



## ALGEBRA I HONORS

*Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.*

### **COURSE DESCRIPTION**

Algebra I Honors is a mathematics course for students who exhibit high mathematical ability and achievement. The course is designed to prepare students for Scientific, Technology, Engineering and Mathematics (STEM) fields. The course focuses on the development of problem-solving skills and the acquisition of mathematical vocabulary and symbols. The active engagement of students along with the use of manipulatives and technology, such as calculators, computers, and spreadsheets, will allow students to develop an understanding of the mathematical principles they are learning. Facility in the use of technology will not be a substitute for students' understanding of quantitative concepts and proficiency in computations. Topics include variables and expressions; solving equations and inequalities; linear, quadratic and exponential functions; graphing and writing linear equations; systems of equations and inequalities; polynomials; factoring; statistics; and rational expressions. Students in Algebra I Honors will focus on both the abstract, theoretical explorations of the concepts along with their applications in a STEM environment. Students will engage in mathematical discourse with the teacher and other students. Students will take the Standards of Learning (SOL) test for Algebra I or a substitute test approved by the State Board of Education. Specific dates for the administration of the SOL test will be announced by the school. Students cannot receive credit for both Algebra I Honors and Algebra I Part 1 (MA3216) or Algebra I Part 2 (MA3218).

### **PREREQUISITE**

Pre-Algebra, Advanced Mathematics 7, or Mathematics 8

### **OPTION FOR NEXT COURSE**

Geometry Honors

### **REQUIRED STUDENT TEXTBOOK**

*Glencoe Algebra 1* (Virginia Edition). John A. Carter, Ph.D., Gilbert J. Cuevas, Ph.D., Roger Day, Ph.D., and Carol Malloy, Ph.D. Glencoe McGraw-Hill, 2012

### **RECOMMENDED CALCULATOR**

TI-83 Plus or TI-84 Plus

**Virginia Beach Instructional Objectives**  
**Algebra I Honors – MA3220**

| School Net Objective             | Objective  |
|----------------------------------|--|
| <b>Variables and Expressions</b> |  |
| <b>A1H.EX.1.1</b>                | The student will be able to discriminate between subsets of the real number system.  |
| <b>A1H.EX.1.2</b>                | The student will estimate and express the square roots and cube roots of whole numbers. <b>(SOL A.3)</b>   |
| <b>A1H.EX.1.3</b>                | The student will write mathematical expressions for verbal expressions and verbal expressions for mathematical expressions and evaluate the expressions for given replacement values of the variables, including applications in science, technology, engineering, or mathematics (STEM). <b>(SOL A.1)</b>   |
| <b>A1H.EQ.1.4</b>                | The student will identify and apply the field properties and axioms of equality valid for sets of real numbers and its subsets. <b>(SOL A.4 b)</b>   |
| <b>A1H.EX.1.5</b>                | The student will perform operations with real numbers, using order of operations to evaluate numeric and variable expressions, including applications in science, technology, engineering, or mathematics (STEM), and will simplify algebraic expressions. <b>(SOL A.1)</b>  |
| <b>Solving Equations</b>         |  |
| <b>A1H.EQ.2.1</b>                | The student will solve first-degree, multi-step equations including ratios, proportions, percent of change, and variables on both sides, and apply them to problems involving science, technology, engineering, or mathematics (STEM). The student will justify operations using the properties of real numbers and confirm algebraic solutions using a graphing calculator. <b>(SOL A.4 b, d, f)</b>  |
| <b>A1H.EQ.2.2</b>                | The student will manipulate formulas and literal equations for a specified variable and apply them to problems involving science, technology, engineering, or mathematics (STEM). <b>(SOL A.4 a)</b>   |
| <b>A1H.EQ.2.3</b>                | The student will solve absolute value equations and confirm algebraic solutions using a graphing calculator.   |
| <b>Linear Functions</b>          |  |
| <b>A1H.FN.3.1</b>                | The student will investigate and analyze linear functions and their characteristics both algebraically and graphically, including determining whether a relation is a function, identifying the domain and range, and finding the values of a function for elements in its domain. Students will make connections between and among multiple representation of functions, including concrete, verbal, numeric, graphic, and algebraic. <b>(SOL A.7 a, b, e, f)</b> |
| <b>A1H.EQ.3.2</b>                | The student will graph linear equations in two variables using the x- and y-intercepts. Solutions to linear equations will be identified using the zeros of a related function. <b>(SOL A.7 c, d)</b>  |
| <b>A1H.EQ.3.3</b>                | The student will determine the slope of a line when given the equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined. <b>(SOL A.6 a)</b>   |
| <b>A1H.FN.3.4</b>                | The student, given a situation in science, technology, engineering, or mathematics (STEM), will analyze a relation to determine whether a direct or inverse variation exists, and represent direct and inverse variations algebraically and graphically. <b>(SOL A.8)</b>  |
| <b>A1H.FN.3.5</b>                | The student will recognize patterns involving arithmetic sequences and write equations to generate arithmetic sequences, with applications in science, technology, engineering, or mathematics (STEM).   |

| <b>Graphing and Writing Linear Equations</b>     |   |
|--|---|
| <b>A1H.EQ.4.1</b>                                | The student will graph linear equations in two variables, identify the slope and y-intercept of a linear graph, and use transformations of the parent function, $y = x$ , to identify the graphs of transformed linear equations. <b>(SOL A.6 a, A.7 c, d)</b>  |
| <b>A1H.EQ.4.2</b>                                | The student will write the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line. The student will apply writing equations of lines to problems in science, technology, engineering, or mathematics (STEM). <b>(SOL A.6 b)</b>  |
| <b>A1H.EQ.4.3</b>                                | The student will find the slope of lines to determine when two lines are parallel or perpendicular.   |
| <b>A1H.ST.4.4</b>                                | The student will collect and analyze data, determine the equation of a line of best fit in order to make predictions, and solve problems in science, technology, engineering, or mathematics (STEM), using mathematical models. <b>(SOL A.11)</b>   |
| <b>Solving Inequalities in One Variable</b>      |   |
| <b>A1H.EQ.5.1</b>                                | The student will solve first-degree, multi-step inequalities and apply them to problems involving science, technology, engineering, or mathematics (STEM). The student will justify operations using the properties of real numbers and confirm algebraic solutions using a graphing calculator. Students will recognize the solution set both algebraically, using set builder notation and interval notation, and graphically. <b>(SOL A.5 a, b, c)</b> |
| <b>A1H.EQ.5.2</b>                                | The student will solve first-degree compound and absolute value inequalities and apply them to problems involving, science, technology, engineering, or mathematics (STEM). The student will justify operations using the properties of real numbers and confirm algebraic solutions using a graphing calculator. Students will recognize the solution set algebraically, using set builder notation and interval notation, and graphically.              |
| <b>Solving Systems of Equations</b>              |   |
| <b>A1H.EQ.6.1</b>                                | The student will solve systems of equations in two variables algebraically and graphically, using graphing calculators to verify solutions. <b>(SOL A.4 e)</b>  |
| <b>A1H.EQ.6.2</b>                                | The student will solve linear inequalities and systems of linear inequalities in two variables and use a graph to represent the solution set. <b>(SOL A.5 d)</b>  |
| <b>Laws of Exponents and Polynomials</b>         |   |
| <b>A1H.EX.7.1</b>                                | The student will apply the laws of exponents to perform operations on expressions, recognize the relationship between the laws of exponents and scientific notation, and apply scientific notation to problems in science, technology, engineering, or mathematics (STEM). <b>(SOL A.2 a)</b>   |
| <b>A1H.EX.7.2</b>                                | The student will add, subtract, and multiply polynomials and use polynomials to model situations in science, technology, engineering, or mathematics (STEM). <b>(SOL A.2 b, 2009)</b>   |
| <b>Factoring and Solving Quadratic Equations</b> |   |
| <b>A1H.EX.8.1</b>                                | The student will factor completely first and second-degree binomials and trinomials in one or two variables. In addition, students will factor polynomials with four terms, using grouping. Graphing calculators will be used as tool for factoring and for confirming algebraic factorizations. <b>(SOL A.2 c)</b>   |
| <b>A1H.EQ.8.2</b>                                | The student will solve a quadratic equation in one variable using factoring and apply quadratics to problems involving science, technology, engineering, or mathematics (STEM). <b>(SOL A.4 c)</b>  |
| <b>A1H.EX.8.3</b>                                | The student will find the quotient of polynomials, using a monomial or binomial divisor, or a completely factored divisor. Student will use long division to divide non-factored divisors. <b>(SOL A.2b)</b>  |
| <b>Quadratic Functions and Curve Fitting</b>     |   |
| <b>A1H.FN.9.1</b>                                | The student will graph quadratic functions in two variables, identify the domain and range, the vertex, the zero(s) of the quadratic function, and use transformations of the parent function, $y = x^2$ , to identify the graphs of transformed quadratic equations. <b>(SOL A.7)</b>  |

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| <b>A1H.EQ.9.2</b>                         | The student will solve a quadratic equation in one variable using graphing, square roots, the quadratic equation, and completing the square and use quadratic equations to solve problems involving science, technology, engineering, or mathematics (STEM). The value of the discriminant will be used to determine the nature of the solutions of a quadratic equation. <b>(SOL A.4 c)</b> |
| <b>A1H.EX.9.3</b>                         | The student will express the solutions of quadratic equations as simplified square roots. Students will express the square root of a monomial algebraic expression in simplest radical form. <b>(SOL A.3)</b>  |
| <b>A1H.FN.9.4</b>                         | The student will use transformations of the parent function, $y = a^x$ , to identify the graphs of transformed exponential functions and identify values of the base that result in exponential growth versus decay, applying exponential functions to situations in science, technology, engineering, or mathematics (STEM).  |
| <b>A1H.ST.9.5</b>                         | The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve problems in science, technology, engineering, or mathematics (STEM), using mathematical models. <b>(SOL A.11)</b>   |
| <b>Statistics</b>                         |  |
| <b>A1H.ST.10.1</b>                        | The student will compare and contrast multiple univariate data sets, using box-and-whisker plots. <b>(SOL A.10)</b>  |
| <b>A1H.ST.10.2</b>                        | The student, given a set of data, will interpret variation in science, technology, engineering, or mathematics (STEM) related contexts and calculate and interpret mean absolute deviation, standard deviation, and z-scores. <b>(SOL A.9)</b>   |
| <b>Rational Expressions and Equations</b> |  |
| <b>A1H.EX.11.1</b>                        | The student will simplify a rational expression, determine restrictions and excluded values for a rational expression, multiply and divide rational expressions, graph rational functions, and solve equations containing rational expressions.  |



**MISSION STATEMENT**

**The Virginia Beach City Public Schools, in partnership with the entire community, will empower every student to become a life-long learner who is a responsible, productive and engaged citizen within the global community.**

**DEPARTMENT OF CURRICULUM AND INSTRUCTION  
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