College Board Standards for College Success, Mathematics and Statistics™
Adapted for Integrated Curricula
Alignment to *Core-Plus Mathematics* ©2008

"The College Board has developed standards for mathematics and statistics to help states, school districts, and schools provide all students with the rigorous education that will prepare them for success in college, opportunity in the workplace, and effective participation in civic life." (*College Board Standards for College Success, Mathematics and Statistics* ©2007, p. ii) More information on the process and goals for development of these standards is given in the introduction to the *College Board Standards for College Success* which can be downloaded from the following Web address: professionals.collegeboard.com/profdownload/Integrated_Math_Standards.pdf.)

This document lists the College Board Standards for Mathematics and Statistics and provides the unit or units from *Core-Plus Mathematics* where each standard is addressed. For more information on *Core-Plus Mathematics* see www.wmich.edu/cpmp.

College Board IMIII and Core-Plus Mathematics Courses

Standard IMIII.1: Patterns of Change and Algebraic Representations Students use constant rate of change to identify situations that can be represented by linear functions, model these situations, interpret the models, and solve mathematical and real-world problems. Students use rate of change and graphical representations to contrast linear relationships with nonlinear relationships.	
Objective IMIII.1.1: Student identifies functions based on their graphical behavior and rates of change, and student describes functions using appropriate notation and terminology.	
IMIII.1.1.1 Determines whether a relationship is a function by using a graph or a verbal description of the relationship.	Course 2: Unit 5
IMIII.1.1.2 Determines whether a relationship is linear or nonlinear based on whether it has a constant rate of change, its verbal description, its table of values, its graphical representation, or its symbolic form.	Course 1: Unit 1, Unit 3, Unit 5 Course 2: Unit 5 (See also Course 4: Unit 5, Lesson 2)
IMIII.1.1.3 Describes characteristics of piecewise-linear functions, including absolute value, and situations in which they arise.	Course 1: Unit 1 Course 4: Unit 1
IMIII.1.1.4 Applies the terminology and symbols associated with expressions, functions, and linear equations, including function notation, inputs, outputs, domain, range, slope, intercepts, and independent and dependent variables.	Course 1: Unit 1, Unit 3, Unit 5 Course 2: Unit 1, Unit 3, Unit 5
Objective IMIII.1.2: Student uses linear functions to interpret, model, and solve situations having a constant rate of change.	
IMIII.1.2.1 Generalizes linear patterns or arithmetic sequences using verbal rules and symbolic expressions such as kx and $ax + b$ in representing proportional or more-general linear relationships, respectively.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 4
IMIII.1.2.2 Analyzes a mathematical or real-world situation; determines whether the situation can be described by a linear model, and if so, determines the constant rate of change and develops and interprets a linear function to model that situation.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 2, Unit 4

Standard IMIII.2: Variables, Expressions, Equations, and Functions in Linear Settings Students distinguish among different uses of variables and find equivalent expressions and equations. They construct, represent, solve, and interpret solutions of linear equations and linear inequalities for mathematical and real-world contexts.	
Objective IMIII.2.1: Student represents linear patterns using expressions, equations, functions, and inequalities and interprets the meanings of these representations, recognizing which are equivalent and which are not.	
IMIII.2.1.1 Represents linear patterns using tables, graphs, sequences, verbal rules, symbolic expressions, equations, and functions of the form $f(x) = ax + b$.	Course 1: Unit 1, Unit 3 Course 2: Unit 4, Unit 5
IMIII.2.1.2 Describes the meaning of symbolic expressions of the form $ax + b$ in words, and interprets the changes resulting from different values of the parameters a and b.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 4
IMIII.2.1.3 Develops equivalent algebraic expressions, equations, and inequalities using the properties of equality and inequality, as well as the commutative, associative, inverse, identity, and distributive properties.	Course 1: Unit 1, Unit 3 Course 2: Unit 2
IMIII.2.1.4 Identifies and translates among equivalent representations of linear expressions, equations, inequalities, and systems of equations, using verbal, tabular, graphical, and symbolic representations.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 2
IMIII.2.1.5 Writes, interprets, and translates among equivalent forms of linear equations and functions, including slope-intercept, point-slope, intercept, and general forms, recognizing that equivalent forms for a linear relationship reveal more or less information about a given situation.	Course 1: Unit 1, Unit 2, Unit 5 Course 2: Unit 1
Objective IMIII.2.2: Student distinguishes among the different uses of variables, parameters, constants, and equations.	
IMIII.2.2.1 Describes and distinguishes among the different uses of variables: as symbols for varying quantities (such as $5x$); as symbols for fixed and possibly unknown values in equations (such as $3x + 2 = 5$); as symbols for all numbers in properties (such as $x + x = 2x$); as symbols in formulas (such as $A = \ell \bullet w$); and as symbols for parameters (such as the m for slope in $y = mx + b$).	Course 1: Unit 1, Unit 2, Unit 3, Unit 5, Unit 6, Unit 7 Course 2: Unit 1, Unit 2, Unit 3, Unit 4, Unit 5, Unit 7
IMIII.2.2.2 Identifies the constant and variable terms in linear expressions, equations, and inequalities and in systems of equations and inequalities.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 2
IMIII.2.2.3 Identifies and distinguishes among parameters and the independent and dependent variables in a linear relationship (e.g., in $y = mx + b$, x and y are the independent and dependent variables, respectively, and m and b are the parameters).	Course 1: Unit 1, Unit 3
IMIII.2.2.4 Describes and distinguishes among the types of equations that can be constructed by equating linear expressions, including identities (e.g., $x + x = 2x$); equations for which there is no solution (e.g., $x + 1 = x + 2$); formulas (e.g., $C = \pi d$); equations where the solution is unique (e.g., $2x + 3 = 5$); and equations relating two variables (e.g., $y = 3x + 7$).	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 5

Objective IMIII.2.3: Student constructs, solves, and interprets solutions of linear equations and linear inequalities representing mathematical and real-world contexts.	
IMIII.2.3.1 Constructs a linear equation or linear inequality to model a real-world situation, using a variety of methods and representations.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 2, Unit 4
IMIII.2.3.2 Analyzes and explains the reasoning used to solve linear equations and linear inequalities.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 2
IMIII.2.3.3 Solves a linear equation or inequality using symbolic methods, graphs, tables, and technology.	Course 1: Unit 1, Unit 3 Course 2: Unit 1, Unit 2
Standard IMIII.3: Exponential and Quadratic Equations and Functions Students identify and classify exponential and quadratic relationships. Students represent simple mathematical and real-world phenomena using exponential and quadratic functions and solve equations involving these functions with a variety of techniques.	
Objective IMIII.3.1: Student identifies certain nonlinear relationships and classifies them as exponential relationships or quadratic relationships, including relationships of the form $y = \frac{k}{x}$, based on rates of change in tables, symbolic forms, or graphical representations. Student recognizes that multiplying linear factors produces nonlinear relationships.	
IMIII.3.1.1 Identifies nonlinear (exponential, quadratic, and equations of the form $y = \frac{k}{x}$) relationships in graphical or tabular displays through an examination of successive differences, ratios, symbolic forms, or graphical properties.	Course 1: Unit 5, Unit 7 Course 2: Unit 5 (See also Course 4: Unit 5, Lesson 2)
IMIII.3.1.2 Identifies terms in a geometric (exponential) sequence using verbal rules or symbolic expressions.	Course 1: Unit 5 Course 2: Unit 8, Lesson 3
IMIII.3.1.3 Multiplies a pair of linear expressions, and interprets the result of the operation numerically by evaluation, through a table of values, and graphically.	Course 1: Unit 7 Course 2: Unit 5
Objective IMIII.3.2: Student represents and interprets simple exponential and quadratic functions based on mathematical and real-world phenomena using tables, symbolic forms, or graphical representations and solves equations related to these functions.	
IMIII.3.2.1 Finds integer powers of rational numbers; evaluates the meaning of integer powers of variables in expressions, and applies the basic laws of exponents ($a^m \cdot a^n = a^{m+n}$, $(a^m)^n = a^{mn}$, and $(ab)^n = a^n b^n$ and for all $a \neq 0$, $a^0 = 1$ and $\frac{a^m}{a^n} = a^{m-n}$).	Course 1: Unit 5
IMIII.3.2.2 Recognizes exponential functions from their verbal description and tabular, graphical, or symbolic representations, and translates among these representations.	Course 1: Unit 5 Course 2: Unit 5
IMIII.3.2.3 Describes the effects of changes in the coefficient, base, and exponent on the growth described by an exponential function.	Course 1: Unit 5
IMIII.3.2.4 Distinguishes among general representations for exponential equations ($y = b^x$, $y = a(b^x)$) and quadratic equations ($y = x^2$, $y = -x^2$, $y = ax^2$, $y = x^2 + c$, $y = ax^2 + c$), and describes how the values of a, b, and c affect their graphical and tabular representations.	Course 1: Unit 5, Unit 7 Course 2: Unit 5
IMIII.3.2.5 Provides and describes multiple representations of solutions to simple exponential and quadratic equations using manipulative models, tables, graphs, and symbolic expressions, and using technology.	Course 1: Unit 5, Unit 7 Course 2: Unit 5

IMIII.3.2.6 Factors simple quadratic expressions (limited to the removal of monomial terms, perfect-square trinomials, difference of squares, and quadratics of the form $x^2 + bx + c$ that factor over the integers), and applies the zero-product property to determine the solutions of the related equation.	Course 1: Unit 7 Course 2: Unit 5
IMIII.3.2.7 Solves quadratic equations using completing the square and technology, and interprets such solutions in terms of the original problem context.	Course 2: Unit 5 Course 3: Unit 5
Standard IMIII.4: Patterns of Shape, Geometric Reasoning, and Geometric Relationships Students represent geometric objects and investigate a variety of relationships among them, form conjectures, and attempt to verify or reject the conjectures. Students develop and apply various methods of proving statements or disproving conjectures within the axiomatic structure of Euclidean geometry.	
Objective IMIII.4.1: Student uses a variety of representations to describe geometric objects and to analyze relationships among them. Student examines elementary models of non-Euclidean geometries and finite geometries to understand the nature of axiomatic systems and the role the parallel postulate plays in shaping Euclidean geometry.	
IMIII.4.1.1 Uses coordinates and algebraic representations (e.g., distances, points that divide segments in specified ratios, slope) to describe and define figures.	Course 2: Unit 3
IMIII.4.1.2 Uses nets, drawings, models, and technologically created images to represent geometric objects and analyze relationships among them.	Course 2: Unit 3
IMIII.4.1.3 Investigates geometric representations and properties not found in Euclidean geometry, for example, relationships from geometry on a sphere or applications of planar networks.	Course 3: Unit 1
IMIII.4.1.4 Interprets the role of the parallel postulate as the key postulate in the formulation of Euclidean geometry, and illustrates its counterparts in other geometries (e.g., geometry on a sphere, in a finite geometry).	Course 3: Unit 1
Objective IMIII.4.2: Student develops, tests, and provides justifications, based on inductive and deductive methods, for conjectures involving relations of lines, angles, and figures.	
IMIII.4.2.1 Describes the structure of and relationships within an axiomatic system (undefined terms, defined terms, axioms/postulates, methods of reasoning, and theorems).	Course 3: Unit 1, Unit 3
IMIII.4.2.2 Recognizes flaws or gaps in the reasoning supporting an argument.	Course 3: Unit 1, Unit 3, Unit 6
IMIII.4.2.3 Develops and tests conjectures about angles, lines, bisectors, polygons (especially triangles and quadrilaterals), circles, and three-dimensional figures.	Course 1: Unit 6 Course 2: Unit 3 Course 3: Unit 1, Unit 3, Unit 6
IMIII.4.2.4 Justifies statements about angles formed by perpendicular lines and transversals of parallel lines.	Course 3: Unit 1
Standard IMIII.5: Surveys and Random Sampling Students design and conduct a survey based on an appropriate sample, and they interpret and communicate the results. Students evaluate survey results reported in the media. Students discern the differences between random and nonrandom sampling methods and can identify sources of bias in sampling. Students distinguish between sampling error and measurement error, and they understand that results may vary from sample to population and from sample to sample.	

Objective IMIII.5.1: Student formulates questions that can be addressed through collection and analysis of survey data. Student explains the importance of random selection of members from the population, and designs and executes surveys. Student uses the results of a survey to communicate an answer appropriate to the question of interest. Student distinguishes between sampling error and measurement error. Student evaluates survey results reported in the media.	
IMIII.5.1.1 Formulates a question of interest and defines key components that can be addressed through a survey. Defines the population, the variables to measure, and how to measure the variables; identifies factors that may influence survey outcomes; designs questionnaires.	Course 3: Unit 4 Course 4: Unit 9
IMIII.5.1.2 Describes techniques for drawing simple random samples of members from a population. Identifies situations in which a stratified random sample from a population would be preferred over a simple random sample.	Course 3: Unit 1 Course 4: Unit 9
IMIII.5.1.3 Identifies and describes the differences between a sample and a census, explaining the advantages and disadvantages of each.	Course 4: Unit 9
IMIII.5.1.4 Designs and implements the selection of a simple random sample from a population; collects and organizes survey data; displays the data in appropriate tables or graphs; and summarizes the data using measures of center and spread, including the mean absolute deviation.	Course 1: Unit 2 Course 3: Unit 4 Course 4: Unit 9
IMIII.5.1.5 Explains the question of interest, the sampling methods used to answer the question, and the results obtained in the context of the question.	Course 3: Unit 1, Unit 4 Course 4: Unit 9
IMIII.5.1.6 Describes how the method of selecting subjects for a sample and the methods of measurement of outcomes can affect survey results. Explains how biases may arise from both sampling errors and measurement errors.	Course 3: Unit 4 Course 4: Unit 9
IMIII.5.1.7 Examines survey results reported in the media, discussing and evaluating how the sample was drawn from the population and the methods used to measure, collect, and represent the data collected. Identifies possible sources of bias that may affect survey results.	Course 3: Unit 1 Course 4: Unit 9
Objective IMIII.5.2: Student understands that results may vary from sample to population and from sample to sample. Student analyzes, summarizes, and compares results from random and nonrandom samples and from a census, using summary numbers and a variety of graphical displays to communicate findings.	
IMIII.5.2.1 Compares measures of center and spread computed using sample data drawn from a population (sample statistics) with the same measures of center and spread computed using data from a census of the population (population parameters). Observes that sample means tend to approach the population mean as sample size increases.	Course 3: Unit 1 Course 3: Unit 4 Course 4: Unit 9
IMIII.5.2.2 Recognizes that measures of center and spread computed using data from a random sample are likely to differ from sample to sample even when the samples are drawn from the same population and have the same number of observations.	Course 3: Unit 1, Unit 4 Course 4: Unit 9
IMIII.5.2.3 Distinguishes between random and nonrandom sampling methods. Compares results from simple random and nonrandom samples drawn from the same population; discusses how and why the results might differ because of potential sources of bias in the various samples.	Course 3: Unit 1 Course 4: Unit 9

College Board IMIV and Core-Plus Mathematics Courses

Standard IMIV.1: Systems of Linear Equations and Matrices Students represent relationships that can be modeled by a system of linear equations and solve the system using a variety of methods and representations. They represent and interpret data and systems of equations through matrix representations, using addition and multiplication of matrices as appropriate. Students use matrix equations and inverses, where they exist, to find solutions to systems of equations using technology.	
Objective IMIV.1.1: Student represents relationships that can be modeled by a system of linear equations and inequalities and solves the system using a variety of methods and representations.	
IMIV.1.1.1 Constructs a system of linear equations modeling a real-world situation, using a variety of methods and representations.	Course 2: Unit 1, Unit 2
IMIV.1.1.2 Analyzes and explains the reasoning used to solve a system of linear equations.	Course 2: Unit 1, Unit 2
IMIV.1.1.3 Solves a system consisting of two linear equations in two unknowns, using graphs, tables, symbolic methods, and technology, and describes the nature of the solutions (no solution, one solution, infinitely many solutions).	Course 2: Unit 1, Unit 2
IMIV.1.1.4 Solves the equation $r = ax + b$ by using the fact that the value of x determined by this equation is the x-coordinate of the solution to the system of equations $\begin{Bmatrix} y = ax + b \\ y = r \end{Bmatrix}$. Relates this solution method to graphical and technology-aided methods of solving equations.	Course 1: Unit 3
Objective IMIV.1.2: Student represents and interprets cross-categorized data in matrices, develops properties of matrix addition, and uses matrix addition and its properties to solve problems.	
IMIV.1.2.1 Represents numerical or relational data categorized by two variables in a matrix and labels the rows and columns. Interprets the meaning of a particular entry in a matrix in terms of the labels of its row and column.	Course 2: Unit 2
IMIV.1.2.2 Uses matrix row and column sums to analyze data.	Course 2: Unit 2
IMIV.1.2.3 Develops the properties of matrix addition, and adds and subtracts matrices to solve problems.	Course 2: Unit 2
Objective IMIV.1.3: Student multiples matrices, verifies the properties of matrix multiplication, and uses the matrix form for a system of linear equations to structure and solve systems consisting of two or three linear equations in two or three unknowns, respectively, with technology.	
IMIV.1.3.1 Verifies the properties of matrix multiplication and multiplies matrices to solve problems.	Course 2: Unit 2
IMIV.1.3.2 Constructs a system of linear equations modeling a real-world situation, and represents the system as a matrix equation ($A\boldsymbol{x} = \mathbf{b}$), that is, $\begin{matrix} ax + by = c \\ dx + ey = f \end{matrix} \Leftrightarrow \begin{bmatrix} a & b \\ d & e \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} c \\ f \end{bmatrix}$	Course 2: Unit 2
IMIV.1.3.3 Solves a system consisting of two or three linear equations in two or three unknowns, respectively, by solving the related matrix equation $A\boldsymbol{x} = \mathbf{b}$, using technology to find $\boldsymbol{x} = A^{-1}\mathbf{b}$.	Course 2: Unit 2

Standard IMIV.2: Geometric Proof, Similarity, and Transformations Students develop general methods of proof and apply these methods to solve problems involving congruence, similarity, rigid transformations, and origin-centered dilations of figures in the plane.	
Objective IMIV.2.1: Student applies mathematical methods of proof to develop justifications for basic theorems of Euclidean geometry.	
IMIV.2.1.1 Forms conjectures based on exploring geometric situations with or without technology.	Course 2: Unit 3, Unit 7 Course 3: Unit 1, Unit 3, Unit 6
IMIV.2.1.2 Proves, directly or indirectly, that a valid mathematical statement is true. Develops a counterexample to refute an invalid statement.	Course 2: Unit 3, Unit 7 Course 3: Unit 1, Unit 3, Unit 6
IMIV.2.1.3 Formulates and investigates the validity of the converse of a conditional statement.	Course 2: Unit 3, Unit 7 Course 3: Unit 1, Unit 3, Unit 6
IMIV.2.1.4 Organizes and presents direct proofs and indirect proofs using two-column, paragraph, and flow-chart formats.	Course 3: Unit 1, Unit 3, Unit 6
Objective IMIV.2.2: Student identifies congruent figures and justifies these congruences by establishing sufficient conditions and by finding a congruence-preserving transformation between the figures. Student solves problems involving congruence in a variety of contexts.	
IMIV.2.2.1 Analyzes figures in terms of their symmetries using the concepts of reflection, rotation, and translation and combinations of these.	Course 2: Unit 3 Course 3: Unit 3
IMIV.2.2.2 Compares and contrasts equality, congruence, and similarity.	Course 3: Unit 3
IMIV.2.2.3 Identifies and differentiates among sufficient conditions for congruence of triangles (SSS, SAS, ASA, AAS, and HL), and applies them.	Course 1: Unit 6 Course 3: Unit 3, Unit 6
IMIV.2.2.4 Uses coordinate geometry and rigid transformations (reflections, translations, and rotations) to establish congruence of figures.	Course 2: Unit 3
Objective IMIV.2.3: Student identifies and applies transformations of figures in the coordinate plane and discusses the results of these transformations.	
IMIV.2.3.1 Represents translations, line reflections, rotations, and origin-centered dilations of objects in the coordinate plane by using sketches, coordinates, and function notation, and explains the effects of these transformations.	Course 2: Unit 3
IMIV.2.3.2 Recognizes and identifies corresponding parts of congruent and similar figures after transformation.	Course 2: Unit 3 Course 3: Unit 3
Objective IMIV.2.4: Student identifies similar figures and justifies these similarities by establishing sufficient conditions and by finding a similarity-preserving rigid transformation or origin-centered dilation between the figures. Student solves problems involving similarity in a variety of contexts.	
IMIV.2.4.1 Identifies the similarity conditions SAS, SSS, and AA as sufficient conditions for establishing similarity of triangles, and applies them, noting that congruence is a special case of similarity.	Course 1: Unit 6 Course 3: Unit 3
IMIV.2.4.2 Uses similarity to calculate the measures of corresponding parts of similar figures, and applies similarity in a variety of problem-solving contexts within mathematics and other disciplines.	Course 3: Unit 3, Unit 6
IMIV.2.4.3 Creates a representation of a figure similar to a specified figure given their similarity ratio.	Course 2: Unit 3 Course 3: Unit 3
IMIV.2.4.4 Uses similar triangles to demonstrate that the rate of change associated with any pair of points on a line is the same.	Course 2: Unit 7 Course 3: Unit 6
IMIV.2.4.5 Uses origin-centered dilations to describe and investigate similarities.	Course 2: Unit 3

Standard IMIV.3: Direct and Indirect Measurements Students justify and apply the measurement formulas associated with one-, two-, and three-dimensional geometric objects.	
Objective IMIV.3.1: Student justifies two- and three-dimensional measurement formulas for perimeter/circumference, area, and volume and applies these formulas and other geometric properties relating angle and arc measures to solving problems involving measures of simple and composite one-, two-, and three-dimensional geometric objects.	
IMIV.3.1.1 Justifies the area formulas for quadrilaterals and regular polygons.	Course 1: Unit 6 Course 3: Unit 1
IMIV.3.1.2 Applies the (volume) = (area of the base) × (height) principle in linking area and volume formulas for prisms and cylinders.	Course 1: Unit 6
IMIV.3.1.3 Links the surface area of prisms and cylinders to the sum of the areas of their bases and lateral surfaces using planar nets to illustrate and sum the relevant measures.	Course 1: Unit 6
IMIV.3.1.4 Identifies and finds the measures of angles formed by segments in three-dimensional figures, extending right-triangle and isosceles/equilateral triangle relationships to study the planar faces of three-dimensional objects.	Course 1: Unit 6
IMIV.3.1.5 Applies formulas and solves problems involving area, perimeter, volume, and surface area of pyramids, cones, spheres, and composite figures.	Course 1: Unit 6
IMIV.3.1.6 Determines arc lengths of circles and areas of sectors of circles using proportions.	Course 3: Unit 6
IMIV.3.1.7 Develops the triangle angle-sum and angle-measure theorems for polygons, and the triangle- and angle-inequality theorems.	Course 1: Unit 6
IMIV.3.1.8 Justifies and applies statements about angles formed by chords, tangents, and secants in circles and the measures of their intercepted arcs.	Course 3: Unit 6
Standard IMIV.4: Two-Stage Experiments, Conditional Probability, and Independence Students determine the sample space for two-stage experiments. They distinguish between independent and dependent events and compute their probabilities. Students use simulation to solve real-world probability problems.	
Objective IMIV.4.1: Student determines the sample space for two-stage experiments, and employs the multiplication rule for counting (Fundamental Property of Counting). Student distinguishes between independent and dependent compound events and computes their probabilities using representations for such events and using the multiplication rule for probability.	
IMIV.4.1.1 Uses lists, tables, and tree diagrams to represent all possible outcomes in the sample space for a given two-stage experiment.	Course 1: Unit 8 Course 2: Unit 8 (see C9 on p. 539, for example)
IMIV.4.1.2 Employs systematic counting approaches, such as the multiplication rule for counting (Fundamental Property of Counting), to determine the number of possible outcomes.	Course 4: Unit 8
IMIV.4.1.3 Distinguishes between independent and dependent compound events, and explains the idea of conditional probability.	Course 2: Unit 8
IMIV.4.1.4 Designs and uses trees, tables, area models, and other representational methods to calculate the probability of compound events in two-stage experiments when the events are independent and when they are not independent.	Course 1: Unit 8 Course 2: Unit 8
IMIV.4.1.5 Describes and applies the multiplication rule for probability for computing probabilities for independent and for dependent compound events.	Course 2: Unit 8

Objective IMIV.4.2: Student develops, uses, and interprets simulations to estimate probabilities for events where theoretical values are difficult or impossible to compute.	
IMIV.4.2.1 Describes a simulation by identifying the components and assumptions in a problem, selecting a device to generate chance outcomes, defining a trial, and specifying the number of trials; conducts a simulation.	Course 1: Unit 8 Course 2: Unit 8
IMIV.4.2.2 Summarizes data from a simulation using appropriate graphical and numerical summaries, develops an estimate for the probability of an event associated with a real-world probabilistic situation, and discusses the effect of the number of trials on the estimated probability of the event.	Course 1: Unit 8 Course 2: Unit 8
IMIV.4.2.3 Recognizes that simulation results are likely to differ from one run of the simulation to the next; observes that the results of the simulation tend to converge as the number of trials increases.	Course 1: Unit 8 Course 2: Unit 8
Standard IMIV.5: Bivariate Data and Trend-Line Models Students examine patterns in scatterplots, and they develop models for trends in bivariate data using median-fit lines.	
Objective IMIV.5.1: Student analyzes bivariate numerical data, representing such data with appropriate scatterplots and sketched trend lines.	
IMIV.5.1.1 Judges whether a scatterplot appears to show a linear trend, and if it does, draws a trend line and writes an equation for that line; uses the equation to make predictions; and interprets the slope of the line in context.	Course 1: Unit 3 Course 2: Unit 4
IMIV.5.1.2 Computes the median-fit line, by hand, to model a relationship shown in a scatterplot, and interprets the slope and intercept in terms of the original context.	Course 1: Unit 3

College Board IMV and Core-Plus Mathematics Courses

Standard IMV.1: Polynomial Expressions, Functions, and Equations Students extend their understanding of functions from linear settings to include polynomial functions, operations on these functions, and the solution of polynomial equations using complex numbers. Students use polynomials, especially quadratics, to model situations with graphical and symbolic representations, and they translate among these representations to represent and discuss the qualitative behavior of the associated functions.	
Objective IMV.1.1: Student operates with monomials, binomials, and polynomials, applies these operations to analyze the graphical behavior of polynomial functions, and applies the composition of functions to model and solve problems.	
IMV.1.1.1 Adds, subtracts, and multiplies polynomial expressions to solve problems.	Course 3: Unit 5 Course 4: Unit 3
IMV.1.1.2 Analyzes and describes graphs of polynomial functions by examining their intercepts, zeros, domain and range, and local (turning points) and global (end) behavior.	Course 3: Unit 5 Course 4: Unit 1, Unit 3
IMV.1.1.3 Uses factoring, properties of exponents, and knowledge of the related contextual needs to transform expressions and solve problems.	Course 3: Unit 5 Course 4: Unit 1, Unit 3
IMV.1.1.4 Applies the composition of functions to model and solve problems, explaining the results.	Course 3: Unit 8

Objective IMV.1.2: Student represents, compares, translates among representations, and graphically, symbolically, and tabularly represents, interprets, and solves problems involving quadratic functions.	
IMV.1.2.1 Identifies, interprets, and translates among different representations of quadratic functions, realizing that their graphs are parabolas.	Course 1: Unit 7 Course 2: Unit 5 Course 3: Unit 5
IMV.1.2.2 Determines reasonable domain and range values for quadratic functions within a context, and tests the reasonableness of solutions to quadratic equations (zeros of quadratic functions).	Course 2: Unit 5 Course 3: Unit 5
IMV.1.2.3 Identifies any points of intersection of the graph of a quadratic equation of the form $y = ax^2$ and the graph of a line of the form $y = k$, and relates the points of intersection to the solutions of the quadratic equation $ax^2 = k$.	Course 1: Unit 7 Course 2: Unit 1, Unit 5
IMV.1.2.4 Sketches a quadratic function's graph, and recognizes the relationships between the coefficients of a quadratic function and characteristics of its graph (e.g., shape, position, intercepts, zeros, maximum, minimum, symmetry, vertex).	Course 1: Unit 7 Course 2: Unit 5
IMV.1.2.5 Formulates equations and inequalities based on quadratic functions, solves them using factoring, completing the square, and technology, and interprets their solutions in terms of the original problem context.	Course 2: Unit 5 Course 3: Unit 2, Unit 5
IMV.1.2.6 Develops the quadratic formula, and applies it to the solution of quadratic equations and the interpretation of the nature of their roots.	Course 1: Unit 7 Course 2: Unit 5 Course 3: Unit 5
IMV.1.2.7 Constructs and solves quadratic inequalities in one and two variables, and represents their solutions graphically.	Course 2: Unit 5 Course 3: Unit 2
Objective IMV.1.3: Student represents, applies, and discusses the properties of complex numbers.	
IMV.1.3.1 Defines, plots, and computes with complex numbers.	Course 3: Unit 5 Course 4: Unit 3, Unit 4
IMV.1.3.2 Describes how the associative, commutative, and distributive properties of operations on real numbers extend to operations on complex numbers.	Course 4: Unit 3
IMV.1.3.3 Solves quadratic equations with real coefficients over the set of complex numbers.	Course 3: Unit 5
Standard IMV.2: Exponential, Logarithmic, and Other Functions Students develop exponential, logarithmic, and other nonlinear functions (rational, radical, absolute value, and piecewise-defined) to represent, investigate, and solve problems in mathematics and real-world contexts.	
Objective IMV.2.1: Student represents geometric or exponential growth with exponential functions and equations, and applies such functions and equations to solve problems in mathematics and real-world contexts.	
IMV.2.1.1 Extends the properties of rational exponents to real exponents, relating expressions with rational exponents to the corresponding radical expressions.	Course 1: Unit 5 Course 2: Unit 1 Course 3: Unit 5, Unit 8
IMV.2.1.2 Approximates solutions to an exponential equation, and relates the solutions to the points of intersection of the graph of the exponential equation and the graph of a horizontal line.	Course 1: Unit 5 Course 2: Unit 5
IMV.2.1.3 Analyzes a problem situation modeled by an exponential function, formulates an equation or inequality, and solves the problem.	Course 1: Unit 5 Course 2: Unit 5 Course 3: Unit 8 Course 4: Unit 5

IMV.2.1.4 Uses exponential functions to solve problems involving compound interest and exponential growth and decay in mathematics and real-world contexts.	Course 1: Unit 5 Course 2: Unit 5 Course 3: Unit 8 Course 4: Unit 5
IMV.2.1.5 Graphs and analyzes the behavior of exponential functions.	Course 1: Unit 5 Course 2: Unit 5 Course 3: Unit 8 Course 4: Unit 5
Objective IMV.2.2: Student defines logarithmic functions and uses them to solve problems in mathematics and real-world contexts.	
IMV.2.2.1 Defines a logarithm as a solution to an exponential equation, and recognizes the inverse relationship between functions defined by logarithms and exponential expressions, showing this relationship graphically.	Course 2: Unit 5 Course 3: Unit 8 Course 4: Unit 5
IMV.2.2.2 Solves problems by applying properties of logarithms [$\log xy = \log x + \log y$; $\log\left(\frac{x}{y}\right) = \log x - \log y$, and $\log(x^a) = a\log(x)$] to construct equivalent forms of a logarithmic expression.	Course 3: Unit 8 Course 4: Unit 5
IMV.2.2.3 Applies the inverse relationship between exponential and logarithmic functions to solve problems in mathematics and real-world contexts.	Course 3: Unit 8 Course 4: Unit 5
Objective IMV.2.3: Student interprets and represents rational and radical functions and solves rational and radical equations.	
IMV.2.3.1 Models and solves problems using direct, inverse, joint, and combined variation.	Course 2: Unit 1
IMV.2.3.2 Models problem situations by constructing equations and inequalities based on rational functions, uses a variety of methods to solve them, and interprets the solutions in terms of the problem situation.	Course 3: Unit 5 Course 4: Unit 3
IMV.2.3.3 Adds, subtracts, multiplies, and evaluates rational functions and simplifies rational expressions with linear and quadratic denominators.	Course 3: Unit 5 Course 4: Unit 3
IMV.2.3.4 Describes the graphs of rational functions, describes limitations on the domains and ranges, and examines asymptotic behavior.	Course 3: Unit 5 Course 4: Unit 3
IMV.2.3.5 Uses properties of radicals to solve equations and identifies extraneous roots when they occur.	Course 4: Unit 3
Objective IMV.2.4: Student interprets and models step and other piecewise-defined functions, including functions involving absolute value.	
IMV.2.4.1 Analyzes a problem situation to determine or interpret reasonable domain and range values for piecewise-defined functions representing the situation.	Course 1: Unit 1 Course 2: Unit 5
IMV.2.4.2 Interprets, constructs, and applies step functions (e.g., greatest integer/floor) and other piecewise-defined functions, including absolute value functions, to model and solve problems.	Course 1: Unit 1 Course 2: Unit 5
IMV.2.4.3 Translates among verbal, graphical, tabular, and symbolic representations of step functions and other piecewise-defined functions, including absolute value functions.	Course 1: Unit 1 Course 2: Unit 5

Standard IMV.3: Structure of Sequences and Recursion Students analyze and represent sequences and series and investigate how recursive relationships and their associated sequences can model the long-term behavior of situations involving sequential change.	
Objective IMV.3.1: Student categorizes sequences as arithmetic, geometric, or neither and develops formulas for the general terms and sums related to arithmetic and geometric sequences.	
IMV.3.1.1 Investigates the rate of change found in sequences, and uses it to characterize sequences as arithmetic, geometric, or neither.	Course 3: Unit 7
IMV.3.1.2 Develops the general term for arithmetic and geometric sequences, and develops methods for calculating sums of terms for finite arithmetic and geometric sequences and the sum of a convergent infinite geometric series.	Course 2: Unit 8 (Lesson 3) Course 3: Unit 7
Objective IMV.3.2: Student develops recursive relationships for modeling and investigating patterns in the long-term behavior of their associated sequences.	
IMV.3.2.1 Develops recursive relationships for arithmetic and for geometric growth situations.	Course 1: Unit 1, Unit 3, Unit 5 Course 2: Unit 8 (Lesson 3) Course 3: Unit 7
IMV.3.2.2 Generates or constructs sequences from given recursive relationships modeling patterns found in mathematics and in other disciplines.	Course 1: Unit 1, Unit 3, Unit 5 Course 3: Unit 7
IMV.3.2.3 Investigates the long-term behavior of a recursive relationship, with and without technology.	Course 1: Unit 1 Course 3: Unit 7
Standard IMV.4: Trigonometric Ratios Students develop and apply the Pythagorean theorem, right-triangle trigonometric ratios, and proportionality relationships in structuring and solving indirect measurement problems.	
Objective IMV.4.1: Student proves and applies the Pythagorean theorem and its converse, and student develops and applies the distance formula, properties of special right triangles, properties of proportions, and the basic trigonometric ratios.	
IMV.4.1.1 Proves the Pythagorean theorem and its converse and applies them in two and three-dimensional settings.	Course 1: Unit 6 Course 2: Unit 7 Course 3: Unit 1, Unit 3, Unit 6
IMV.4.1.2 Develops and applies the distance formula to determine the distance between points in the coordinate plane.	Course 2: Unit 3 Course 3: Unit 1, Unit 3, Unit 6
IMV.4.1.3 Develops and applies the properties of 30˚-60˚-90˚ and 45˚-45˚-90˚ triangles; develops and applies proportional relationships involving the altitude drawn to the hypotenuse of a right triangle.	Course 1: Unit 7 Course 2: Unit 3 Course 3: Unit 3, Unit 6
IMV.4.1.4 Applies the sine, cosine, and tangent trigonometric ratios to determine lengths and angle measures in right triangles.	Course 2: Unit 7 Course 3: Unit 3, Unit 6 Course 4: Unit 2, Unit 4
IMV.4.1.5 Applies, singly and in combination, the Pythagorean theorem, properties of proportionality, trigonometric ratios, and similarity in solving mathematical and real-world problems.	Course 2: Unit 7 Course 3: Unit 3, Unit 6 Course 4: Unit 2, Unit 4
Standard IMV.5: Experiments, Surveys, and Observational Studies Students distinguish among experiments, surveys, and observational studies. They design studies, collect and analyze data using appropriate methods, draw conclusions, and communicate results. They evaluate studies reported in the media.	

Objective IMV.5.1: Student identifies problems that can be addressed through collection and analysis of experimental data, designs and implements simple comparative experiments, and draws appropriate conclusions from the collected data.	
IMV.5.1.1 Describes how well-designed experiments use random assignment to balance the variation of some factors in order to isolate the effects of a treatment.	Course 2: Unit 4 (page 303) Course 3: Unit 1
IMV.5.1.2 Designs a simple comparative experiment to answer a question: determines treatments, identifies methods of measuring variables, randomly assigns units to treatments, and collects data, distinguishing between explanatory and response variables.	Course 3: Unit 1 Course 4: Unit 9
IMV.5.1.3 Organizes and displays data from an experiment; summarizes the data using measures of center and spread, including the mean and standard deviation; identifies patterns and trends in tables and plots; and communicates methods used and the results of the experimental study to non-technical persons.	Course 1: Unit 2 Course 2: Unit 4 Course 3: Unit 1
Objective IMV.5.2: Student distinguishes among surveys, observational studies, and designed experiments and relates each type of investigation to the research questions it is best suited to address. Student recognizes that an observed association between a response and an explanatory variable does not necessarily imply that the two variables are causally linked. Student recognizes the importance of random selection in surveys and random assignment in experimental studies. Student communicates the purposes, methods, and results of a statistical study, and evaluates studies reported in the media.	
IMV.5.2.1 Distinguishes among questions best explored through a sample survey, an observational study, or a designed experiment. Recognizes that an observed association between a response and an explanatory variable does not necessarily imply that the two variables are causally linked. Illustrates the different types of conclusions that may be drawn from surveys, observational studies, and designed experiments.	Course 2: Unit 4 Course 3: Unit 1
IMV.5.2.2 Evaluates possible factors involved in a given problem and what information they provide relative to the question of interest. Formulates specific questions and identifies quantitative measures that may be used in providing answers to the question of interest.	Course 3: Unit 1 Course 4: Unit 9
IMV.5.2.3 Describes advantages and disadvantages of using different methods of measuring variables. Explains how biases can occur in studies and their effects on study outcomes.	Course 3: Unit 1, Unit 4 Course 4: Unit 9
IMV.5.2.4 Compares and contrasts the random sampling of units from a population and the random assignment of treatments to experimental units.	Course 3: Unit 1
IMV.5.2.5 Explains why most research questions do not have unique answers and why several approaches to answering the same question may be appropriate; explains why different studies of the same research question, conducted differently, may yield very different results and why this is to be expected.	Course 3: Unit 1 (sort of page 89 #1), Unit 4 (different statistical tests used for out of control behavior)
IMV.5.2.6 Communicates, both orally and in writing, the purposes, methods, and results of a statistical study using non-technical language.	Course 1: Unit 2 Course 2: Unit 4 Course 3: Unit 1, Unit 4 Course 4: Unit 9
IMV.5.2.7 Evaluates study results reported in the media.	Course 2: Unit 4 Course 3: Unit 1, Unit 4 Course 4: Unit 9

College Board IMVI and Core-Plus Mathematics Courses

Standard IMVI.1: Properties of Families of Functions Students develop and apply properties of functions and families of functions and their related equations. Students apply and interpret the results of various operations with functions in mathematical and real-world situations.	
Objective IMVI.1.1: Student investigates behavior of functions and their related equations, and student compares and contrasts properties of families of functions and their related equations.	
IMVI.1.1.1 Determines the domain and range of functions as represented by symbols and graphs, where appropriate.	Course 2: Unit 5 Course 3: Unit 5, Unit 6 Course 4: Unit 1, Unit 3, Unit 4, Unit 5
IMVI.1.1.2 Identifies and applies relationships among significant points of a function (zeros, maximum points, minimum points), the graph of the function, the nature and number of the function's zeros, and the symbolic representation of the function.	Course 1: Unit 7 Course 2: Unit 5 Course 3: Unit 5, Unit 6 Course 4: Unit 1, Unit 3, Unit 4, Unit 5
IMVI.1.1.3 Determines the number and nature of solutions to polynomial equations with real coefficients over the complex numbers.	Course 3: Unit 5 Course 4: Unit 3
IMVI.1.1.4 Recognizes and describes continuity, end behavior, asymptotes, symmetry (odd and even functions), and limits, and connects these concepts to graphs of functions.	Course 3: Unit 5 Course 4: Unit 1, Unit 3, Unit 4, Unit 5
IMVI.1.1.5 Identifies situations involving functions for which there is no elementary algorithm to find zeros (for example, $a^x = x^n$), and distinguishes them as such.	Course 4: Unit 3, Unit 5
IMVI.1.1.6 Compares and contrasts characteristics of different families of functions, such as polynomial, rational, radical, power, exponential, logarithmic, trigonometric, and piecewise-defined functions, and translates among verbal, tabular, graphical, and symbolic representations of functions.	Course 4: Unit 1, Unit 3, Unit 4, Unit 5 (Also addressed in Courses 1–3 as each family is introduced)
IMVI.1.1.7 Describes and contrasts common elementary functions symbolically and graphically, including x^n, x^{-1}, $\ln x$, $\log_a x$, e^x, a^x, and the basic trigonometric functions.	Course 1: Unit 1, Unit 5, Unit 6 Course 2: Unit 1 Course 3: Unit 8 Course 4: Unit 5
Objective IMVI.1.2: Student examines and applies basic transformations of functions and investigates the composition of two functions in mathematical and real-world situations.	
IMVI.1.2.1 Finds, interprets, and graphs the sum, difference, product, and quotient (where it exists) of two functions, indicates the relevant domain and range for the resulting function, and provides a graph of the resulting function.	Course 4: Unit 1
IMVI.1.2.2 Forms the composition of two functions, and determines the domain, range, and graph of the composite function. Composes two functions to determine whether they are inverses.	Course 4: Unit 1
IMVI.1.2.3 Applies basic function transformations to a parent function $f(x)$, including $a \cdot f(x)$, $f(x) + d$, $f(x - c)$, $f(b \cdot x)$, $\lvert f(x)\rvert$, and $f(\lvert x\rvert)$, and interprets the results of these transformations verbally, graphically, and numerically.	Course 4: Unit 1

Standard IMVI.2: Trigonometric Functions Students extend trigonometric ratios to functions of angle measure and of real numbers. They develop these functions' graphs, properties, and inverse functions. Students solve trigonometric equations. They develop more-general trigonometric functions and apply them to solve real-world problems.	
Objective IMVI.2.1: Student solves problems involving measures in triangles by applying trigonometric functions of the degree or radian measure of a general angle and shifts from primarily viewing trigonometric functions as based on degree measure to viewing them as functions based on radian measure, and ultimately to viewing them as general periodic functions of real numbers. Student investigates the properties of trigonometric functions, their inverse functions, and their graphical representations.	
IMVI.2.1.1 Develops and applies the definition of the sine and cosine functions of the degree measure of a general angle in standard position in relation to the values of the *y*- and *x*-coordinates, respectively, of points on the terminal side of the angle.	Course 2: Unit 7 Course 3: Unit 6
IMVI.2.1.2 Develops radian measure of angles, measures angles in both degrees and radians, and converts between these measures.	Course 3: Unit 6
IMVI.2.1.3 Defines the trigonometric functions as functions of the radian measure of a general angle, and describes them as functions of real numbers.	Course 3: Unit 6 Course 4: Unit 1, Unit 4
IMVI.2.1.4 Develops and applies the values of the trigonometric functions at 0, $\frac{\pi}{6}$, $\frac{\pi}{4}$, $\frac{\pi}{3}$, $\frac{\pi}{2}$ radians and their multiples.	Course 3: Unit 6 Course 4: Unit 1, Unit 4
IMVI.2.1.5 Constructs the graphs of the trigonometric functions, and describes their behavior, including periodicity, amplitude, zeros, and symmetries.	Course 3: Unit 6 Course 4: Unit 1, Unit 4
IMVI.2.1.6 Defines and graphs inverses of trigonometric functions with appropriately restricted domains.	Course 3: Unit 8 Course 4: Unit 1, Unit 4
IMVI.2.1.7 Develops the fundamental Pythagorean trigonometric identities, sum and difference identities, double-angle identities, and the secant, cosecant, and cotangent functions, and uses them to simplify trigonometric expressions.	Course 4: Unit 4
IMVI.2.1.8 Develops the Law of Sines and the Law of Cosines, and uses them to find the measures of unknown sides and angles in triangles.	Course 2: Unit 7 Course 3: Unit 1, Unit 3, Unit 6 Course 4: Unit 2
Objective IMVI.2.2: Student uses transformations of trigonometric functions, their properties, and their graphs to model and solve trigonometric equations and a variety of problems.	
IMVI.2.2.1 Graphs functions of the form $f(t) = A \sin(Bt + C) + D$ or $g(t) = A \cos(Bt + C) + D$, and interprets A, B, C, and D in terms of amplitude, frequency, period, and vertical and phase shift.	Course 3: Unit 6 Course 4: Unit 1, Unit 4
IMVI.2.2.2 Relates and uses rectangular and polar representations of complex numbers, and uses DeMoivre's theorem.	Course 4: Unit 3, Unit 4
IMVI.2.2.3 Solves trigonometric equations, noting the periodic nature of solutions when applicable, and interprets the solutions graphically.	Course 3: Unit 8 Course 4: Unit 4
IMVI.2.2.4 Uses trigonometric functions to model and solve problems in mathematics and other disciplines.	Course 3: Unit 6, Unit 8 Course 4: Unit 2, Unit 4

Standard IMVI.3: Conic Sections and Polar Equations Students develop the general symbolic forms for and graphically represent the conic sections based on their locus descriptions, applying these results to mathematical and real-world contexts. Students represent points in polar form and find equivalent polar and rectangular representations for points and curves.	
Objective IMVI.3.1: Student develops and represents conic sections from their locus descriptions, illustrating the major features and graphs. Student uses conic sections and their properties to model mathematical and real-world problem situations.	
IMVI.3.1.1 Determines an equation representing each of the conic sections from its locus description.	Course 4: Unit 6
IMVI.3.1.2 Analyzes a quadratic equation in x and y representing a conic with center at (h, k) and involving no rotation, recognizes the type of conic section represented, expresses the equation in a form useful for graphing, and constructs a graph of the conic.	Course 2: Unit 3 Course 3: Unit 5 Course 4: Unit 6
IMVI.3.1.3 Uses conic sections to model and solve problems from mathematics and other disciplines.	Course 3: Unit 5, Unit 6 Course 4: Unit 6
Objective IMVI.3.2: Student represents points and curves in rectangular and polar forms and finds equivalent polar and rectangular representations for points and curves.	
IMVI.3.2.1 Expresses points in the plane in both rectangular and polar forms.	Course 4: Unit 6
IMVI.3.2.2 Finds equivalent representations for points and curves, including the conics, in both rectangular and polar forms.	Course 4: Unit 6
Standard IMVI.4: Vectors and Parametric Equations Students represent, investigate, and solve problems using two-dimensional vectors and parametric equations.	
Objective IMVI.4.1: Student applies vector concepts in two dimensions to represent, interpret, and solve problems.	
IMVI.4.1.1 Defines vectors in two dimensions as objects having magnitude and direction, and represents them geometrically.	Course 4: Unit 2
IMVI.4.1.2 Illustrates and applies the properties of vector addition and scalar multiplication to represent, investigate, and solve problems.	Course 4: Unit 2, Unit 4
IMVI.4.1.3 Uses vectors in modeling physical situations to solve problems.	Course 4: Unit 2, Unit 4
IMVI.4.1.4 Models geometric translations with vector addition to solve problems.	Course 4: Unit 2
Objective IMVI.4.2: Student applies parametric methods to represent and interpret motion of objects in theplane.	
IMVI.4.2.1 Uses parametric equations to represent situations involving motion in the plane, including motion on a line, motion of a projectile, and motion of objects in orbits.	Course 4: Unit 2, Unit 4
IMVI.4.2.2 Converts between a pair of parametric equations and an equation in x and y to interpret the situation represented.	Course 4: Unit 2
IMVI.4.2.3 Analyzes planar curves, including those given in parametric form.	Course 4: Unit 2

Standard IMVI.5: Least-Squares Regression and Association in Bivariate Data Students develop models for trends in bivariate data using least-squares regression lines. Students use the correlation coefficient to measure linear association in scatterplots, and they examine the effects of outliers on the correlation and on models for trend. Students investigate the effects of data transformations on measures of center, spread, association, and trend.	
Objective IMVI.5.1: Student assesses association in tables and scatterplots of bivariate numerical data and uses the correlation coefficient to measure linear association. Student develops models for trends in bivariate data using least-squares regression lines.	
IMVI.5.1.1 Generates the least-squares regression line, using technology, to model a relationship shown in a scatterplot, and interprets the slope and intercept in terms of the original context.	Course 1: Unit 3 Course 2: Unit 4 Course 4: Unit 5 (Lesson 2)
IMVI.5.1.2 Determines the correlation, using technology, between two numerical variables, interprets the correlation, and describes the strengths and weaknesses of the correlation coefficient as a measure of linear association.	Course 2: Unit 4
IMVI.5.1.3 Computes and plots residuals from the least-squares regression line; assesses the fit of the linear model using graphical and numerical results, and determines whether the use of a linear model is appropriate.	Course 2: Unit 4 Course 4: Unit 5 (Lesson 2)
IMVI.5.1.4 Interpolates using trends observed in scatterplots or fitted regression lines, and judges when extrapolating observed trends may be appropriate.	Course 1: Unit 3 Course 2: Unit 4
Objective IMVI.5.2: Student examines the influence of outliers on the correlation and on models for trend.	
IMVI.5.2.1 Identifies unusual observations in scatterplots, and conjectures about the effect of such outliers on the strength of the association between the variables defining the scatterplot.	Course 2: Unit 4
IMVI.5.2.2 Investigates and describes the influence outliers may have on a correlation coefficient, on the slope and intercept of a least-squares regression line, and on a median-fit line.	Course 2: Unit 4
IMVI.5.2.3 Analyzes the potential importance of outliers as flags for possible errors in the data, or as counterexamples or unique cases, especially when describing societal trends or behavioral traits.	Course 2: Unit 4
Objective IMVI.5.3: Student examines the effects of transformations on measures of center, spread, association, and trend and develops basic techniques for modeling and more-advanced data analytic techniques.	
IMVI.5.3.1 Demonstrates and describes how different scales (e.g., original, linear, square root, logarithmic) may affect scatterplots and summary statistics, and shows how different representations (tables, graphs, summary numbers) may reveal different characteristics of a data set.	Course 4: Unit 5
IMVI.5.3.2 Describes and illustrates how data scales are chosen for convenience in analyzing and presenting information, and describes how transformations may be used in the development of linear models.	Course 2: Unit 4 Course 4: Unit 5 (Lesson 2)

Standard IMVI.6: Permutations, Combinations, and Probability Distributions Students solve ordering, counting, and related probability problems. Students recognize a binomial probability setting and compute the probability distribution for a binomial count. Students recognize settings where the normal model may be used, and they apply the empirical rule to solve problems.	
Objective IMVI.6.1: Student solves ordering, counting, and related probability problems. Student recognizes a binomial probability setting and computes the probability distribution for a binomial count.	
IMVI.6.1.1 Uses permutations, combinations, and the multiplication rule for counting (Fundamental Property of Counting) to solve counting and probability problems.	Course 4: Unit 8
IMVI.6.1.2 Recognizes a binomial probability setting, and develops and graphs the probability distribution for a binomial count.	Course 3: Unit 4 Course 4: Unit 9
Objective IMVI.6.2: Student identifies settings in which the normal distribution may be useful. Student describes characteristics of the normal distribution and uses the empirical rule to solve problems.	
IMVI.6.2.1 Identifies settings in which the normal distribution may be useful, and describes characteristics of the normal distribution.	Course 3: Unit 4 Course 4: Unit 9
IMVI.6.2.2 Uses graphical displays and the empirical rule to evaluate the appropriateness of the normal model for a given set of data. Uses the empirical rule to estimate the probability that an event will occur in a specific interval that can be described in terms of whole numbers of standard deviations about the mean.	Course 3: Unit 4 Course 4: Unit 9