CORE-PLUS MATHEMATICS PROJECT

Scope & Sequence

algebra and functions

statistics and probability

geometry and trigonometry

discrete mathematics

Contemporary Mathematics in Context

A Unified Approach

C O R E - P L U S M A T H E M A T I C S P R O J E C T

Scope and Sequence

Contemporary Mathematics in Context

A Unified Approach

Arthur F. Coxford
James T. Fey
Christian R. Hirsch
Harold L. Schoen
Gail Burrill
Eric W. Hart
Brian A. Keller
Ann E. Watkins
with
Mary Jo Messenger
Beth E. Ritsema
Rebecca K. Walker

Glencoe McGraw-Hill

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Send all inquiries to:
Glencoe McGraw-Hill
8787 Orion Place
Columbus, Ohio 43240-4027

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About the *Core-Plus Mathematics Project*

The **Core-Plus Mathematics Project (CPMP)** was funded by the National Science Foundation to develop student and teacher materials for a comprehensive Standards-based high school mathematics curriculum. Courses 1–3 comprise a core curriculum appropriate for *all* students. Course 4 continues the preparation of students for college mathematics.

Project Director
Christian R. Hirsch
Western Michigan University

Project Co-Directors
Arthur F. Coxford
University of Michigan

James T. Fey
University of Maryland

Harold L. Schoen
University of Iowa

Senior Curriculum Developers
Gail Burrill
University of Wisconsin-Madison

Eric W. Hart
Western Michigan University

Brian A. Keller
Michigan State University

Ann E. Watkins
California State University, Northridge

Professional Development Coordinator
Beth Ritsema
Western Michigan University

Evaluation Coordinator
Steven W. Ziebarth
Western Michigan University

Advisory Board
Diane Briars
Pittsburgh Public Schools

Jeremy Kilpatrick
University of Georgia

Kenneth Ruthven
University of Cambridge

David A. Smith
Duke University

Edna Vasquez
Detroit Renaissance High School

Curriculum Development Consultants
Alverna Champion
Grand Valley State University

Cherie Cornick
Wayne County Alliance for Mathematics and Science

Edgar Edwards
(Formerly) Virginia State Department of Education

Kenneth Ross
University of Oregon

Richard Scheaffer
University of Florida

Martha Siegel
Towson University

Edward Silver
University of Pittsburgh

Lee Stiff
North Carolina State University

Paul Zorn
St. Olaf College

Collaborating Teachers
Emma Ames
Oakland Mills High School, Maryland

Cheryl Bach Hedden
Sitka High School, Alaska

Mary Jo Messenger
Howard County Public Schools, Maryland

Valerie Mills
Ann Arbor Public Schools, Michigan

Jacqueline Stewart
Okemos High School, Michigan

Michael Verkaik
Holland Christian High School, Michigan

Marcia Weinhold
Kalamazoo Area Mathematics and Science Center, Michigan

Graduate Assistants
Cos Fi
University of Iowa

Sarah Field
University of Iowa

Kelly Finn
University of Iowa

Judy Flowers
University of Michigan

Johnette Masson
University of Iowa

Chris Rasmussen
University of Maryland

Heather Thompson
Iowa State University

Bettie Truitt
University of Iowa

Roberto Villarubi
University of Maryland

Rebecca Walker
Western Michigan University

Ed Wall
University of Michigan

Technical Coordinator
James Laser
Western Michigan University

Production and Support Staff
Kelly MacLean
Jennifer Rosenboom
Wendy Weaver
Kathryn Wright
Teri Ziebarth
Western Michigan University

Catherine Kern
University of Iowa

Software Developers
Jim Flanders
Colorado Springs, Colorado

Eric Kamischke
Interlochen, Michigan

UNIFIED MATHEMATICS

Contemporary Mathematics in Context is a four-year unified curriculum that replaces the traditional Algebra-Geometry-Advanced Algebra/Trigonometry-Precalculus sequence. Each course features interwoven strands of algebra and functions, statistics and probability, geometry and trigonometry, and discrete mathematics. Each of these strands is developed within focused units connected by fundamental ideas such as symmetry, functions, matrices, and data analysis and curve-fitting. The largest number of units is devoted to algebra and functions. By encountering mathematics every year from a more mathematically sophisticated point of view, students' understanding of the strands deepen across the four-year curriculum. Mathematical connections between strands and ways of thinking mathematically that are common across strands are emphasized. These mathematical habits of mind include visual thinking, recursive thinking, searching for and explaining patterns, making and checking conjectures, reasoning with multiple representations, and providing convincing arguments and proofs.

Algebra and Functions

The algebra and functions strand develops student ability to recognize, represent, and solve problems involving relations among quantitative variables. Central to the development is the use of functions as mathematical models. The key algebraic models in the curriculum are linear, exponential, power, polynomial, logarithmic, rational, and periodic functions. Each algebraic model is investigated in four linked representations—verbal, graphic, numeric, and symbolic—with the aid of technology. Attention is also given to modeling with systems, both linear and nonlinear, and to symbolic reasoning and manipulation.

Statistics and Probability

The primary role of the statistics and probability strand is to develop student ability to analyze data intelligently, to recognize and measure variation, and to understand the patterns that underlie probabilistic situations. The ultimate goal is for students to understand how inferences can be made about a population by looking at a sample from that population. Graphical methods of data analysis, simulations, sampling, and experience with the collection and interpretation of real data are featured.

Geometry and Trigonometry

The primary goal of the geometry and trigonometry strand is to develop visual thinking and student ability to construct, reason with, interpret, and apply mathematical models of patterns in visual and physical contexts. Activities include describing patterns with regard to shape, size, and location; representing patterns with drawings, coordinates, or vectors; predicting changes and invariants in shapes; and organizing geometric facts and relationships through deductive reasoning.

Discrete Mathematics

The discrete mathematics strand develops student ability to model and solve problems involving enumeration, sequential change, decision making in finite settings, and relationships among a finite number of elements. Topics include matrices, vertex-edge graphs, recursion, models of social decision making, and systematic counting methods. Key themes are discrete mathematical modeling, existence *(Is there a solution?)*, optimization *(What is the best solution?)*, and algorithmic problem solving *(Can you efficiently construct a solution?)*.

ORGANIZATION OF THE CURRICULUM

The first three courses in the *Contemporary Mathematics in Context* series provided a common core of broadly useful mathematics for all students. They were developed to prepare students for success in college, in careers, and in daily life in contemporary society. Course 4 formalizes and extends the core program, with a focus on the mathematics needed to be successful in college mathematics and statistics courses. Unit titles for the four-year curriculum are given in the following table.

Course 1

1 Patterns in Data

2 Patterns of Change

3 Linear Models

4 Graph Models

5 Patterns in Space and Visualization

6 Exponential Models

7 Simulation Models

CAPSTONE Planning a Benefits Carnival

Course 2

1 Matrix Models

2 Patterns of Location, Shape, and Size

3 Patterns of Association

4 Power Models

5 Network Optimization

6 Geometric Form and Its Function

7 Patterns in Chance

CAPSTONE Forests, the Environment, and Mathematics

Course 3

1 Multiple-Variable Models

2 Modeling Public Opinion

3 Symbol Sense and Algebraic Reasoning

4 Shapes and Geometric Reasoning

5 Patterns in Variation

6 Families of Functions

7 Discrete Models of Change

CAPSTONE Making the Best of It: Optimal Forms and Strategies

Course 4

1 Rates of Change

2 Modeling Motion

3 Logarithmic Functions and Data Models

4 Counting Models

5 Binomial Distributions and Statistical Inference

6 Polynomial and Rational Functions

7 Functions and Symbolic Reasoning

8 Space Geometry

9 Informatics

10 Problem Solving, Algorithms, and Spreadsheets

The Strand Charts

The following charts provide an overview of the mathematical content and flow of Courses 1–4 in the *Contemporary Mathematics in Context* curriculum. The charts are organized by mathematical strand: algebra and functions, statistics and probability, geometry and trigonometry, and discrete mathematics. Each of the four strands has been divided into major categories, and under each of these categories you will find the mathematical topics developed in the curriculum.

Many cells in the grid have either a "●" or a "+" to indicate the units in which each topic is covered. The "●" indicates focus; this means that the topic is initially developed or is extended beyond its initial development or use. The "+" indicates connection, which means that a conceptual basis for the topic is developed, the topic is briefly introduced, or the topic is revisited and used without further development.

ALGEBRA AND FUNCTIONS

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Algebraic Representations																															
Coordinate graphs	●	●	+			+		+	●	+	+		+	+	●		+	+		●	+	+	+	+			+	+	●		
Tables and graphs	+	●	●		+	●		+	+		●		+	+	●		+			●	+	+	●	+			●	+	+		+
Symbolic expressions		●	●			●		+			●		+	+	●		●			●	●	●	●	●	●	+	●	●	●		●
Modeling data patterns	+	●	●			●				●	●		+	+	+		+			●	+	+	●	●			●	+	+		+
Error of prediction and residuals			●							●	+													+							
Matrices				●				●	●	+											+				+		●			+	
Coordinate models of transformations									●											●				●							
Summation notation	+									+				+					+		●				+	+					+
Vectors																							●					●			
Parametric equations																							●				+		+		
Logarithmic scales																								●							
Standard form of complex numbers																											●	+			
Polar coordinates																												●			
Polar form of complex numbers																												●			
Trigonometric form of complex numbers																												●			
Spreadsheets																															●
Linear Expressions and Relations																															
Modeling situations		+	●		+			+		●					+		+			●	+		●	+							●
Symbolic forms and effects of parameters		●	●			+				+	+						+			●	●	+	●	●					+		
Graphs and equations of lines		●	●			+		●	●	+	+				+		+			●		+		+			+		+		
Solving equations		●	●					+							+		●			+	+		+								●
Solving inequalities		●	●												+		●				+										●
Rates of change, slopes, and intercepts			●			+			+	+	+				+		+			+	●	●	+	+			+		+		+
Parametric equations for linear motion																							●								
Exponential Expressions and Relations																															
Modeling situations		+				●								+			+			●	+	+		●		+		●			+
Symbolic forms and effects of parameters		●				●					+						+			●	+	+		●		+		+			+
Graphs and intercepts		●				●											+			●		+		●				+			
Solving equations and inequalities		+				●											+			+	+			●				●			+
Rates of change						●														●		●		+				+			+
Asymptotes																	+			●				+				+			+

ALGEBRA AND FUNCTIONS

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Power Expressions and Relations																															
Symbolic forms and effects of parameters		+									●						+			●		+		●	+	+	+				
Graphs, intercepts, and zeroes		+									●						+			●		+		●			+				
Fractional and negative exponents						+					●											+		●			+				
Laws of exponents						+					●						+							+	+					+	
Modeling situations											●						+			●		●		●		+	+				+
Inverse variation											●				+		+			●		+		+			●				
Asymptotes (inverse variation)											+				+		+			●							+				
Solving equations and inequalities											●						+			+											
Roots and radicals											●						+			●				+		+					
Rates of change											+						+			●		●		+							
Quadratic Expressions and Relations																															
Modeling situations		+									●				+		+			+		+	●	●			+				
Symbolic forms and effects of parameters		+									●						+			●		+	●	+	+		+		+		
Graphs, intercepts, and zeroes		+									●				+		●			+		+	●	+			+		+		
Rates of change		+									+									+		●									
Solving equations by graphic and numeric approximation		+									●				+		+			+			●				+				●
Number of solutions											●				+		●			+							●				
Solving inequalities											●				+		●										●				
Higher-degree polynomials											●						●			●		+		●	●		●				
Solving equations by factoring																	●										●				
Solving equations by using the quadratic formula																	●										●				
Parametric equations for projectile motion																							●								
Parametric equations for circular motion																							●						+		
Parametric equations for elliptical motion																							●						+		+
Conic sections											+						+			+			●	+					●		
Polynomial Expressions and Relations																															
Modeling situations																				+							●				
Symbolic forms and effects of parameters																	+			+							●				
Graphs, intercepts, and zeroes											+																●				
Rates of change																						●					●				
End behavior																											●				
Solving equations and inequalities											+						+										●				
Number of solutions																											●				

ALGEBRA AND FUNCTIONS

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Rational Expressions and Relations																															
Proportions															●		+	+		+		●									+
Symbolic forms and effects of parameters		+													+		+			●							●				
Graphs, intercepts, and zeroes		+									+				+							+					●				
Rates of change											+						+					●					+				
Modeling situations											+				+		●										●				
Solving equations and inequalities															+		+										●				
Asymptotes																				●							●				
Periodic Relations																															
Modeling situations		+											●				+			●		+	●	+				●			
Symbolic forms and effects of parameters		+											●				+			●		+	●					●			
Graphs, intercepts, and zeroes		+											+				+			●		+	●	+				●			
Rates of change																						●						+			
Inverse trigonometric functions													+		+			+						+				●			
Solving trigonometric equations													+		+													●			
Trigonometric identities																												●			
Logarithmic Expressions and Relations																															
Definition and notation																								●				●			
Common logarithms																								●				+			
Modeling situations																								●							
Graphs and intercepts																								●				●			
Symbolic forms and effects of parameters																								●							
Properties of logarithms																								●	+			●			+
Solving logarithmic equations and inequalities																								●							
Evaluating logarithmic expressions																								●				●			+
Natural logarithms																												●			
Change of base for logarithms																												●			
Multivariable Expressions																															
Formulas	+	+			+					●			+		●		+	+	+						●	+		+			●
PythagoreanTheorem					●				+		+		+		+		+										+		●		
Law of Sines and Law of Cosines															●		●	+													
Modeling using symbolic equations and inequalities															●		+								+		+	+			+
Solving for one variable in terms of others															●													+			+
Effect of change among variables															●												+	+			+

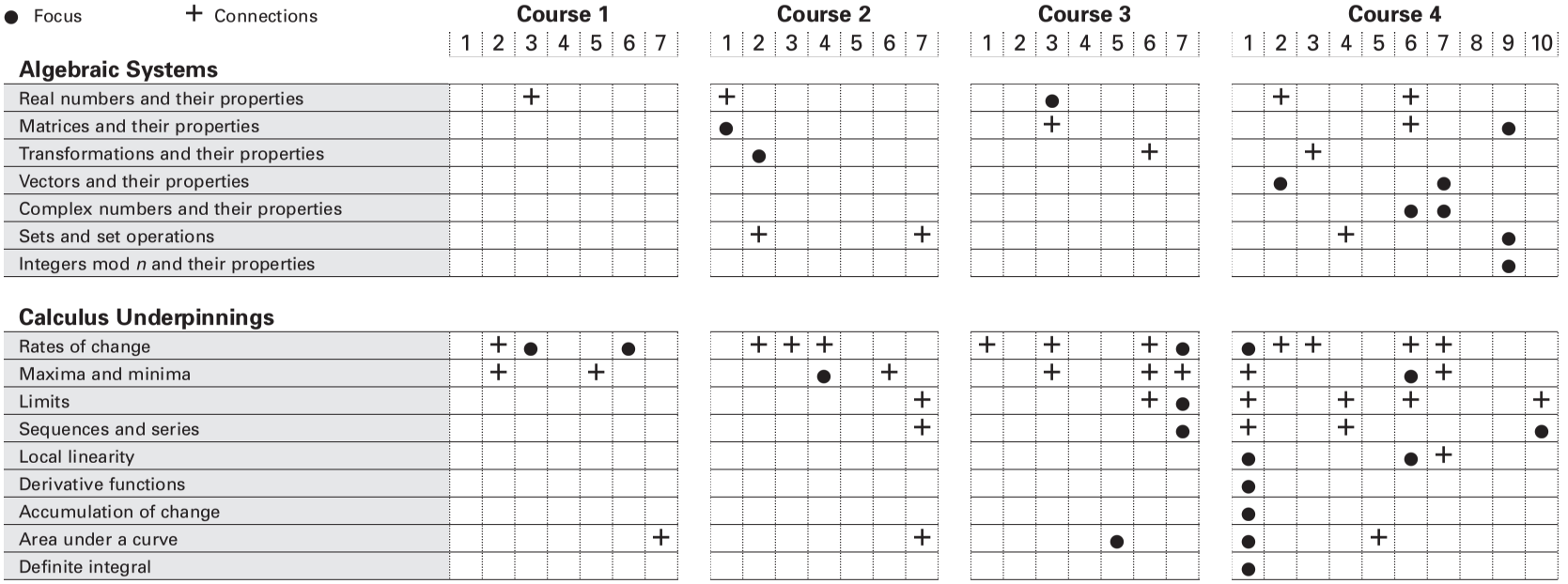
ALGEBRA AND FUNCTIONS

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Systems of Relations																															
Graphing systems			+						●						●																
Solving linear systems by graphical and numeric methods			●					+	●						+						+										
Solving linear systems by substitution			●					+	●						+						+						+				
Solving linear systems by matrix methods								●	+						+						+						+				
Solving linear systems by linear combinations									●						+																
Solving systems of linear inequalities															●																
Linear programming															●																
Linear-quadratic systems															●																
Systems of parametric equations																							●								
Functions																															
Definition and notation		+									+						●			+	+	+	+	+	+		●		+		
Domain and range			+			+					+						●			●		+	+	●	+		●	+				
Rates of change		+	●			+			+	+	+						+			●		●		+			+	+				
Transformations of graphs		+	+			+			+		+						●			●		+	+	●			+	●				
Composition of functions									+												+			●								
Zeroes of functions											+						●			+	+											
Sequences and series														+							●				+							
Inverses of functions																								●					+			
Algebraic Reasoning																															
Equivalent expressions			●			+					+				●		+			+			●	+	+		+	●	●			+
Distributive property			+					+									●	+		+					+		+	+	+			
Commutative properties			+					+									●	+		+			+		+		+	+	+			
Properties of exponents						+					●						+							+	+		+	●		+		
Associative properties								+									●	+		+					+		+	+	+			
Properties of equations								+	+						●		+	+		+				●			●	+	+			
Additive inverse								+							+		+						+				+			+		
Multiplicative inverse								+							+		+							+			+			+		
Closure property								+	+														+				●					
Radicals and operations											●				+		+							+		+	+					
Algebraic proof														+			●	+		+	+	+	+	●	+	+		●		+		
Polynomials and binary operations																	●			●					+		●					
Factoring, expanding, and simplifying																	●								+		●	+				
Binomial Theorem											+						+			+					●	+	+					
Pascal's Triangle																									●							
Completing the square																	+												●			
Substitution of variable																											+	●				
Mathematical induction																									●			+				
De Moivre's Theorem																												●				

ALGEBRA AND FUNCTIONS

● Focus + Connections



STATISTICS AND PROBABILITY

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Univariate Data																															
Number line (dot) plots	●																														
Measures of center and their properties: mean, median	●			+			+							+			+		+							+					
Basic shapes	●						+																			+					
Skewness and symmetry	●						+							+												+					
Histograms	●						+							+					+							+					
Clusters, gaps, and outliers	●									●				+					●												
Box plots	●															+										+					
Linear transformations of data	●																+		+	+						+					
Stem-and-leaf plots	●																		+												
Range and interquartile range (IQR)	●																		+												
Mean absolute deviation (MAD)	●																		+												
Percentiles and quartiles	●																		+							+					
Standard deviation and its properties	+																		●							+					
Frequency tables							●							●												+					
Standardized or *z*-scores																			●							●					
Concept of distribution	●						●							●			●		●							●					
Bivariate Data																															
Scatterplots and association	●	+	+		+					●	+								+	+				●							
Plots and trends over time	●									+									+		+			+							
Sum of squared differences	+									●									●					●							
Centroid	+									●																					
Least squares regression lines			●			+				●	+								+	+				●							
Errors of prediction and residuals			+							●	+													●							
Nonlinear regression						●					●									+				●							
Influential points										●									●												
Spearman's rank correlation coefficient										●																					
Scatterplot and correlation matrices										●																					
Pearson's correlation coefficient *r*										●														+							
Explanatory and response variables										●																					
Lurking variables										●																+					
Cause-and-effect relationships										●																					
Log and log-log transformations																								●							

STATISTICS AND PROBABILITY

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Probability																															
Normal distribution	+																		●							●					
Simulation						+	●						+			+											●					
Random digit tables and random number generators							●																				+					
Law of Large Numbers							●																				+					
Empirical (experimental) and theoretical probabilities							●							●					+								+					
Independent events							●							●					+						+		+			+		
Binomial distribution							+							+		+									+		●			+		
Geometric (waiting-time) distribution							+							●													+					
Multiplication Rule for independent events														●					+						+		+					
Geometric (area) models														●																		
Conditional probability														●											+						+	
Expected value														●													●					
Rare events														+					+								●					
Sampling distributions																●			+								●					
Mutually exclusive events																			●								+					
Addition Rule for mutually exclusive events																			●								+					
Central Limit Theorem																			+								●					
Probability distribution							●							●					●								●					
General multiplication rule																									●							
Binomial probability formula																											●					
Normal approximation to a binomial																											●					
Inferential Statistics																															
Population vs. sample																●			+								●					
Confidence intervals																●											+					
Margin of error																●											+					
Control (run) charts																			●													
Tests of significance including Type I and Type II errors																			+								●					
Statistical significance																											●					
One sample z-test for a proportion																											●					
Generalizability of results										+						●			+								●					
Surveys																															
Characteristics of a well-designed survey																●											+					
Sample survey vs. census																●											+					
Sample size																●											+					
Simple random sample																●											●					
Bias in survey method																●											●					
Response rate																●																

STATISTICS AND PROBABILITY

● Focus + Connections

Experiments

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Characteristics of a well-designed experiment																										●					
Treatments, control groups, random assignment, and replication																										●					
Source of bias and confounding, including placebo effect and blinding																										●					
Randomization test																										●					
Large sample test for a difference between two proportions																										●					

GEOMETRY AND TRIGONOMETRY

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Three-dimensional Shapes																															
Regular (Platonic) solids				+	●																										
Right polygonal prisms and pyramids					●						+																		+		
Cones and cylinders					●																								+		
Sketching shapes					●																								●		
Rigidity					●																										
Bilateral symmetry					●																								●		
Cross sections																													●		
Contour diagrams																													●		
Surfaces																													●		
Surfaces of revolution																													●		
Cylindrical surfaces																													●		
Two-dimensional Shapes																															
Definitions of polygons					●																										
Characteristics of polygons and special quadrilaterals					●				●				+					●							+					+	
Bilateral and rotational symmetry					●				+		+																			+	
Translational symmetry					●				+																						
Angle sums of polygons					●								+		+		+	+													
Tessellations					●																										
Congruence					+				+				+					●													
Properties of parallelograms					+				+				+				+	●													
Similarity									●				+		+			●													
Modeling plane shapes with coordinates									●								+	+													
Triangular and quadrilateral linkages													●		+																
Measures																															
Area		+			●	+					+				+		+	+				●		+	+						+
Perimeter		+			●						●														+						+
PythagoreanTheorem					●				+		+		+		+		●	+							+		+				
Volume					●						●				+												+				+
Surface area					●						+				+												+				+
Radian and degree measure					+								●							+		+	●					●			
Angular velocity													●										●								
Linear velocity													●																		

GEOMETRY AND TRIGONOMETRY

● Focus + Connections

Coordinate Models and Graphs

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Coordinate graphs	●	●	+					+	+								+	+		●		+	+	+					●		
Geometry of function graphs		+									+									●									●		
Slope of a line			●						+								+	+				+	+	+			+		+		
Equations of lines								●	●						●								+	●			+		+		
Slopes of parallel and perpendicular lines									●								+	+											+		
Distance and midpoint formulas									●								+	+									+		●		
Coordinate representation of transformations									●																						
Congruence and similarity									●																						
Matrix representation of polygons									●																						
Coordinate proof																	●	+													
Vectors																							●				+	+			
3-dimensional coordinate graphs																													●		
Sketching surfaces in 3-dimensional space																													●		
Equations of surfaces																													●		
Equations of planes																													●		
Traces of surfaces																													●		

Transformations and Symmetries

Bilateral and rotational symmetry	+				●				+		+									+								+	+	
Fractals				+		+															+				+						
Translational symmetry					●				+											+							+				
Tessellations					●																										
Strip patterns					●																										
Isometric transformations					●				●											+											
Size transformations									●		+		●					+		+											
Matrix representation of transformations									●																						
Transformation of graphs and function rules		+	+			+			+		+						●			●		+		●			+	+		
Complex number operations and transformations																												●			

GEOMETRY AND TRIGONOMETRY

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Trigonometry																															
Periodic change		+											●				+			●		●	●					●			
Triangular linkages with one variable side													●		+																
Trigonometric ratios and functions (sine, cosine, and tangent)													●		+		+					+	+								
Indirect measurement (angles and lengths)													●		●		+														
Circular and periodic motion													●				+			●			●					●			
Period													●				+			●			●					●			
Periodic models													●				+			●		+	●					●			
Trigonometric graphs													●				+			●		●	+	+				●			
Radian and degree measure					+								●							+		+	●					●			
Amplitude													●							●		+						●			
Law of Cosines															●		●	+					+								
Law of Sines															●		+	+					+								
Component analysis of vectors																							●								
Inverse trigonometric functions													+		+			+						+				●			
Trigonometric identities																	+											●			
Trigonometric ratios and functions (secant, cosecant, and cotangent)																												●			
Reasoning and Proof																															
Inductive reasoning	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	●	+	+	+	+	+	+	+	+	+	+	+	+	+
Counterexamples				+	+			+	+	+	+					+	+	●				+		+	+		+		+	
Deductive reasoning					+				●			+	+		+		+	●			+	+		+	+	+		●		+	
Designing and programming algorithms									●			+																		+	
Coordinate and analytic proof									●								●	●										●	●		
Synthetic proof																		●													
Assumptions in proof																		●							+					+	
Principles of logic																		●							+					+	
Converse																		●													
Angle relations for two intersecting lines																		●													
Angle relations for three intersecting lines																		●													
Parallelism																		●													
Similarity conditions for triangles																		●													
Congruence conditions for triangles																		●													
Necessary and sufficient conditions for parallelograms																		●													
Geometric constructions																		●													
Vector proof																							●								

DISCRETE MATHEMATICS

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Vertex-Edge Graphs																															
Vertex-edge graph models				●	+	+		+		+		●						+			+				+						
Digraphs				●				+		+		+																			
Adjacency matrices for vertex-edge graphs				●				●				+																			
Euler paths and circuits				●																											
Graph coloring				●																					+						
Critical path analysis and PERT charts				●																											
Trees and minimal spanning trees						+						●													+						
Shortest paths												●																			
Hamiltonian paths and circuits												●																			
Recursion and Iteration																															
Representation using the words NOW and NEXT		●	+	+		●		+					+							+	●			+						+
Representations of linear functions		+	●																		●										+
Representations of exponential functions		+				●															●										+
Recursion equations (difference equations)		+	+			+															●				+						+
Fractals				+		+															+				+						+
Composition of functions									+												+										+
Sequences and series														+							●				+						
Function iteration																					●										+
Finite differences																					●										
Fixed points																					●										
Graphical iteration																					●										
Matrices																															
Adjacency matrices for vertex-edge graphs				●				●				+																			
Matrix models				+				●	●			●									+										
Row and column sums				+				●				+																			
Matrix addition								●	+												+										
Scalar multiplication								●	+												+										
Matrix multiplication								●	+												+								+		
Identity matrices								●	+												+										
Inverse matrices								●	+												+					+			+		
Matrix solutions of linear systems								●	+						+						+					+					
Properties of matrices								●																					+		
Transformation matrices									●																						
Scatterplot matrices										●																					

DISCRETE MATHEMATICS

● Focus + Connections

	Course 1							Course 2							Course 3							Course 4									
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10
Social Decision Making																															
Preferential voting																●															
Approval voting																●															
Vote-analysis methods																●															
Arrow's Theorem																●															
Algorithms																															
Optimization				●								●			+		+									+					
Algorithmic problem solving				●					+			●									+				+				+	+	
Designing and programming algorithms									●			+				+										+			+	+	
Analyzing and comparing algorithms												●																		+	
Combinatorics														+											●						
Counting trees				+								+		+		+									●	+					+
Multiplication principle of counting				+								+		+		+									●	+					
Addition principle of counting																									+						
Pigeonhole principle												+		+											●	+					
Permutations														+											●	+					
Combinations														+											●	+				+	
Selections with repetition																									+						
Pascal's triangle																									●						
Binominal Theorem											+						+			+					●	+	+				
Combinatorial reasoning																									●	+					
Informatics																									+					●	
Set operations																	+	+										+		●	
Logical (or Boolean) operators																		+									+			●	
Venn diagrams																														●	
Modular arithmetic																														●	
Symmetric-key cryptosystems																														●	
RSA public-key cryptosystems																														●	
Protocols																														●	
Error-detecting codes																														●	

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