Mount Pleasant Central School District

Algebra 2/TrigonometryR, Math

We believe that students should learn the mathematical practice standards by showing the connections between real world problems and mathematical solutions by modeling, explorations and discovery.

How can we communicate mathematical understanding of the real world using appropriate complex algebraic language/models and apply knowledge of the unit circle? In this class, students will study advanced algebra and trigonometry topics that build on their work with functions and geometric trigonometry. Our main goal is to have students continue to explore functions, including absolute value, polynomials, exponential, logarithmic, and trigonometric functions, and expand their understanding of polynomials, complex numbers, radical expressions, and rational expressions and equations. We emphasize connecting mathematical concepts through multiple representations and encourage critical thinking and problem solving, promoting independent thinking. The ultimate goal is for students to master the ability to justify and communicate their reasoning process and solutions. Assessment will be primarily through summative assessments and performance-based tasks.

Unit Title	Month	Content	Vocabulary	Standards	Skills	Big Ideas	Assessments
Functions	September	-Function notation (input vs output). -Properties of graphed functions and their inverses.	-Function -One-to-one function -Domain -Range -Inverse	Understand the concept of a function and use function notation. (AII-F.IF)	*Students will differentiate between the domain and range of a function. *Students will evaluate functions at various inputs using a variety of representations.	Understand that functions represent relationships. These relationships are a result of inputs and outputs and can be used to model real-world situations.	Cumulative exam with a focus on the most recent unit. The exam has multiple-choice, free-response questions, application questions, and open-ended questions, which require written explanation
Factoring	October	-Factoring (linear and quadratic) -Zero product law	-Factor (verb vs. noun) -Conjugate -GCF (greatest common factor) -Binomial -Trinomial	Interpret the structure of expressions. (AII-A.SSE)	*Students will identify and factor the difference of squares. *Students will make a factor pair for trinomials with a leading coefficient not equal to 1.	Understand the various methods of taking a complex expression and demonstrating it as the product of binomials.	Cumulative exam with a focus on the most recent unit. The exam has multiple choice, free response questions, application questions, and open-ended questions which require written explanation

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Quadratic Functions	October	-Using the algebraic components of factorings to create a parabola. -Displacement of a parent quadratic to various positioning/orientations based on changing coefficients and constants.	- Turning point/vertex - Zeros & intercepts - Minimum/maximum - Vertex form - Factored form	Write expressions in equivalent forms to reveal their characteristics. (AII-A.SSE)	*Students will describe key features of a quadratic function (turning point/vertex, maximum/minimum, intercepts). *Students will express quadratic equations in various forms (standard, factored, vertex) absolute value functions.	Understand that quadratics are a particular form that can be graphed with predictable features.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation
Exponents and Radicals	November	-Square root functions and working with equations involving square roots. -Rationalize fractions	-Inverse operations -Roots -Radicals -Rationalize -Quadratic	Understand solving equations as a process of reasoning and explain the reasoning. (AII-A.REI)	*Students will find the domain and range of square root functions and how to graph them. *Students will rationalize fractions by identifying denominators.	Understand that radicals and exponents are inverse operations of each other with related properties used to solve various equations.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation

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Complex Numbers	December	-Imaginary numbers -Operations with imaginary numbers	-Complex numbers -Discriminant	Perform arithmetic operations with complex numbers. (AII-N.CN)	*Students will calculate imaginary numbers. *Students will use operations of complex numbers.	Understand that the number system expands when existing systems are insufficient using logical extensions of mathematics.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation
Polynomials & Rational Functions	January	-Graphs of quadratics using end & root behaviors. -Rational functions	-End Behavior -Root Behavior	Interpret the structure of expressions. (AII.A.SSE)	*Students will create simplified polynomials. *Students will use operations with rational numbers.	Understand that polynomial functions behave in a predictable way determined by their roots and ends. Rational functions extend polynomials by allowing division.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation
Exponentials and Logarithms	February	-Laws and relationships of exponents.	-Base -Exponent	Analyze functions using different representations.	*Students will use exponential properties to	Understand that exponents and logarithms	Cumulative exam with a focus on the most recent

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		-Laws and relationships of radicals.	-Exponential -Logarithim	(AII-F.IF)	solve real world problems. *Students will use logarithmic properties to solve real world problems.	are inverse operations and provide a wider variety of applications beyond radicals.	unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation
Trig and the Unit Circle	March	-Understanding the relationship between the unit circle and triangles. -Sine/Cosine/Tangent	-Sine -Cosine -Tangent -Standard Unit	Extend the domain of trigonometric functions using the unit circle. (AII-F.TF)	*Students will create a unit circle using special right triangles. *Students will define sine, cosine, and tangent.	Understand that the unit circle emphasizes how circular motion and triangle ratios connect to the trigonometric functions.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation
Trig Applications	April	-Exploring the 3 base trig functions and their inverses. -Trigonometric transformations	-Secant -Cosecant -Cotangent -Amplitude -Period	Model periodic phenomena with trigonometric functions. (AII-F.TF)	*Students will define trig inverses. *Students will graph sin/cos/tan.	Understand that trigonometry connects triangles to real world measurement and can be used to model periodic and oscillating behavior.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended

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Unit Title	Month	Content	Vocabulary	Standards	Skills	Big Ideas	Assessments
							questions which require written explanation
Statistics	May	-Exploration of probability. -Exploration of the normal distribution.	-Condition -Standard deviation -Mean/average	Summarize, represent, and interpret data on a single count or measurement variable (AII-S.ID)	-Conditional probability -Z-score	Understand that the normal distribution is a real world phenomena and it can be used to predict and calculate a variety of statistics.	Cumulative exam with a focus on the most recent unit. Exam has multiple choice, free response questions, application questions and open ended questions which require written explanation
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