



VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

Department of Teaching & Learning
Parent/Student Course Information

ALGEBRA, FUNCTIONS AND DATA ANALYSIS
(MA 3134)
One Credit, One Year
Grades 10-12

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

The course offers students the opportunity to collect and analyze univariate and bivariate data using a variety of statistical and analytical tools. They will learn to use functional algebra and statistics, allowing for the possibility of standardizing and analyzing data through the use of mathematical models. Students will solve problems that require the formulation of linear, quadratic, exponential or logarithmic equations or a system of equations. They will also use transformational graphing and the regression capabilities of graphing calculators to find regression equations. The infusion of technology (graphing calculator and/or computer software) in this course will assist in modeling and investigating functions and data analysis.

PREREQUISITE

Geometry Honors or Geometry Parts 1 and 2

OPTIONS FOR NEXT COURSE

Algebra II or Algebra II/Trigonometry

REQUIRED TEXTBOOK

Algebra, Functions, and Data Analysis: A Virginia Course, Bertelle, et al., The Consortium for Foundation Mathematics and Pearson Custom Publishing (2009)

RECOMMENDED CALCULATOR

TI-83 Plus, TI-84 Plus, TI-84 Plus C or TI-84 Plus CE

Virginia Beach Instructional Objectives
Algebra, Functions and Data Analysis – MA3134

| VBO# | Objective |
|---------------------|---|
| | Algebra and Functions |
| MA.AFDA.1.1 | The student will develop problem-solving strategies and communicate problem-solving ideas in both written and oral form. Students will translate verbal statements into algebraic equations and use formulas to solve problems. Students will write proportions and use them to solve problems, including rate problems. Unit analysis will be used in the problem-solving process. (SOL AFDA.4) |
| MA.AFDA.1.2 | The student will recognize trends in data pairs and define functions verbally, algebraically and graphically, through the use of a rectangular coordinate system. Students will solve equations numerically and graphically, evaluate algebraic expressions and isolate a variable in an equation. (SOL AFDA.1, AFDA.4) |
| MA.AFDA.1.3 | The student will analyze graphs of data pairs to identify increasing, decreasing and constant intervals, minimum and maximum points and whether or not a functional relationship exists. Students will obtain a new graph from an original graph using horizontal and vertical shifts. (SOL AFDA.1) |
| MA.AFDA.1.4 | The student will analyze linear functions and determine when a situation can be modeled by linear functions. Students will investigate the equations and graphs of linear functions and their attributes. Students will use transformations to write an equation of a linear function given the graph. Students will construct scatterplots from sets of data and use best-fit equations to make predictions about the data. (SOL AFDA.2, AFDA.3) |
| MA.AFDA.1.5 | The student will graph a linear piecewise function and write a piecewise function to represent a given situation. Students will examine the continuity of piecewise functions and identify the domain and range. Students will graph absolute value functions defined by $y = x - c $. (SOL AFDA.1, AFDA.4) |
| MA.AFDA.1.6 | The student will use systems of linear equations and inequalities to solve application problems. Various methods of solving linear systems, including numeric, graphic and substitution, will be explored. The student will determine optimal values in problem situations by identifying constraints and using linear programming techniques. (SOL AFDA.5) |
| MA.AFDA.1.7 | The student will analyze quadratic functions and identify their characteristics using equations, graphs and technology. Students will write the equation of a quadratic function using transformations given the graph. Students will solve quadratic equations using various methods, factor quadratic expressions and use quadratic regression to solve problems. (SOL AFDA.1, AFDA.2, AFDA.3, AFDA.4) |
| MA.AFDA.1.8 | The student will recognize direct variation statements, identify the constant of proportionality and solve direct variation problems. Students will identify the properties of power functions ($y = kx^n$) and graph power functions using transformations. Students will identify inverse variation functions ($y = \frac{k}{x}$) and graph inverse variation functions, identify vertical and horizontal asymptotes and identify the constant of variation. Students will identify the end behavior of graphs. (SOL AFDA.1, AFDA.2, AFDA.4) |
| MA.AFDA.1.9 | The student will analyze exponential functions and identify their characteristics using equations, graphs and technology. Students will write the equation of an exponential function using transformations given the graph. Students will solve problems involving compounding and continuous interest and continuous growth and decay. (SOL AFDA.1, AFDA.2, AFDA.4) |
| MA.AFDA.1.10 | The student will analyze logarithmic functions and identify their characteristics, using equations, graphs and technology. Students will write the equation of a logarithmic |

| VBO# | Objective |
|----------------------|---|
| | function using transformations given the graph. Students will apply the properties of logarithms and solve both exponential and logarithmic equations, both graphically and algebraically. (SOL AFDA.1, AFDA.2, AFDA.4) |
| MA.AFDA.1.11 | The student will collect data and compare the average rate of change of logarithmic, exponential, linear and quadratic equations to generate an equation for the curve of best fit to model real-world problems. Students will use the best-fit equation to interpolate function values, make decisions and justify conclusions with algebraic and/or graphical models. Students will utilize technology to create mathematical models. (SOL AFDA.3) |
| Data Analysis | |
| MA.AFDA.2.1 | The student will calculate the probability of an event and discern between experimental and theoretical probabilities through the understanding of the law of large numbers. Students will calculate conditional probabilities and use the addition and multiplication rules to determine the probability of dependent and independent events. (SOL AFDA.6) |
| MA.AFDA.2.2 | The student will apply counting techniques to solve application problems and recognize the components of a binomial experiment and calculate binomial probabilities. (SOL AFDA.6) |
| MA.AFDA.2.3 | The student will be able to organize and interpret data using frequency tables, line graphs, bar graphs, circle graphs, stacked bar graphs, dot plots, histograms and stem-and-leaf plots. Students will determine measures of central tendencies and recognize symmetric and skewed frequency distributions. (SOL AFDA.8) |
| MA.AFDA.2.4 | The student will recognize the elements of designing and conducting an experiment or survey, to include sampling techniques and sample size, and controlling bias and experimental error. Students will be able to design and execute a statistical survey and analyze and report the results. (SOL AFDA.8) |
| MA.AFDA.2.5 | The student will measure and analyze the variability of a frequency distribution using standard deviation and utilize boxplots to display the results. (SOL AFDA.8) |
| MA.AFDA.2.6 | The student will identify and analyze data that is normally distributed, including identifying the properties of a normal curve and percentiles. Students will solve problems using the z-scores of a standardized normal curve, find the area under the standard normal curve using tables and a calculator, compare x-values in a normal distribution using z-scores and determine percentiles given various parameters. (SOL AFDA.7) |

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For further information please call (757) 263-1070.

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To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/Executive Director of Student Support Services at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

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