceptions promptly.

- Hands-on Activities: Incorporate manipulatives like algebra tiles to visually represent polynomial expressions and operations.

MLL (Multilingual Learners):

- Bilingual Resources: Provide materials in both the student's native language and English to aid comprehension. Include glossaries of key terms in both languages.
- Visual Supports: Use diagrams, charts, and visual aids to explain concepts. Incorporate videos or animations that visually demonstrate polynomial operations.
- Language Support: Offer sentence starters and word banks to help ELL students explain their reasoning and solutions in English.
- Peer Assistance: Pair ELL students with bilingual peers for collaborative learning and language support.

Gifted Students:

1. Advanced Problems: Provide more challenging problems that require higher-order thinking and deeper analysis of polynomial functions and their applications.
2. Independent Projects: Encourage gifted students to work on independent or group projects exploring real-world applications of polynomials, such as physics problems or financial modeling.
3. Enrichment Activities: Offer opportunities for enrichment activities, like math competitions or advanced topic exploration, to further develop the ir problem-solving skills.
4. Flexible Grouping: Allow gifted students to work in small groups on complex tasks, facilitating discussion and exploration of advanced concepts .

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 4 - Radical Expressions and Complex Numbers

Content Area: **Mathematics**
Course(s):

Time Period: **2nd Marking Period**
Length: **12 Days**
Status: **Published**

Summary of the Unit

First, students will learn the meaning of nth roots and rational exponent notation, and how to apply the properties of rational exponents. Next, they will learn to perform operations, including adding, subtracting, multiplying, and dividing radical expressions as well as rationalizing denominators. Then, they will learn how to determine whether a given radical expression has an imaginary unit. Finally, students will learn to simplify and perform operations on complex numbers.

Enduring Understandings

Rational exponents and radical notation can be converted into each other and simplified.

Operations, can be performed on Radical expressions and complex numbers.

Essential Questions

How do you evaluate nth roots of real numbers using both radical notation and rational exponent notation?
How do you use properties of rational exponents to evaluate and simplify expressions?
How do you perform operations with functions including power functions?
How do you find inverses of linear functions?
How do you find inverses of nonlinear functions?
How do you solve equations that contain radicals or rational exponents?
Why do imaginary numbers exist?
How do you add, subtract, and multiply complex numbers?
When does a quadratic equation have imaginary solutions?
How do you find imaginary solutions for quadratic equations?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

- Unit Test:
    - Format: Multiple choice, short answer, and extended response questions.
    - Content:
        - Simplifying radical expressions.
        - Performing operations with radicals (addition, subtraction, multiplication, and division).
        - Solving radical equations.
        - Understanding and performing operations with complex numbers.
        - Graphing complex numbers on the complex plane.
    - Criteria:
        - Accuracy in simplifying and performing operations with radicals.
        - Correct solutions to radical equations.
        - Understanding of complex numbers and accuracy in performing operations with them.
        - Ability to graph complex numbers and interpret their position on the complex plane.
- Project:
    - Format: Individual or group project.

- Content:
  - Research real-world applications of radical expressions and complex numbers.
  - Create a presentation or report detailing the application and the mathematics involved.
  - Include examples of problems solved using radical expressions and complex numbers.
- Criteria:
  - Relevance and complexity of the chosen application.
  - Thoroughness and accuracy of the mathematical analysis.
  - Quality and clarity of the presentation or report.

- Performance Task:
  - Format: Practical application task.
  - Content:
    - Provide students with real-world problems that involve radical expressions and complex numbers.
    - Students must solve these problems and justify their solutions.
  - Criteria:
    - Correct identification and setup of problems involving radicals and complex numbers.
    - Accuracy in solving the problems.
    - Justification and explanation of the solution process.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Simplify Radical Expressions and Expressions Involving Rational Exponents	4 days	Simplify radical expressions including expressions that involve higher index. Evaluate expressions using rational exponents by converting them	• Provide Instructions on n_{th} roots (different cases based on whether the index is even or odd). • Provide directions how to	Check student understanding via oral participation. Check student work. Monitor

		into radical form. Use properties of exponents to simplify expressions having rational exponents. Write radicals in simplest form. Add, subtract, multiply and Radicals.	convert expression using rational exponents to radicals. • Model simplifying these expressions and provide increasingly difficult problems. • Review the idea of "like", and for radicals to be "like", they need the same index and radicand. • Model adding, subtracting, and multiplying radicals • Allow time for independent practice.	student's independent work. Classwork assigned. Homework assigned
Rationalizing Denominators	3 days	Write denominators as rational numbers. Write fractions that involve radicals in simplest form.	• Review what rational numbers mean. • Model rationalizing denominators and writing fractions in	Check student understanding via oral participation. Check

			simplest form. • Use example problems that are varies level of difficulty. • Allow time for independent practice.	student work. Monitor student's independent work. Classwork assigned. Homework assigned Exit cards.
Complex Numbers	5 days	Simplify radical expressions that involve even index and negative radicand. Add, subtract, multiply, and divide complex numbers.	• Introduce the imaginary unit "i" to Simplify radical expressions that involve even index and negative radicand. 2. Model adding, subtracting, multiply, and divide complex numbers introducing the idea of conjugates. • Use conjugates to rationalize denominators.	Check student understanding via oral participation. Check student work. Monitor student's independent work. Classwork assigned. Homework assigned Exit cards.

Standards

MATH.9-12.A.APR.D.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x)$ + $r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
MATH.9-12.A.APR.D.7	Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
MATH.9-12.N.CN.A.1	Know there is a complex number i such that $i^2 = –1$, and every complex number has the form $a + bi$ with a and b real.
MATH.9-12.N.CN.A.2	Use the relation $i^2 = –1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
MATH.9-12.N.CN.A.3	Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Special Education:

- Simplified Instructions: Break down the steps for simplifying radicals and performing operations with complex numbers into smaller, manageable parts. Provide clear, concise language and step-by-step guides.
- Graphic Organizers: Use visual aids such as flow charts and graphic organizers to help students understand the processes involved in simplifying radical expressions and solving complex number problems.
- Frequent Check-ins:

  Regularly check for understanding and provide immediate feedback. Utilize formative assessments to gauge progress and address misconcep tions promptly.
- Hands-on Activities:

  Incorporate manipulatives like algebra tiles and visual aids to represent radical expressions and complex numbers visually.

MLL (Multilingual Learners):

- Bilingual Resources: Provide materials in both the student's native language and English to aid comprehension. Include glossaries of key terms in both languages.
- Visual Supports: Use diagrams, charts, and visual aids to explain concepts. Incorporate videos or animations that visually demonstrate operations with radicals and complex numbers.
- Language Support: Offer sentence starters and word banks to help ELL students explain their reasoning and solutions in English.
- Peer Assistance: Pair ELL students with bilingual peers for collaborative learning and language support.

Gifted Students:

1. Advanced Problems: Provide more challenging problems that require higher-order thinking and deeper analysis of radical expressions and complex numbers.
2. Independent Projects: Encourage gifted students to work on independent or group projects exploring real-

world applications of radicals and complex numbers, such as engineering problems or financial modeling.

3. Enrichment Activities: Offer opportunities for enrichment activities, such as math competitions or advanced topic exploration, to further dev elop their problem-solving skills.

4. Flexible Grouping: Allow gifted students to work in small groups on complex tasks, facilitating discussion and exploration of advanced con cepts.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 5 - Quadratic functions and Their Graphs

Content Area: **Mathematics**
Course(s):
Time Period: **3rd Marking Period**
Length: **12 Days**
Status: **Published**

Summary of the Unit

In this unit, students will learn how to graph quadratic functions written in standard form, vertex form, and how to use the graph of a quadratic equation to solve it. Students will learn how to solve quadratic equations by factoring and using the quadratic formula. Students will learn how to use properties of radicals, how to use

the value of discriminant to identify the number of real or imaginary solutions.

Enduring Understandings

Quadratic functions may be represented in a variety of forms (standard form, vertex form, or intercept form), and can be graphed in different ways based on the given form. Quadratic functions can be solved using a variety of techniques (factoring, finding square roots, completing the square, or using the quadratic formula), and the technique chosen comes after analyzing the function and thinking about the best course of action. Solving quadratic functions may produce complex solutions.

Essential Questions

How does the graph of g(x) = (x – h) 2 + k compare with the graph of f(x) = x^2 ?
How does the graph of g(x) = ax 2 differ from the graph of f(x) = x^2 ?
How can you graph the function f(x) = a(x – h)^2+ k?
How do you convert quadratic functions to the vertex form f(x) = a(x – h)^2 + k?
How do you determine where the graph of a quadratic function crosses the x-axis?
How are quadratic models used to solve real-world problems?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

Summative Assessment Options:

- Unit Test:

- Format: Multiple choice, short answer, and extended response questions.
- Content:
  - Understanding the standard form, vertex form, and factored form of quadratic functions.
  - Graphing quadratic functions and identifying key features (vertex, axis of symmetry, intercepts).
  - Solving quadratic equations using various methods (factoring, completing the square, quadratic formula).
  - Application problems involving quadratic functions.
- Criteria:
  - Accuracy in solving quadratic equations and graphing quadratic functions.
  - Correct identification and interpretation of key features of quadratic graphs.
  - Logical reasoning and clear explanations in extended responses.

- Project:
  - Format: Individual or group project.
  - Content:
    - Research and present real-world applications of quadratic functions.
    - Develop a detailed explanation of the application and the mathematics involved.
    - Create visual aids such as graphs or diagrams to support findings.
  - Criteria:
    - Relevance and complexity of the chosen application.

        - Thoroughness and accuracy of the mathematical analysis.
        - Quality and clarity of the presentation or report.

- Performance Task:
    - Format: Practical application task.
    - Content:
        - Provide students with real-world problems that involve quadratic functions.
        - Students must solve these problems and justify their solutions.
    - Criteria:
        - Correct identification and setup of problems involving quadratic functions.
        - Accuracy in solving the problems and graphing the functions.
        - Justification and explanation of the solution process.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Graph Quadratic Functions in Standard Form	5 days	Graph a quadratic in standard form correctly. Identify the axis of symmetry, vertex, and solutions, if possible. Find the minimum or maximum value of a quadratic function by hand or by using the graphing calculator. Create a quadratic function to solve a minimum/maximum word problem.	• Graph, the "parent" quadratic function. • Define the standard form of a quadratic function, meaning of vertex, minimum/maximum, and axis of symmetry. • Use the graphing calculator to explore what changes in *a*, *b*, or *c* do to the graph. Discuss what makes a parabola	Check student responses. Check student graphs. Check for correct use of graphing calculator. Classwork assigned. Homework assigned.

			open up vs open down. • Provide notes on the equation of the axis of symmetry, the *y*-intercept, and solutions (*x*-intercepts). • Practice making graphs of quadratics using a hand- generated table of values, then use the graphing calculator to verify.	
Graph Quadratic Functions in vertex Form	3 days	Identify the vertex form of quadratic functions. Convert the standard to vertex form by completing square. Graph a quadratic in vertex form correctly.	• Formalize discussion on how to convert to vertex form and how to find the vertex, and how to create a table of values that includes the vertex, to sketch the graph. • Allow time for independent practice.	Check student responses. Check student graphs. Check for correct use of graphing calculator. Classwork assigned.

		Identify the axis of symmetry, vertex, and solutions, if possible.		Homework assigned. Q & A closure session.
Solve Quadratic Equations	4 days	Solve quadratic functions by factoring and applying zero product property. Solve quadratic functions by applying the quadratic formula and use discriminant to identify number and type of solutions.	• Model solving quadratic functions by setting the problem equal to zero and use factoring to and zero product property to identify x-intercepts. • Model solving multiple quadratic functions that results in different types of solutions. • Discuss the discriminant and that its value can predict the types of solutions there will be using previously modeled problems.	Assess students understanding via oral participation. Monitor student's independent work. Check student's results. Classwork assigned. Homework assigned. Q & A closure session.

			• Include word problems that can be solved using the quadratic formula. 3. Remind students that the graphing calculator can be used to do checks.	

Standards

MATH.9-12.A.APR.C.4	Prove polynomial identities and use them to describe numerical relationships.
MATH.9-12.A.REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MATH.9-12.A.REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
MATH.9-12.F.IF.C.7.a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MATH.9-12.F.IF.C.8.a	Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
MATH.9-12.A.SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Special Education Students

- Simplified Instructions: Break down instructions into smaller, manageable steps.
- Visual Aids: Use graphs, charts, and visual representations to explain concepts.
- Hands-On Activities: Incorporate manipulatives like graphing calculators or physical models of parabolas.
- Frequent Check-Ins: Regularly check for understanding and provide immediate feedback.
- Modified Assessments: Use alternative assessments such as oral presentations or projects instead of traditional tests.

English Language Learners (ELL)

- Language Support: Provide key vocabulary lists with definitions and visual aids.
- Sentence Starters: Use sentence frames to help students articulate their thoughts.
- Collaborative Learning: Pair ELL students with peers for group work to encourage language practice.
- Visual and Contextual Clues: Use diagrams and real-life examples to explain abstract concepts.
- Bilingual Resources: Offer resources in both English and the student's native language if possible.

Gifted Students

- Advanced Problems: Provide more challenging problems that require higher-order thinking.
- Independent Projects: Allow students to explore related topics through independent research projects.
- Flexible Grouping: Group students by ability for certain activities to encourage peer learning.
- Creative Assignments: Encourage students to create their own problems or explore real-world applications of quadratic functions.
- Enrichment Activities: Offer additional resources such as online courses or advanced textbooks for further study.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of

kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

Unit 6 - Rational Expressions and Equations

Content Area: **Mathematics**
Course(s):
Time Period: **3rd Marking Period**
Length: **6 Days**
Status: **Published**

Summary of the Unit

In this unit, students will learn to simplify rational functions, to multiply, divide, add, and subtract rational expressions, and simplify complex fractions. Finally, Students will learn to solve rational equations

Enduring Understandings

Rational functions have discontinuities where the denominator is equal to zero.

Knowledge of adding, subtracting, multiplying, and dividing are extended to rational expressions.

Rational equations may have extraneous solutions, so a check is always needed.

Essential Questions

How do rational functions model real-world problems and their solutions?
How do you write and use inverse variation models?
How do you write and use joint variation models?
How do you multiply and divide rational expressions?
How do you add and subtract rational expressions?
How do you simplify complex fractions? How do you solve rational equations?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

- Written Quiz/ Test:
    - Task: A comprehensive test covering simplifying rational expressions, performing operations (addition, subtraction, multiplication, division), and solving rational equations.
    - Criteria: Correctness of answers, logical reasoning, and the ability to show all steps clearly.
- Project-Based Assessment:
    - Task: Students create a real-world application project involving rational expressions and equations. For example, they could analyze rates and ratios in a business scenario or model a situation involving proportional relationships.
    - Criteria: Accuracy of the mathematical model, creativity, and clarity in explaining the concepts used.

- Portfolio:
    - Task: Students compile a portfolio of their work throughout the unit, including homework, classwork, quizzes, and a reflective essay on their learning process.
    - Criteria: Completeness, organization, and reflection on learning.
- Presentation:
    - Task: Students present a topic related to rational expressions and equations, such as their applications in engineering or science.
    - Criteria: Depth of research, clarity of presentation, and the ability to answer questions from peers.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Multiply and Divide Rational Expressions	2 days	Multiply and divide rational expressions correctly by using factoring.	• Start with simplifying rational expressions first. • Factor numerator and denominator identify domain restrictions, then cancel common factors. Then move onto multiplying and dividing rational expressions. • Model, then provide practice problems.	Check student understanding via oral participation. Check student work. Classwork assigned. Homework assigned.
Add and Subtract Rational Expressions	2 days	Add and subtract rational expressions correctly after finding the LCD.	• Help students recall how to find the LCD in simple	Check student understanding via oral participation.

			arithmetic problems and extend that knowledge to algebraic expressions (may have to factor denominators). • Provide a method to find the LCD, and then a way to make both denominators "match", to add or subtract correctly. • Model problems and provide practice problems.	Monitor students independent practice. Check student work. Classwork assigned. Homework assigned. Exit cards.
Solve Rational Equations	2 days	Solve rational equations by finding and multiplying through by the LCD to create a simpler equation to solve.	• Provide directions on how to solve rational equations by finding and multiplying through by the LCD to create a	Check student understanding via oral participation. Check student work. Monitor student's

			simpler equation to solve. • Remind students that a check must be done because extraneous solutions can occur. • Model sample problems and provide practice. • See if students can point out when cross-multiplying can be used to solve rational	independent work. Classwork assigned. Homework assigned Exit cards.

Standards

MA.A-APR.D.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x)$ + $r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Special Education Students

- Simplified Instructions: Break down complex problems into smaller, manageable steps.
- Visual Aids: Use diagrams, charts, and visual representations to explain rational expressions and equations.
- Hands-On Activities: Incorporate manipulatives like algebra tiles or interactive software to visualize concepts.
- Frequent Check-Ins: Regularly check for understanding and provide immediate feedback.
- Modified Assessments: Use alternative assessments such as oral presentations or projects instead of traditional tests.

Multilingual Learners (MLL)

1. Language Support: Provide key vocabulary lists with definitions and visual aids.
2. Sentence Starters: Use sentence frames to help students articulate their thoughts.

3. Collaborative Learning: Pair ELL students with peers for group work to encourage language practice.
4. Visual and Contextual Clues: Use diagrams and real-life examples to explain abstract concepts.
5. Bilingual Resources: Offer resources in both English and the student's native language if possible.

Gifted Students

- Advanced Problems: Provide more challenging problems that require higher-order thinking.
- Independent Projects: Allow students to explore related topics through independent research projects.
- Flexible Grouping: Group students by ability for certain activities to encourage peer learning.
- Creative Assignments: Encourage students to create their own problems or explore real-world applications of rational expressions and equations.
- Enrichment Activities: Offer additional resources such as online courses or advanced textbooks for further study.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 7 - Matrices and Determinants

Content Area: **Mathematics**
Course(s):
Time Period: **3rd Marking Period**
Length: **12 Days**
Status: **Published**

Summary of the Unit

In this unit students will learn about a matrix to organize data, how to identify the size of a matrix, apply operations on matrices, identify the inverse and determinant of a square matrix. Finally, students will learn solving systems of equations using the Cramer's Rule.

Enduring Understandings

Matrices can help solve real-life problems that are represented by systems of equations.

Matrix operations have many practical applications.

Determinants are often used in other branches of mathematics such as when changes of variables are made in calculus.

Essential Questions

How are matrices used to model real world data and to solve real world problems?
How do you add and subtract matrices, multiply a matrix by a scalar, and solve matrix equations? How do you multiply two matrices?
How do you evaluate determinants of 2x2 and 3x3 matrices?
How do you use Cramer's rule to solve systems of linear equations? How do you find and use inverse matrices?
How do you solve systems of linear equations using inverse matrices?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

- Written Quiz. Test:
    - Task: A comprehensive test covering matrix operations (addition, subtraction, multiplication), finding determinants, and solving systems of equations using matrices.
    - Criteria: Correctness of answers, logical reasoning, and the ability to show all steps clearly.
- Project-Based Assessment:
    - Task: Students create a project that applies matrices and determinants to a real-world problem. For example, they could model a network of roads or analyze data using matrix operations.
    - Criteria: Accuracy of the mathematical model, creativity, and clarity in explaining the concepts used.

- Portfolio:
    - Task: Students compile a portfolio of their work throughout the unit, including homework, classwork, quizzes, and a reflective essay on their learning process.
    - Criteria: Completeness, organization, and reflection on learning.
- Presentation:
    - Task: Students present a topic related to matrices and determinants, such as their applications in computer graphics or cryptography.
    - Criteria: Depth of research, clarity of presentation, and the ability to answer questions from peers.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Matrices and System of Equations	5 days	Determine the size of a matrix. Use the definition of equal matrices to solve for missing elements.	• Identify the size of a matrix as number of rows by number of columns. • Explain the equal matrices they must have same size. Corresponding elements are equal. • Use equal matrices to solve for missing elements. • Allow time for independent practice.	Check student understanding via oral participation. Check student work. Monitor student's independent work. Classwork assigned. Homework assigned Exit cards.
Operations with Matrices	1 day	Multiply by a scaler. Add and Subtract Matrices. Multiply Matrices.	• A scaler is a constant that can be distributed to all elements of a matrix. • To add and subtract matrices, they must have the same size. Adding and	Check student understanding via oral participation. Check student work. Monitor student's

			subtracting corresponding elements. • To multiply two matrices, the number of columns in the first matrix must equal the number of rows in the second matrix. Multiply rows by columns. The size of ye resulting matrix is formed by the outer dimensions of the two original matrices. Multiplication of matrices is not commutative.	independent work. Classwork assigned. Homework assigned Exit cards.
Inverse of a Square Matrix	2 days	Identify the inverse of 2x2 and 3x3 matrices.	• Demonstrate process of finding the inverse of 2x2 and 3x3 matrices using student's input to keep them involved. • Allow time for independent practice.	Check student understanding via oral participation. Check student work. Monitor student's independent work. Classwork

				assigned. Homework assigned Exit cards.
Determinant of a Square Matrix	2 days	Evaluate 2x2 and 3x3 determinants.	• Demonstrate process of finding the value of 2x2 and 3x3 determinants using student's input to keep them involved. • For 3x3 determinants, show both the diagonals and expansion by minor's methods. Have students compare the two techniques and pick their favorite method. 6. Allow time for independent practice.	Check student understanding via oral participation. Check student work. Monitor student's independent work. Classwork assigned. Homework assigned Exit cards.
Cramer's Rule	2 days	Solve systems of equations using Cramer's rule.	• Demonstrate Cramer's rule in solving 2x2 and 3x3 systems of equations using guided practice. • Allow time for	Check student understanding via oral participation. Check student work.

			independent practice.	Monitor student's independent work. Classwork assigned. Homework assigned Exit cards.

Standards

MA.N-VM.B.5a	Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(\boldsymbol{v}_x, \boldsymbol{v}$ subscript $y) = (c\boldsymbol{v}_x, c\boldsymbol{v}$ subscript $y)$.
MA.N-VM.C	Perform operations on matrices and use matrices in applications.
MA.N-VM.C.7	Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
MA.N-VM.C.8	Add, subtract, and multiply matrices of appropriate dimensions.
MA.N-VM.C.9	Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
MA.N-VM.C.10	Understand that the zero and identity matrices play a role in matrix addition and

multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using Google Translate, and or Implementing 504 and special modifications listed on student's IEP.

Special Education Students

- Simplified Instructions: Break down complex problems into smaller, manageable steps.
- Visual Aids: Use diagrams, charts, and visual representations to explain matrix operations and determinants.
- Hands-On Activities: Incorporate manipulatives like algebra tiles or interactive software to visualize concepts.
- Frequent Check-Ins: Regularly check for understanding and provide immediate feedback.
- Modified Assessments: Use alternative assessments such as oral presentations or projects instead of traditional tests.

Multilingual Learners (MLL)

- Language Support: Provide key vocabulary lists with definitions and visual aids.
- Sentence Starters: Use sentence frames to help students articulate their thoughts.
- Collaborative Learning: Pair ELL students with peers for group work to encourage language practice.
- Visual and Contextual Clues: Use diagrams and real-life examples to explain abstract concepts.
- Bilingual Resources: Offer resources in both English and the student's native language if possible.

Gifted Students

- Advanced Problems: Provide more challenging problems that require higher-order thinking.
- Independent Projects: Allow students to explore related topics through independent research projects.
- Flexible Grouping: Group students by ability for certain activities to encourage peer learning.
- Creative Assignments: Encourage students to create their own problems or explore real-world

applications of matrices and determinants.

- Enrichment Activities: Offer additional resources such as online courses or advanced textbooks for further study.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 8 - Trigonometric Ratios, Right Triangle Trigonometry and Applications

Content Area: **Mathematics**
Course(s):
Time Period: **4th Marking Period**
Length: **5 Days**
Status: **Published**

Summary of the Unit

Students will learn the right triangle definitions of the six trigonometric functions and how to use right triangle trigonometry.

Enduring Understandings

The trigonometric ratios used in right triangle trigonometry are based on the concept of similar triangles.

Concepts such at the Pythagorean Theorem are carried over from the study of Geometry.

Trigonometric ratios can be found for acute angles using right triangle trigonometry.

Essential Questions

What is the definition of the six basic trig functions in terms of the sides of a right triangle?
How does tangent relate to sine and cosine?
How does cotangent relate to secant and cosecant?
How can the six basic trig functions be used to solve right triangles?
What is the main difference between a trig function and its inverse?
How can inverse trig functions be used to calculate unknown angles in a right triangle?
How can your calculator fool you into thinking a wrong answer is correct?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

- Written Test/ Quiz:
    - Task: A comprehensive test covering trigonometric ratios (sine, cosine, tangent), solving right triangles, and applying trigonometry to real-world problems.
    - Criteria: Correctness of answers, logical reasoning, and the ability to show all steps clearly.
- Project-Based Assessment:
    - Task: Students create a project that applies trigonometric ratios and right triangle trigonometry to a real-world problem. For example, they could design a model to calculate heights of buildings or distances using trigonometric principles.
    - Criteria: Accuracy of the mathematical model, creativity, and clarity in explaining the concepts used.
- Portfolio:
    - Task: Students compile a portfolio of their work throughout the unit, including homework, classwork, quizzes, and a reflective essay on their learning process.
    - Criteria: Completeness, organization, and reflection on learning.
- Presentation:

- Task: Students present a topic related to trigonometric ratios and right triangle trigonometry, such as their applications in navigation, architecture, or physics.
- Criteria: Depth of research, clarity of presentation, and the ability to answer questions from peers.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Right Triangle Trigonometry	3 days	Solve right triangles using properties of special right triangles and	• Review what students can/should recall from Geometry: Pythagorean	Check student understanding via oral participation.

		right triangle definitions of the six trigonometric functions. Solve for all missing parts of a right triangle, given two sides, or given one trigonometric ratio in the triangle.	Theorem, Pythagorean triples, and 30-60-90 and • 45-45-90 triangles. Derive the relationships of the sides in the special right triangles, as needed. Point out trigonometric ratios are equal in similar triangles. Review right triangle trigonometry when solving for sides and using inverse trigonometry when solving for angles. • Introduce the reciprocal functions and point out co-function relationships. • As time permits, discuss GPS, latitude and longitude, and	Check student work and diagrams. Check for correct use of graphing calculator (degree mode vs. radian mode). Classwork assigned. Homework assigned. Q & A Closure Session.

			converting angles in decimal degree to degree, minutes and seconds, and vice versa.	
Applications Using Trigonometric Ratios	2 days	Solve word problems involving angle of elevation and angle of depression.	• Demonstrate working on word problems that involve angle of elevation and angle of depression by using guided practice. • Allow time for independent practice in small groups.	Check student understanding via oral participation. Check student work. Monitor student's independent work. Classwork assigned. Homework assigned Exit cards.

Standards

MA.9-12.F-TF.A.3

MA.F-TF.A.3	Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosines, and tangent for π – x, π + x, and 2π – x in terms of their values for x, where x is any real number.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Special Education Students

- Simplified Instructions: Break down complex problems into smaller, manageable steps.
- Visual Aids: Use diagrams, charts, and visual representations to explain trigonometric concepts.
- Hands-On Activities: Incorporate manipulatives like interactive software or physical models to visualize trigonometric ratios and right triangles.
- Frequent Check-Ins: Regularly check for understanding and provide immediate feedback.
- Modified Assessments: Use alternative assessments such as oral presentations or projects instead of traditional tests.

Multilingual Learners (MLL)

- Language Support: Provide key vocabulary lists with definitions and visual aids.
- Sentence Starters: Use sentence frames to help students articulate their thoughts.
- Collaborative Learning: Pair ELL students with peers for group work to encourage language practice.
- Visual and Contextual Clues: Use diagrams and real-life examples to explain abstract concepts.
- Bilingual Resources: Offer resources in both English and the student's native language if possible.

Gifted Students

- Advanced Problems: Provide more challenging problems that require higher-order thinking.
- Independent Projects: Allow students to explore related topics through independent research projects.
- Flexible Grouping: Group students by ability for certain activities to encourage peer learning.
- Creative Assignments: Encourage students to create their own problems or explore real-world applications of trigonometric ratios and right triangle trigonometry.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 9 - Unit Circle, Radian Measure, and Periodic Functions

Content Area: **Mathematics**
Course(s):
Time Period: **4th Marking Period**
Length: **15 Days**
Status: **Published**

Summary of the Unit

Students will learn to use radian measure extend their understanding of the right triangle definitions of the six trigonometric functions and how to use right triangle trigonometry to evaluate trigonometric functions of any angle.
Finally, Students are introduced to the graphs of sine, cosine, and tangent functions.

Enduring Understandings

Angles can be measured in degrees or radians.

Trigonometric ratios can be found for acute angles using right triangle trigonometry and can be found for other types of angles using radian measure and/or the unit circle.

Sine, cosine, and tangent functions are periodic. Sine and cosine functions oscillate about a midline, with a specific amplitude, and their domain is all real numbers.

The parent tangent function is undefined for odd multiples of $\pi\pi$, and 2 has vertical asymptotes at those values.

Essential Questions

What is the definition of a radian?
How can you convert from radians to degrees and vice versa?
How do you select Radian Mode or Degree Mode on your calculator?

What is the fundamental difference between a degree and a radian?
What is the arc length formula? (be sure to be able to define the variables)

What is angular velocity?

How does it differ from linear velocity?
How does the arc length formula allow us to convert between angular and linear velocity?

When discussing angles in the Cartesian Plane, which axis is always the initial side?
Which direction of rotation is positive and which is negative?

How many radians represent a full revolution?
How can reflection over the y-axis, origin, and x-axis be used to easily determine the values of the six basic trig functions in any quadrant of the Cartesian Plane?
Under which conditions are two angles coterminal?
Why are important numbers when discussing coterminal angles?
How can the concept of coterminal angles be used to evaluate the six basic trig functions at any value? What is the Unit Circle?
What trig function is represented by the x-axis? The y-axis?

How can the unit circle help us evaluate trig functions quickly?
How can the unit circle be used to help us identify angles for which certain trig functions are not define?

At which angles are tangent, cotangent, secant, and cosecant undefined?

How can symmetry and reflections be used to help you quickly memorize the unit circle?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

- Written Quiz / Test:
    - Task: A comprehensive test covering the unit circle, converting between degrees and radians, and analyzing periodic functions.
    - Criteria: Correctness of answers, logical reasoning, and the ability to show all steps clearly.
- Project-Based Assessment:
    - Task: Students create a project that applies the unit circle and periodic functions to a real-world problem. For example, they could model the motion of a pendulum or analyze sound waves.
    - Criteria: Accuracy of the mathematical model, creativity, and clarity in explaining the concepts used.
- Portfolio:
    - Task: Students compile a portfolio of their work throughout the unit, including homework, classwork, quizzes, and a reflective essay on their learning process.
    - Criteria: Completeness, organization, and reflection on learning.
- Presentation:
    - Task: Students present a topic related to the unit circle, radian measures, or periodic functions, such as their applications in engineering or physics.
    - Criteria: Depth of research, clarity of presentation, and the ability to answer questions from peers.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
Define General Angles and Use Radian Measure	7 days	Define angles in standard position, initial side, and terminal side; distinguish between positive and negative angles; Convert angles from degree to radian	• Intro key vocabulary: Angle, made by rotating a ray about a point, Angle in standard position, vertex, initial ray, terminal ray, positive angle, negative angle.	Check student understanding via oral participation. Check student work and diagrams. Classwork assigned.

		and vice versa, find co-terminal angles, complementary angles and supplementary angles, and sketch angle (both in degree measure and radian measure). Define radian in terms of the measure of the central angle of a circle. Find arc length and area of a sector.	• Draw a positive angle and negative angle that are co- terminal and have student supply definition of co- terminal. • Recall Quadrants, degrees in full and • ½ rotation, complementary, supplementary, acute, right, obtuse, reflexive, angles greater than 360 and Quadrantal angles. • Write the definition of radian on the board, ask students to read. What does it mean? To explain, draw a circle on the board and draw in a radius	Homework assigned. Exist Cards.

			(where initial ray in standard position would be). Cut a length of twine equal to the length of the radius. Use the twine to measure an arc on the circle. Draw terminal ray to meet end of arc. That central angle is a radian. Have students estimate the degree measure (about 60° is fine for now.). • Intro formula for $s=r\theta$. In a circle, $C=2\pi r$, and circumference is an arc made rotating and angle a full rotation. Plug into $s=r\theta$ to show a full rotation in radians is 2π. • Draw xy axes, and label radian measures for 0,	

			90, • 180, 270 and 360 • degrees. Draw xy axes again, and draw 1, 2, 3, 4, 5, 6 • radians….a bit more than 3 fit in 180 • degrees (3.14!). • Also show area of a sector formula, and where is comes from A=1/2(r^2)π. • Develop conversion factor for degrees and radians from the fact that 180°=π radians. Show what 1° equals and what one radian equals (and use a calculator to show it is about 57°). • Formalize: To convert degrees to radians,	

			multiply degrees by $\pi/180$ degrees; and to convert radians to degrees, multiply radians by 180 degrees/π. • Introduce 17 special angles, and how to find the radian measures quickly. • Review co-terminal, complementary and supplementary angles, and find them in radian measure (review fraction work as needed).	
Evaluate Trigonometric Functions of Any Angle		Find reference angles and evaluate the trigonometric function of any special angle using reference angles.	• Define a reference angle for an angle θ (the reference angle, θ', is the acute angle between the terminal ray of	Check student understanding via oral participation. Check student work.

		Given an ordered pair on the terminal ray of an angle in standard position, SWBAT evaluate the 6 trigonometric functions of that angle. Predict the sign of a trigonometric function depending on the Quadrant its terminal ray lies in. Use this knowledge to develop the definitions of the 6 trigonometric functions based on *x*, *y*, and *r*. Evaluate trigonometric functions of any angle with respect to *x*, *y*, and *r* (including quadrantal angles).	the angle θ and the horizontal axis). Draw an angle in each of the 4 quadrants and have students show where the reference angle is. Then give an angle measure for θ, and have students find the measure of θ' (start with degrees i.e. 300, -135, and then formalize process, so they can do this for radian measure • i.e. 3π/4). • Review sides of 30- 60-90 and 45-45-90 • triangles. Then, given a special angle θ, find θ', and use θ' to draw a special right triangle and evaluate the 6 trig functions for that angle	Monitor student's independent work. Check student's created unit circles. Classwork assigned. Homework assigned Exit cards.

			(use right triangle trigonometry). • Practice: given a point on the terminal ray of an angle θ, find sin θ, cos θ and tan θ. Expand definition to include points on terminal ray of an angle (x, y) more/less than one unit away from the origin • Have students come up with the definitions of the 6 trigonometric functions in terms of x, y, and r. Expand exploration to have students predict the sign of the 6 trigonometric functions in each quadrant based on the signs of the (x, y) pair.	

			• Do problems where one trigonometric ratio of an angle and the Quadrant where the terminal ray lie are given and find the remaining trigonometric functions. Or problems where one trigonometric ratio of an angle is given, and the sign of another trigonometric ratio is given, find the remaining ratios. • Students make their own unit circle.	
Graph Sine, Cosine, and Tangent Functions	4 days	Sketch the graphs of sine and cosine functions, after identifying amplitude, period, and the 5 key points needed to sketch the graph. Sketch the graph of	• Provide sketches of the parent graphs of y=sin *x* and y=cos *x*, and discuss domain, range, amplitude, period, and *x*-intercepts (note the 5 key points that are needed to sketch a complete curve). Discuss	Check student understanding via oral participation. Check student graphs. Monitor student's independent

		the tangent function after identifying period and asymptotes.	and practice graphing y=a sin b*x* and y= a cos b*x*, making changes in *a* and *b*. • Repeat for the graphs of y=tan *x* and y=a tan b*x*, discussing period, domain (results in vertical asymptotes), range, and *x*-intercepts.	work. Classwork assigned. Homework assigned Exit cards.

Standards

MA.F-TF.A.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
MA.F-TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
MA.F-TF.A.4	Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP.

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.
Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 10 - Descriptive Statistics

Content Area: **Mathematics**
Course(s):
Time Period: **4th Marking Period**
Length: **9 Days**
Status: **Published**

Summary of the Unit

In this unit, students will study the Fundamental Counting Principle, permutations (with and without repetition), and combinations (simple or multiple events). Students will examine the patterns found in Pascal's triangle and apply these patterns to binomial expansions.

Enduring Understandings

There are many ways to count the number of possibilities, but it depends on whether order matters.
Probabilities can also be computed, but you must be mindful of whether events are independent or dependent.

Essential Questions

How do you use the fundamental counting principle to count the number of ways an event can happen?
How do you use permutations to count the number of ways an event can happen?
How do you use combinations to count the number of ways an event can happen?
How do you find theoretical and experimental probabilities?
How do you find geometric probabilities?
How do you use compliments to find the probability of an event?
How do you find the probability of independent events?
How do you find the probability of dependent events?

Summative Assessment and/or Summative Criteria

Section Quizzes, End of Unit Tests, and End of Quarter Exam

Summative Assessment Ideas

- Written Exam:
    - Task: A comprehensive test covering measures of central tendency (mean, median, mode), measures of variability (range, variance, standard deviation), and interpretation of data displays (histograms, box plots, etc.).
    - Criteria: Correctness of answers, logical reasoning, and the ability to show all steps clearly.
- Project-Based Assessment:
    - Task: Students analyze a real-world dataset and present their findings. This could involve collecting data, calculating descriptive statistics, and interpreting the results.
    - Criteria: Accuracy of calculations, depth of analysis, and clarity in presenting findings.
- Portfolio:
    - Task: Students compile a portfolio of their work throughout the unit, including homework, classwork, quizzes, and a reflective essay on their learning process.
    - Criteria: Completeness, organization, and reflection on learning.
- Presentation:
    - Task: Students present a topic related to descriptive statistics, such as the use of statistics in a particular field (e.g., sports, medicine, economics).
    - Criteria: Depth of research, clarity of presentation, and the ability to answer questions from peers.

Resources

Websites may be used

https://www.math-drills.com/
https://www.education.com/worksheets/math/

https://www.kutasoftware.com/

https://www.khanacademy.org/math

https://wegassign.net
Worksheets, Online assignments, and Textbook

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments
The Counting Principle	3 days	Use the Fundamental Counting Principle.	• Define key vocabulary such as outcome, sample space, event, and independent vs. dependent. • Introduce the idea of ways to count by hand, such as with	Check student understanding via oral participation. Check student work. Check for

			a tree diagram or a table. • Introduce the Fundamental Counting Principle and provide practice problems using it (both independent and dependent events).	correct use of graphing calculator. Classwork assigned. Homework assigned. Q & A Closure Session.
Permutations and Combinations	3 days	Solve problems using permutations and permutations with repetition. Solve problems using combinations and combinations with multiple events.	• Define a permutation and introduce factorial notation. • Introduce the permutation formula and show how to use it in the graphing calculator. • Show the formula for permutation with repetition and provide practice problems to use it. • Define a combinatio n.	Check student understanding via oral participation. Check student work. Check for correct use of graphing calculator. Classwork assigned. Homework assigned. Q & A Closure Session.

			• Introduce the combination formula and show how to use it in the graphing calculator. • Provide practice problems with simple events, and multiple events.	
Use Combinations and the Binomial Theorem	3 days	Use the Binomial Theorem to expand a power of a binomial expression completely, or to find a specific term in the expansion.	• Introduce Pascal's Triangle using numbers, and then using combinations. • Solve problems such as "How many different combinations of 2 Model UN members can be chosen from the 6 Model UN students in the club?" using Pascal's Triangle (confirm with combinations). Then expand $(aa + bb)_n$ for n=0, 1, 2, 3, and 4, and show that the coefficients match Pascal's	Check student understanding via oral participation. Check student work. Check for correct use of graphing calculator. Classwork assigned. Homework assigned. Q & A Closure Session.

			Triangle. • Introduce the Binomial Theorem, then use it to expand $(xx^2 + yy)^3$ and other practice problems. As time permits, find specific terms or coefficients of terms, using knowledge of the Binomial Theorem	

Standards

MA.9-12.N-Q.A.1
MA.9-12.N-Q.A.3
MA.9-12.F-IF.A.2

MA.F-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MA.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MA.N-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting

quantities.

Modifications for Students with IEPs/504s, Academically At Risk, Gifted or MLL

*Consistent with individual plans, when appropriate. Such as using google translate, and or Implement 504 and special modifications listed on student's IEP

Suggested Technological Innovations/Use

Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, graphing calculators, Communicators/individual dry erase boards.

Teachers are encouraged to use electronic assessments to determine mastery of concepts taught. The use of kahoot or other types of interactive software is encouraged.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
9.2 21st Century Life and Career Skills: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.