College Readiness Mathematics - IC

Scope and Sequence

Unit 1: Exploring the Real Number System through Public Health

Lesson	Objectives
Simplifying Expressions	• Identify parts of an algebraic expression • Evaluate expressions using the order of operations and the field properties of real numbers. • Simplify expressions using the order of operations and the field properties of real numbers.
Rational Exponents	• Evaluate numeric expressions using properties of rational exponents. • Simplify algebraic expressions using properties of rational exponents.
Performing Operations in Public Health Contexts	• Perform multi-step mathematical operations on real numbers to solve real-life problems. • Estimate a real number solution to a real-life problem. • Assess the reasonableness of an estimate in the context of a real-life problem.
Adding and Subtracting Radicals	• Identify like radicals. • Add and subtract radical expressions.
Multiplying Radicals	• Perform multiplication of radical expressions.
Dividing Radicals	• Perform division of radical expressions, rationalizing the denominator when necessary.
Dimensional Analysis	• Use dimensional analysis to convert units and compare quantities, attending to limitations on the unit of measurement.

Unit 2: Interpreting Data

Lesson	Objectives
Relative Frequencies	• Complete a two-way table, and calculate marginal and conditional distributions. •

	Given a two-way table, calculate marginal and joint relative frequency distributions. • Given a two-way table, calculate conditional relative frequency distributions. • Create marginal relative frequency distributions. • Create conditional relative frequency distributions. • Interpret frequencies appropriately when given data from samples that differ considerably in sample size for two categorical variables.
Describing and Comparing Data with Dotplots and Stemplots	• Identify and/or describe a dotplot. • Identify and/or describe a stemplot. • Compare two distributions using dotplots or stemplots.
Describing and Comparing Data with Histograms	• Identify the patterns, shape, and spread of a distribution using histograms. • Relate measures of center to the shape of a distribution using histograms. • Compare two distributions using histograms.
Measures of Center and Location	• Calculate measures of center, given a data set or a graphical display. • Interpret the measures of center. • Analyze the effect of extreme values on the value of the mean and median. • Analyze the relationship between center and shape.
Measures of Variability	• Calculate the range, standard deviation, or interquartile range of a univariate data set. • Interpret the range, standard deviation, or interquartile range of a univariate data set. • Compare the spread given graphical displays of two univariate data sets. • Use a graphing calculator to compute the numerical summary of a univariate data set.
Boxplots and Outliers	• Identify if a univariate data set contains any outliers. • Represent univariate data using a boxplot.

	• Compare distributions presented in parallel box-plots. • Identify the percent and number of values lying in each portion of a boxplot. • Create a boxplot using a graphing calculator.
The Relationship between Two Quantitative Variables	• Identify the explanatory and response variable. • Represent two quantitative variables using a scatterplot. • Describe the direction, form, strength, and unusual observations given a scatterplot. • Create a scatterplot using a graphing calculator.
Correlation	• Interpret the correlation of a linear relationship between two quantitative variables. • Describe the effect of unusual observations on the correlation. • Distinguish between correlation and causation.
Making Predictions from a Least-Squares Regression Line	• Interpret the slope and y -intercept of a linear model. • Make a prediction using a linear model.
Calculating the Least-Squares Regression Line	• Explain why the line that is the best fit for a linear relationship is called the least-squares regression line. • Compute a least-squares regression line and correlation using technology. • Identify a least-squares regression line using computer output.
R-squared and s	• Determine r 2 using a graphing calculator or computer output. • Interpret r 2 and s in context. • Identify s . • Describe the effect that influential points have on the least-squares regression line.

Unit 3: Calculating Probabilities of Compound Events

Lesson	Objectives

Introduction to Probability	• Interpret probability as the long-run relative frequency of an event. • Describe the law of large numbers. • Describe how a simulation is used to imitate a random process. • Conduct a simulation using a graphing calculator.
Probability Rules	• Identify a probability model to describe a random process. • Apply the basic probability rules, which indicate that the probability of an event is a number between 0 and 1 and that the sum of the probabilities of all outcomes in the sample space is 1. • Apply the complement rule and the addition rule for mutually exclusive events.
Applying Probability Rules	• Determine probabilities using a two-way table. • Determine probabilities using a Venn diagram.
Conditional Probabilities	• Calculate a conditional probability. • Interpret a conditional probability. • Determine if two events are independent.

Unit 4: Two- and Three-Dimensional Geometry

Lesson	Objectives
Application of Distance, Midpoint, and Slope	• Use the distance formula, midpoint formula, or slope to verify a geometric property. • Use coordinates to compute the area of a triangle, rectangle, or circle. • Use coordinates to compute the perimeter of a polygon or the circumference of a circle.
Figures in the Coordinate Plane	• Apply coordinate algebra proofs to triangles and quadrilaterals. • Calculate the perimeter of a triangle or quadrilateral given the coordinates of the vertices.
Area of Triangles and Parallelograms	• Solve problems involving areas of triangles and parallelograms.
Circumference and Arc Length	• Solve problems involving circumference of a circle.

	• Determine the radian measure of a central angle. • Solve problems involving arc length with central angles measured in degrees. • Solve problems involving arc length with central angles measured in radians.
Area of a Circle and a Sector	• Solve problems involving area of a circle. • Solve problems involving area of a sector with central angles measured in radians. • Solve problems involving area of a sector with central angles measured in degrees.
Volume of Cylinders, Cones, and Spheres	• Write expressions to represent the volumes or unknown measures of cylinders and cones. • Solve mathematical and real-world problems involving the volume of right and oblique cylinders. • Solve mathematical and real-world problems involving the volume of right and oblique cones. • Solve mathematical and real-world problems involving the volume of spheres.
Surface Area	• Solve mathematical and real-world problems involving lateral area of prisms, cylinders, pyramids, and cones. • Solve mathematical and real-world problems involving surface area of prisms, cylinders, cones, spheres, and pyramids. • Solve mathematical and real-world problems about lateral and surface areas of composite figures.
Application of Volume and Surface Area	• Derive the formula for the volume of a prism or a pyramid, or a cone. • Derive the formula for the surface area of a prism, a pyramid, or a cone. • Calculate the volume or surface area of a prism. • Calculate the volume or surface area of a cone. • Calculate the volume or surface area of a pyramid.

Unit 5: Right-Angle Trigonometry

Lesson	Objectives
Right Triangle Trigonometry	• Use the Pythagorean theorem, and the trigonometric functions and their inverses to solve right triangles. • Use special right triangle relationships to solve right triangles.
Trigonometric Ratios	• Given an acute angle of a right triangle, label the hypotenuse, opposite, and adjacent sides. • Given an acute angle of a right triangle, write ratios for sine, cosine, and tangent. • Relate trigonometric ratios of similar triangles and the acute angles of a right triangle.
Solving for Side Lengths of Right Triangles	• Write equations using trigonometric ratios that can be used to solve for unknown side lengths of right triangles. • Solve for unknown side lengths of right triangles using trigonometric ratios. • Apply trigonometric ratios to solve real-world problems.
Solving for Angle Measures of Right Triangles	• Write equations that can be used to solve for unknown angles in right triangles. • Solve for unknown angles of right triangles using inverse trigonometric functions. • Apply inverse trigonometric functions to solve real-world problems.

Unit 6: Building and Interpreting Functions in Authentic Situations: Part One

Lesson	Objectives
Relations and Functions	• Represent a relation in multiple ways, including equations, graphs, words, and tables of values. • Determine if a relation is a function. • Determine if the function is one-to-one. • Determine the domain and range of a relation. • Evaluate function rules.
Domain and Range	• Determine the domain and range of a function in both mathematical and real-world contexts.

Rate of Change	• Calculate the average rate of change of a function over a specified interval. • Interpret the average rate of change of a function over a specified interval. • Solve problems involving direct variation.
Linear Functions	• Determine if a function is linear. • Represent a linear relationship numerically, algebraically, and graphically.
Absolute Value Functions	• Analyze absolute value functions to determine key features of the graph. • Model and solve mathematical and real-world problems with absolute value functions.
Quadratic Functions	• Find the line of symmetry and vertex of a parabola given its function rule. • Identify a quadratic function from the function rule. • Use key attributes of a quadratic function to solve word problems.
Square Root Functions	• Find the inverse of a quadratic function. • Find the domain of a square root function.
The Cubing Function	• Graph the parent cubic function and translations of the parent cubic function. • Use technology to graph cubic functions. • Approximate solutions to cubic equations from graphs.
Graphing Radical Functions	• Relate transformations to the graphs of square root and cube root functions to their parent function. • Determine the domain and range of square root and cube root functions.
Application of Rational Functions	• Identify the graph of a rational function expressed algebraically. • Graph the parent function of a rational function that models a real-world scenario. • Analyze key characteristics of the graph of a rational function. •

	Model key characteristics of the graph of a rational function.

Unit 7: Building and Interpreting Functions in Authentic Situations: Part Two

Lesson	Objectives
Rewriting Exponential Functions	• Write exponential functions and expressions in equivalent forms, using the properties of exponents to justify steps. • Use alternative forms of an exponential function to highlight different information about that function and the real-world situation it models.
Graphing Exponential Functions	• Identify exponential functions. • Determine the domain and range of exponential functions. • Graph exponential functions.
Graphing Logarithmic Functions	• Identify logarithmic functions. • Determine the domain and range of logarithmic functions. • Identify and analyze the graphs of logarithmic functions.
Arithmetic Sequences	• Find the common difference of an arithmetic sequence. • Determine if a sequence is arithmetic. • Apply the formula of an arithmetic sequence. • Find the terms of an arithmetic sequence.
Geometric Sequences	• Find the common ratio of a geometric sequence. • Determine if a sequence is geometric. • Apply the formula of a geometric sequence. • Find terms of a geometric sequence.
Comparing Characteristics of Functions	• Determine the similarities and differences in characteristics of multiple functions graphically. • Determine the similarities and differences in characteristics of multiple functions tabularly. • Determine the similarities and differences in characteristics of multiple functions symbolically.

	• Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
Functions and Transformations	• Graph a transformation of a function. • Recognize even and odd functions. • Write the equation of a transformed function given its graph. • Describe the effect of one or more transformations on the graph of a function.
Modeling with Functions in Financial Contexts	• Analyze a function to make a decision about a financial investment. • Interpret key characteristics of a function that represents a financial investment scenario. • Graph a parent function that models a financial investment scenario. • Identify the graph of a parent function that models a financial investment scenario. • Classify a relation as a function, one-to-one and/or onto.

Unit 8: Analyzing Financial Investments: Part One

Lesson	Objectives
Literal Equations	• Solve a literal equation in terms of a given variable. • Determine if expressions are equivalent.
Absolute Value and Linear Equations in Financial Contexts	• Create a linear or absolute value equation in one variable to represent a financial scenario. • Use a linear or absolute value equation in one variable to solve a financial investment problem.
Absolute Value and Linear Inequalities in Financial Context	• Create a linear or absolute value equation in one variable to represent a financial scenario. • Use a linear or absolute value equation in one variable to solve a financial investment problem. • Use the solution to a linear or absolute value inequality to draw conclusions about a situation being modeled, including possible constraints.
Solving Linear Systems Graphically	•

	Solve systems of two-variable linear equations graphically. • Classify systems of two-variable equations as dependent, independent, consistent, or inconsistent. • Solve systems of two-variable linear inequalities.
Solving Linear Systems by Elimination	• Solve systems of two-variable linear equations using elimination.
Solving Linear Systems by Substitution	• Solve systems of two-variable linear equations using substitution.
Modeling with Linear Systems	• Model and solve real-world problems using systems of linear equations and inequalities.
Quadratic Functions and Equations in Financial Context	• Use a quadratic function to solve a financial investment problem. • Use the solution to a quadratic equation to draw conclusions about a situation being modeled, including possible constraints.
Mixed Degree Systems	• Solve linear-quadratic systems of equations. • Solve quadratic-quadratic systems of equations.
Solving One-Variable Equations with Systems	• Solve a one-variable linear or quadratic equation by graphing a related system of equations.

Unit 9: Analyzing Financial Investments: Part Two

Lesson	Objectives
Rational Equations in Financial Contexts	• Create a rational equation in one variable to represent a financial scenario. • Use a rational equation to solve a financial investment problem.
Radical Equations and Extraneous Roots	• Model and solve mathematical and real-world problems using radical equations, and determine extraneous roots.
Exponential Equations in Financial Contexts	• Use an exponential equation to solve a financial investment problem. • Create an exponential equation in one variable to represent a financial scenario.
Solving Exponential and Logarithmic Equations	• Solve exponential and logarithmic equations using inverses, properties, and algorithms.

Modeling with Exponential and Logarithmic Equations	• Model and solve real-world problems using exponential and logarithmic functions.

Unit 10: Capstone Project

Lesson	Objectives
Completing a Capstone Project	• Develop a topic and proposal for a course capstone project. • Complete research. • Draft and revise a capstone project.