

INDIAN HILL EXEMPTED VILLAGE SCHOOL DISTRICT
Mathematics Curriculum - May 2009 - High School – Algebra II

Main Idea: Equations and Inequalities

Objectives & Skills:

- Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.
- Use algebraic representations and functions to describe and generalize geometric properties and relationships.
- Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.
- Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.
- Describe the relationship between slope of a line through the origin and the tangent function of the angle created by the line and the positive x -axis.
- Connect physical, verbal and symbolic representations of irrational numbers; e.g., construct [square root of 2] as a hypotenuse or on a number line.
- Explain the meaning of the n th root.
- Approximate the n th root of a given number greater than zero between consecutive integers when n is an integer; e.g., the 4th root of 50 is between 2 and 3.

Main Idea: Linear Equations and Functions

Skills & Objectives:

- Define function formally and with $f(x)$ notation.
- Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.
- Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.
- Use algebraic representations and functions to describe and generalize geometric properties and relationships.
- Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.
- Describe the relationship between slope of a line through the origin and the tangent function of the angle created by the line and the positive x -axis.

Main Idea: Linear Systems and Matrices

Skills & Objectives:

- Solve systems of linear inequalities.
- Solve real-world problems that can be modeled, using systems of linear equations and inequalities.

Main Idea: Quadratic Functions and Factoring

Skills & Objectives:

- Define function formally and with $f(x)$ notation.
- Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.
- Use algebraic representations and functions to describe and generalize geometric properties and relationships.
- Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.
- Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions.

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Main Idea: Polynomials and Polynomial Functions

Skills & Objectives:

- Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.
- Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.
- Use algebraic representations and functions to describe and generalize geometric properties and relationships.
- Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.
- Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions.
- Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.
- Describe the relationship between slope of a line through the origin and the tangent function of the angle created by the line and the positive x -axis.

Main Idea: Rational Exponents and Radical Functions. Exponential and Logarithmic Functions.

Skills & Objectives:

- Describe and compare the characteristics of the following families of functions: quadratics with complex roots, polynomials of any degree, logarithms, and rational functions; e.g., general shape, number of roots, domain and range, asymptotic behavior.
- Identify the maximum and minimum points of polynomial, rational and trigonometric functions graphically and with technology.
- Define function formally and with $f(x)$ notation.
- Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.
- Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.
- Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.
- Solve equations and inequalities having rational expressions as coefficients and solutions.
- Graph the quadratic relationship that defines circles.
- Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions.
- Define function formally and with $f(x)$ notation.
- Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.
- Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.
- Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions.
- Graph the quadratic relationship that defines circles.

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Main Idea: Rational Functions

Skills & Objectives:

- Describe and compare the characteristics of the following families of functions: quadratics with complex roots, polynomials of any degree, logarithms, and rational functions; e.g., general shape, number of roots, domain and range, asymptotic behavior.
- Identify the maximum and minimum points of polynomial, rational and trigonometric functions graphically and with technology.
- Describe how a change in the value of a constant in an exponential, logarithmic or radical equation affects the graph of the equation.

Main Idea: Find Measures of Central Tendency. Sequences and Series.

Skills & Objectives:

- Create a scatterplot of bivariate data, identify trends, and find a function to model the data.
- Use technology to find the Least Squares Regression Line, the regression coefficient, and the correlation coefficient for bivariate data with a linear trend, and interpret each of these statistics in the context of the problem situation.
- Describe the standard normal curve and its general properties, and answer questions dealing with data assumed to be normal.
- Analyze and interpret univariate and bivariate data to identify patterns, note trends, draw conclusions, and make predictions.
- Describe how a linear transformation of univariate data affects range, mean, mode, and median.
- Use technology to compute the standard deviation for a set of data, and interpret standard deviation in relation to the context or problem situation.
- Design a statistical experiment, survey or study for a problem; collect data for the problem; and interpret the data with appropriate graphical displays, descriptive statistics, concepts of variability, causation, correlation and standard deviation.
- Analyze the behavior of arithmetic and geometric sequences and series as the number of terms increases.
- Translate between the numeric and symbolic form of a sequence or series.
- Represent and analyze bivariate data using appropriate graphical displays (scatterplots, parallel box-and-whisker plots, histograms with more than one set of data, tables, charts, spreadsheets) with and without technology.
- Display bivariate data where at least one variable is categorical.
- Identify outliers on a data display; e.g., use the interquartile range to identify outliers on a box-and-whisker plot.
- Interpret the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread.
- Use factorial notation and computations to represent and solve problem situations involving arrangements.
- Describe measures of center and the range verbally, graphically and algebraically.
- Interpret the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread.
- Provide examples and explain how a statistic may or may not be an attribute of the entire population; e.g., intentional or unintentional bias may be present.
- Differentiate and explain the relationship between the probability of an event and the odds of an event, and compute one given the other.

Main Idea: Trigonometric Ratios and Functions

Skills & Objectives:

- Describe and compare the characteristics of transcendental and periodic functions; e.g., general shape, number of roots, domain and range, asymptotic behavior, extrema, local and global behavior.
- Represent the inverse of a transcendental function symbolically.
- Use trigonometric relationships to determine lengths and angle measures; i.e., Law of Sines and Law of Cosines.