Mount Pleasant Central School District

Algebra, 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 algebraic language/models? In this class, students are introduced to expressions and equations, functions, inequalities, quadratics, exponents, systems, and statistics. Our main goal is to encourage the development of algebraic problem-solving skills aligned to real-world contexts, enhanced by the use of a graphing calculator. We emphasize and foster the foundation for the mathematical literacy skills required for success in subsequent high school mathematics courses. Assessment will primarily be through quizzes, tests, and performance-based projects, with the course culminating in a New York State Regents Exam.

Unit Title	Month	Content	Vocabulary	Standards	Skills	Big Ideas	Assessments
Building Blocks of Algebra	September	*Variables and expressions. *Properties of numbers.	*Term *Coefficient *Distributive *Associative *Commutative	Interpret the structure of expressions. (AI.A.SSE)	*Students will identify parts of an algebraic term. *Students will apply mathematical properties to variables.	Expressions and equations are a series of terms, each of which is created by a combination or variable and numbers with different values.	Cumulative exam with a focus on the unit. The exam contains multiple-choice and free-response questions that require students to justify their reasoning.
Solving Linear Equations and Inequalities	September	*Linear equations and their solutions. *Inequalities and their solutions.	*Inequality *Interval notation *Constraint *Coefficients and constants *Expressions and variables	Solve equations and inequalities in one variable. (AI-A.REI)	*Students will model with linear equations. *Students will solve and model with linear inequalities.	*Students can use an inequality to describe a real-life statement.	*The summative assessment requires students to solve simple and multi-step inequalities algebraically and to interpret their solutions within the real-world context of the problem. Additionally, when required, students will justify their choice of solving method based on the problem.

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Functions	October	*Properties of functions. *Average rate of change.	*Domain *Range *Rate of change *Function	Understand the concept of a function and use function notation. (AI-F.IF)	*Students will interpret functions in algebraic and table form. *Students will be able to create graphic representations of a function.	Functions describe relationships, can be represented in multiple ways, and are used to model real world scenarios.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.
Linear Functions	November	*Linear functions & graphing. *Modeling with linear functions.	*Slope *Y-intercept *Greater than *Less than	Analyze functions using different representations. (AI-F.IF)	*Students will write and understand the equation of a line. *Students will extend the properties of equations to inequalities.	Linear functions model a constant rate of change.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.
Linear Systems	December	*System of equations *System of inequalities	*System *Elimination *Substitution *Intersection point	Solve systems of equations. (AI-A.REI)	*Students will write and solve systems of linear equations by graphing, substitution and elimination. *Students will write and	*Students will understand that systems of equations can be solved via graphing, substitution and elimination.	*The summative assessment requires students to create systems of linear equations, to solve them graphically and algebraically, and to interpret their solutions

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					solve systems of linear inequalities by graphing, substitution and elimination.		within the real-world context of the problem. Additionally, students will justify their solving method choice based on the structure of the system.
Exponential Algebra and Functions	January	*Exponent properties and functions. *Exponential models (percent growth/decay).	*Exponential function *Exponential growth/decay *Compound interest *Common ratio *Recursive rule	Construct and compare linear, quadratic, and exponential models and solve problems. (AI-F.LE)	*Students will understand exponential structure. *Students will understand exponential growth and decay.	*Students will discern that exponential functions have a different constant rate of change than linear functions and, as such, can model a different style of real life application.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.
Polynomials	February	*Polynomial operations *Factoring	*Factoring *Conjugate *Binomial *Trinomial	Understand the relationship between zeros and factors of polynomials. (AI-A.APR)	*Students will add, subtract, multiply, and divide polynomials. *Students will factor trinomials.	*Polynomials are expressions that extend patterns of arithmetic and algebra and model real world phenomena. They can be written in many different forms.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.

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Quadratic Functions	March	*Quadratic form and graphed parabolas. *Finding the roots of a quadratic.	*Root *Zero product law *Axis of symmetry *Vertex	Interpret expressions for functions in terms of the situation they model. (AI-F.LE)	*Students will identify and manipulate quadratic functions. *Students will apply quadratics to real life applications and graphs.	Quadratic equations model situations with variable rates of change and can be represented in multiple forms, each with unique insights.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.
Roots & Irrational Numbers	April	*Integers and rational number properties. *Square roots.	*Root *Rational *Irrational	Use properties of rational and irrational numbers. (AI-N.RN)	*Students will compute square roots of variables and numbers alike. *Students will use radicals to solve quadratics.	Roots and irrational numbers extend the conventional number system and can be used for a variety of purposes.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.
Functions & Their Transformations	May	*Transformations of parent functions.	*Parent function *Translation *Reflection *Dilation	Interpret the structure of expressions (AI-A.SSE)	*Students will understand how altering a parent function will result in a physical movement in a graph.	Functions can be transformed without changing their fundamental type.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require

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					*Students will understand the vertex form of a quadratic function		students to justify their reasoning.
Statistics	May - June	*Bivariate Data *Least squared regression line	*Distribution *Correlation *Bivariate *Dependent *Independent	Summarize, represent, and interpret data on a single count or measurement variable. (AI-S.ID)	*Students will understand how the relationships between two types of variables can be expressed visually and a model can be formed to predict trends.	Patterns in data can be visualized, analyzed and used to make predictions.	Cumulative exam with focus on unit. The exam contains multiple choice and free response questions that require students to justify their reasoning.