



Mount Pleasant Central School District

Algebra 2/TrigonometryH, 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 by applying 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 |
|---|------------|--|--|--|---|---|---|
| Absolute Value, Inequalities, and Functions | September | -Function notation and properties of a function. -Inverses and compositions of functions. | Domain/Range One-to-one/onto Composition Inverse Function Notation | Solve equations and inequalities in one variable. (AII-A.REI) | *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 focus on the current unit. The questions are a variety of multiple-choice and free responses. |
| Exponents and Radicals | October | -Root functions and working with equations involving roots and rationalizing fractions. -Operations with imaginary numbers and complex numbers. | Laws of exponents Inverse operations Rationalize Complex numbers Conjugate | Understand solving equations as a process of reasoning and explain the reasoning (AII-A.REI) | *Students will rationalize fractions by identifying denominators. *Students will calculate imaginary numbers and perform operations of complex numbers. | 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. The exam has multiple-choice, free-response questions, application questions, and open-ended questions which require written justification. |
| Quadratic & Polynomial | November - | -Graphs and features of | Polynomial | Understand the concept | *Students will describe | Understand that | Cumulative Exam with |

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| Functions | January | polynomial functions. -Use algebraic and graphic methods to solve polynomial equations. | Behavior Forms Critical Values (Critical, Extreme, etc) Minimum/Maximum | of a function and use function notation. (AII-F.IF) | key features, graph and solve polynomial equations, and express them in various forms. *Students will create simplified polynomial expressions. | polynomial functions behave in a predictable way determined by their roots and ends. | focus on the current unit. Questions are a variety of multiple choice and free responses. |
| Exponentials and Logarithms | January - March | -Graphing inverse of exponential functions to represent logarithmic functions. -Solving exponential equations using logs. | Exponential growth/decay Logarithmic function Compound Interest Log properties and equations Natural log | Analyze functions using different representations. (AII-F.IF) | *Students will use exponential properties to solve real world problems. *Students will use logarithmic properties to solve real world problems. | Understand that exponents and logarithms are inverse operations and provide a wider variety of applications beyond radicals. | Compound Interest Project and Cumulative Exam with focus on the current unit. Questions are a variety of multiple choice and free responses. |
| Rationals | March | -Operations with rational expressions. -Rational functions and | Expressions Equivalent expressions Extraneous solutions/ | Interpret the structure of expressions. (AII.A.SSE) | *Students will use operations with rational numbers. | Understand how the division of polynomials creates unique behaviors, | Cumulative Exam with focus on the current unit. Questions are a variety of |

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| | | complex fractions. | Undefined Indeterminate values Work/rate | | | and rational functions extend polynomials by allowing division. | multiple choice and free responses. |
| Trig and the Unit Circle | March | -Understanding the relationship between the unit circle and triangles. -Using sine/cosine/tangent to model sinusoidal functions. | Sine Cosine Tangent Standard Unit Sinusoidal | 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. | Unit Circle Project and Cumulative Exam with focus on the current unit. Questions are a variety of multiple choice and free responses.. |
| Application of Trig Functions | April | - Exploring the three base trig functions and their inverses. -Trigonometric transformations. | Secant Cosecant Cotangent Amplitude/period/midline Law of sines/cosines | Model periodic phenomena with trigonometric functions. (AII-F.TF) | *Students will be able to define trig inverses. *Students will be able to graph Sin/Cos/Tan functions. | Understand that trigonometry connects triangles to real world measurement and can be used to model periodic and oscillating behavior. | Cumulative Exam with focus on the current unit. Questions are a variety of multiple choice and free responses. |
| Trig Equations & Identities | May | -Introduction and application of basic identities. -Verifying identities using | Reciprocal identities Quotient identities Pythagorean identities | Prove and apply trigonometric identities. (AII-F.TF) | *Students will identify and use trigonometric identities. | Understand how to leverage the properties of trigonometric functions to manipulate | Cumulative Exam with focus on the current unit. Questions are a variety of multiple choice and free |

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| | | algebraic techniques and fundamental identities to prove more complex trigonometric identities. | | | *Students will simplify trigonometric expressions and solve trigonometric equations. | expressions and use algebraic strategies to solve complex equations. | responses. |
| 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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