

New Hampshire State Core Curriculum

Standards adopted 2006

Functions and Algebra

| Strand | Description | Boardworks High School Algebra presentations |
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| | M:F&A:HS:1 Identifies arithmetic and geometric sequences and finds the n th term; then uses the generalization to find a specific term. | Sequences and rules Arithmetic sequences Geometric sequences |
| NECAP | M:F&A:10:1 Identifies, extends, and generalizes a variety of patterns (linear and nonlinear) represented by models, tables, sequences, or graphs in problem solving situations. | Sequences and rules Arithmetic sequences Geometric sequences Other types of sequences Sequences and series The sum of an arithmetic series The sum of a geometric series Binomial coefficients |
| | M:F&A:HS:2 Demonstrates conceptual understanding of linear and nonlinear functions and relations. | |
| | <ul style="list-style-type: none"> Analyzes characteristics of classes of functions (polynomial, rational, and exponential) to include domain, range, intercepts, increasing and decreasing intervals and rates of change. | Graphs of important non-linear functions Functions and relations Domain, range and composite functions Plotting and sketching graphs Graphs of quadratic functions Exponentials and logarithms Simplifying rational functions |
| | <ul style="list-style-type: none"> Understands one-to-one (injective) functions and that a function that is one-to-one has a converse that is also a function; and finds inverses algebraically and graphically. | Functions and relations Domain, range and composite functions Inverse functions |

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| | <ul style="list-style-type: none"> • Graphs polynomial, rational and exponential functions, including vertical and horizontal shifts, stretches, and compressions as well as reflections across vertical and horizontal axes. | Graphs of important non-linear functions Plotting and sketching graphs Graphs of quadratic functions Exponentials and logarithms Simplifying rational functions Transforming functions part 1 Transforming functions part 2 |
| | <ul style="list-style-type: none"> • Applies knowledge of functions to interpret and understand situations, design mathematical models, and solve problems in mathematics as well as in the natural and social sciences. | Real life graphs Problems leading to quadratic equations Exponential growth and decay |
| NECAP | M:F&A:10:2 Demonstrates conceptual understanding of linear and nonlinear functions and relations (including characteristics of classes of functions) through an analysis of constant, variable, or average rates of change, intercepts, domain, range, maximum and minimum values, increasing and decreasing intervals and rates of change (e.g., the height is increasing at a decreasing rate); describes how change in the value of one variable relates to change in the value of a second variable; or works between and among different representations of functions and relations (e.g., graphs, tables, equations, function notation). | Ratio Dividing in a given ratio Direct proportion Inverse proportion Real life graphs |
| | M:F&A:HS:3 Demonstrates conceptual understanding of algebraic expressions. | |
| | <ul style="list-style-type: none"> • Manipulates, evaluates, and simplifies algebraic and numerical expressions. | Multiplying parentheses The distributive property Factoring Factoring quadratic expressions Algebraic fractions Solving linear equations Equations with parentheses and fractions Equations, formulas and identities |
| | <ul style="list-style-type: none"> • Adds, subtracts, multiplies and divides polynomials and rational expressions. | Operations with polynomials Dividing polynomials The factor theorem Simplifying rational functions Operations with algebraic fractions Improper fractions |

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| | <ul style="list-style-type: none"> • Factors quadratic and higher degree polynomials. | Factoring Factoring quadratic expressions Quadratic equations and factoring Solving quadratic equations |
| | <ul style="list-style-type: none"> • Understands properties of logarithms and converts between logarithmic and exponential forms. | The laws of logarithms Solving equations involving logarithms |
| | <ul style="list-style-type: none"> • Manipulates, evaluates, and simplifies expressions involving rational exponents and radicals and converts between expressions with rational exponents and expressions with radicals. | Exponents and roots Exponent laws Negative exponents and reciprocals Rational exponents Radicals Manipulating radicals |
| | <ul style="list-style-type: none"> • Understands the effect of simplifying rational expressions on the domain of the related functions (e.g., $x^2/x = x$ for $x \neq 0$). | Simplifying rational functions Operations with algebraic fractions Improper fractions |
| NECAP | M:F&A:10:3 Demonstrates conceptual understanding of algebraic expressions by solving problems involving algebraic expressions, by simplifying expressions (e.g., simplifying polynomial or rational expressions, or expressions involving integer exponents, square roots, or absolute values), by evaluating expressions, or by translating problem situations into algebraic expressions. | Exponents Zero, negative and fractional exponents Multiplying parentheses The distributive property Factoring Factoring quadratic expressions Algebraic fractions Manipulating radicals Absolute value functions Simplifying rational functions Operations with algebraic fractions Improper fractions |
| | M:F&A:HS:4 Demonstrates conceptual understanding of equality. | |
| | <ul style="list-style-type: none"> • Factors, completes the square, uses the quadratic formula, and graphs quadratic functions to solve quadratic equations. | Factoring Factoring quadratic expressions Quadratic equations and factoring Completing the square The quadratic formula Problems leading to quadratic equations Solving quadratic equations Graphs of quadratic functions |

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| | <ul style="list-style-type: none"> • Solves equations involving polynomial, rational, and radical expressions. Graphs and interprets the solutions. | Manipulating formulas Solving quadratic equations Graphs of quadratic functions Plotting and sketching graphs Simplifying rational functions Operations with algebraic fractions Improper fractions |
| | <ul style="list-style-type: none"> • Understands extraneous solutions. | – |
| | <ul style="list-style-type: none"> • Finds approximate solutions to equations by graphing each side as a function using technology. Understands that any equation in x can be interpreted as the equation $f(x) = g(x)$ and interpret the solutions of the equation as the x-value(s) of the intersection point(s) of the graphs of $y = f(x)$ and $y = g(x)$. | Non-linear functions Using graphs to solve equations Function notation |
| | <ul style="list-style-type: none"> • Solves 2×2 and 3×3 systems of linear equations and graphically interprets the solutions. | Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations |
| | <ul style="list-style-type: none"> • Solves systems of linear and quadratic inequalities. | Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables Quadratic inequalities Solving quadratic inequalities |
| | <ul style="list-style-type: none"> • Solves systems of equations involving nonlinear expressions and graphically interprets the solutions. | Systems of linear and quadratic equations One linear and one quadratic equation |
| | <ul style="list-style-type: none"> • Translates problem situations into inequalities; and solves linear and non-linear inequalities (symbolically and graphically). | Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables Quadratic inequalities Solving quadratic inequalities |

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| NECAP | M:F&A:10:4 Demonstrates conceptual understanding of equality by solving problems involving algebraic reasoning about equality; by translating problem situations into equations; by solving linear equations (symbolically and graphically) and expressing the solution set symbolically or graphically, or provides the meaning of the graphical interpretations of solution(s) in problem solving situations; or by solving problems involving systems of linear equations in a context (using equations or graphs) or using models or representations. | Solving linear equations Using equations to solve problems Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations Absolute value functions |
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