

# High School Mathematics

## Pre-Algebra

This course is designed for students who have a basic understanding of arithmetic skills and want to further their study of mathematics. Mastery of this course will provide the student with the essentials to go on to study Algebra. Topics will include number systems, number properties, solving simple equations, and applications of formulas from science and geometry. Students will use calculators in most applications.

### Learning Opportunities

Chapter assessments, unit assessments, quizzes, homework, daily work, portfolio, group projects, board work, partner pairs, round-the-clock, problem of the day, ticket out, bingo, graphing calculator, challenge problems and web quests

### Standards

Fields of Knowledge: Mathematics, Science, Technology

*Mathematical Understanding*

**7.8** Functions and Algebra Concepts : Students use function and algebra concepts.

*Mathematical Problem Solving and Reasoning*

**7.10** Applications : Students use concrete, formal, and informal strategies to solve mathematical problems, apply the process of mathematical modeling, and extend and generalize mathematical concepts. Students apply mathematics as they solve scientific and technological problems or work with technological systems.

### Content Knowledge and Skills

**Connections to Algebra (semester 1):** Numbers and number operations; exponents and powers; equations and inequalities, a problem-solving plan: variables in Algebra; order of operations; verbal models and Algebraic models; exploring Geometry –area, perimeter and volume

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**Rules of Algebra (semester 2):** determining percentages, the integer number line, addition and subtraction of integers, solving algebraic equations with integers, graphing and the coordinate plane, exploring data: rates and ratios, advanced problem solving, percentage increase and decrease, multiplication and division of integers, inequalities and the number line, solving inequalities, measurement and unit conversion, exploring data: frequency, proportion and probability, literals and equations

### Assessment Criteria

#### **Connections to Algebra**

*Students are able to:*

- represent numbers and number operations, including whole numbers, decimal numbers and fractional numbers
- recognize and determine patterns, multiples, and factors;
- perform number operations on whole numbers, decimal numbers, fractional numbers;
- convert fractions to decimals and decimals to fractions;
- convert decimals to percents and percents to decimals;
- use grouping symbols;
- check and solve equations;
- represent inequalities;
- evaluate variable expressions;
- represent real-life quantities using variable expressions;
- evaluate expressions containing exponents;
- use exponents in real-life problems;
- identify and perform operations on like terms;
- understand inverse operations;
- use an established order of operations to evaluate algebraic expressions;
- understand the difference between an expression and an equation;
- use an established process to simplify, solve and check the solution of an algebraic equation;
- translate verbal phrases into algebraic expressions and equations;
- translate relationships and geometric shapes into algebraic expressions and equations;

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- use algebra to solve simple real-life problems;
- use tables to organize data;

### **Rules of Algebra**

*Students are able to:*

- use rates to relate quantities measured in different units;
- use ratios to relate quantities measured in the same units;
- represent proportions and percents;
- determine percentage relationships;
- determine percentage increase and decrease;
- apply percentages to real-life situations and problems;
- graph and compare integer numbers;
- find opposites and absolute values;
- add integers;
- subtract integers;
- multiply integers;
- divide integers;
- simplify, solve and check algebraic equations and inequalities with integers;
- understand the x-and y-axes
- understand scale;
- graph inequalities;
- apply frequency to probability;
- understand the Cartesian Coordinate System;
- make connections between Algebra and Geometry using the system;
- use an Algebraic equation to find a table of ordered pairs;
- use ordered pairs and construct tables of ordered pairs;
- graph ordered pairs;
- develop bar charts and use them;
- develop line graphs and use them;
- develop scatter plots and use them; develop the formula using the slope and y-intercept of a line; identify the x and y intercept;
- calculate a slope of a line and interpret that slope;
- construct and understand a circle graph;
- construct and use a metric and non-metric ruler;
- construct and use unit conversion between different scales and units;
- identify, construct, manipulate and use basic literal equations;

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- develop basic advanced problem solving techniques involving literal equations.

### **Resources**

**Text:** *Pre-Algebra*, Fearon (Upper Saddle River, New Jersey, Simon & Schuster/Globe Fearon, 1997).