

Curriculum Map for: Introduction to College Mathematics

Prepared August 2007 by James Haver

Textbook: Mathematical Excursions, by Aufmann, Lockwood, Nation, and Clegg 2007 by Houghton Mifflin Company

Prerequisites: This course is intended of students who have completed at least 3 years of high school math. Students wishing to take the course should have a TI-83 or TI-83plus calculator for use during class and at home.

Scope: Contemporary Mathematics is a one-semester high school course that is comparable to entry-level mathematics courses in colleges and universities. Students that take this course will have the option of receiving college credit for the class through Schenectady Community College. This course is designed to acquaint the student with various areas of contemporary mathematics. Among the topics investigated are mathematical systems, groups, logic, truth tables, Euclidean and Non-Euclidean geometries, probability, modeling with exponential and logarithmic functions, and statistics.

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
<p>WEEK 1</p>	<p><u>Numeration Systems and Number Theory</u></p> <p>4.1–Early Numeration Systems</p> <ul style="list-style-type: none"> • Hindu–Arabic Numeration System • Egyptian Numeration System • Roman Numeration System <p>4.2–Place-Value Systems</p> <ul style="list-style-type: none"> • Expanded Form • Babylonian Numeration System • Mayan Numeration System <p>4.3–Different Base Systems</p> <ul style="list-style-type: none"> • Converting Non-Base-Ten Numerals to Base Ten • Converting from Base Ten to Another Base • Converting Directly Between Computer Bases • The Double-Dabble Method <p>QUIZ 1</p>	<p>p178–185</p> <p>p187–197</p> <p>p197–207</p>

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
<p>WEEK 2</p>	<p><u>Mathematical Systems</u></p> <p>7.1–Modular Arithmetic</p> <ul style="list-style-type: none"> • Intro to Modular Arithmetic • Arithmetic Operations in Modulo n • Solving Congruence Equations • Additive and Multiplicative Inverses in Modular Arithmetic <p>7.2–Applications of Modular Arithmetic</p> <ul style="list-style-type: none"> • ISBN, UPC, and Credit Card Numbers • Cryptology <p>7.3–Introduction to Group Theory</p> <ul style="list-style-type: none"> • Introduction to Groups • Symmetry Groups • Permutation Groups <p>QUIZ 2</p>	<p>p408–419</p> <p>p419–431</p> <p>p431–444</p>

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
WEEK 3	<p><u>Applications of Functions</u></p> <p>6.1–Rectangular Coordinates and Functions</p> <ul style="list-style-type: none"> • Intro to Rectangular Coordinate System • Intro to Functions • Graphs of Functions <p>6.2–Properties of Linear Functions</p> <ul style="list-style-type: none"> • Intercepts • Slope of a Line • Slope–Intercept Form of a Straight Line <p>6.3–Finding Linear Models</p> <ul style="list-style-type: none"> • Finding Linear Models • Regression Lines <p>QUIZ 3</p>	<p>p328–340</p> <p>p340–353</p> <p>p353–364</p>
WEEK 4	<p>6.5–Exponential Functions</p> <ul style="list-style-type: none"> • Intro to Exponential Functions • The Natural Exponential Function • Applications of Exponential Functions • Exponential Regression <p>6.6–Logarithmic Functions</p> <ul style="list-style-type: none"> • Intro to Logarithmic Functions • Common and Natural Logarithms • Graphs of Logarithmic Functions • Applications of Logarithmic Functions <p>QUIZ 4</p>	<p>p377–389</p> <p>p389–402</p>

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
WEEK 5	TEST #1 (Mathematical Systems and Functions)	Mixed Review Test at the End of the Week
WEEK 6	<p><u>GEOMETRY</u></p> <p>8.1–Basic Concepts of Euclidean Geometry</p> <ul style="list-style-type: none"> • Lines and Angles • Angles Formed by Intersecting Lines • Angles of a Triangle <p>8.2–Perimeter and Area of Plane Figures</p> <ul style="list-style-type: none"> • Perimeter of Plane Geometric Figures • Area of Plane Geometric Figures <p>QUIZ 5</p>	<p>p449–469</p> <p>p469–492</p>
WEEK 7	<p>8.3–Properties of Triangles</p> <ul style="list-style-type: none"> • Similar Triangles • Congruent Triangles • The Pythagorean Theorem <p>8.4–Volume and Surface Area</p> <ul style="list-style-type: none"> • Volume • Surface Area <p>QUIZ 6</p>	<p>p493–507</p> <p>p507–522</p>
WEEK 8	TEST #2 (Geometry)	Mixed Review Test at the End of the Week
WEEK 9	<u>LOGIC</u>	

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
	<p>3.1–Logic Statements and Quantifiers</p> <ul style="list-style-type: none"> • Logic Statements • Compound Statements • Quantifiers and Negation <p>3.2–Truth Tables, Equivalent Statements, and Tautologies</p> <ul style="list-style-type: none"> • Truth Tables • Alternative Method for the Construction of a Truth Table • Equivalent Statements • Tautologies and Self-Contradictions <p>QUIZ 7</p>	<p>p114–124</p> <p>p125–136</p>
WEEK 10	<p>3.3–The Conditional and the Biconditional</p> <ul style="list-style-type: none"> • Conditional Statements • The Truth Table for the Conditional $p \rightarrow q$ • An Equivalent Form of the Conditional • The Negation of the Conditional • The Biconditional <p>QUIZ 8</p> <p>3.4–The Conditional and Related Statements</p> <ul style="list-style-type: none"> • Equivalent Forms of the Conditional • The Converse, the Inverse and the Contrapositive <p>3.5–Arguments</p> <ul style="list-style-type: none"> • Arguments • Arguments and Truth Tables • Standard Forms <p>QUIZ 9</p>	<p>p136–145</p> <p>p145–152</p> <p>p145–164</p>

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
WEEK 11	TEST #3 (LOGIC)	Mixed Review Test at the End of the Week
WEEK 12	<p><u>Probability</u></p> <p>11.1–The Counting Principle</p> <ul style="list-style-type: none"> • Counting by making a list • Counting by making a table • Counting by using a tree diagram • The Counting Principle • Counting With and Without Replacement <p>11.2–Permutations and Combinations</p> <ul style="list-style-type: none"> • Factorial • Permutations • Applying Several Counting Techniques • Permutations of Indistinguishable Objects • Combinations <p>QUIZ 10</p>	<p>p720–730</p> <p>p730–743</p>
WEEK 13	<p>11.3–Probability and Odds</p> <ul style="list-style-type: none"> • Introduction to Probability • Application to Genetics • Calculating Odds <p>11.4–Addition and Complement Rules</p> <ul style="list-style-type: none"> • The Addition Rule for Probabilities • The Complement of an Event • Combinatoric Formulas and Probability <p>QUIZ 11</p>	<p>p743–757</p> <p>p757–765</p>
WEEK 14	11.5–Conditional Probability	p767–778

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
	<ul style="list-style-type: none"> • Conditional Probability • Product Rule for Probabilities • Independent Events • Applications of Conditional Probability <p>QUIZ 12</p>	
WEEK 15	TEST #3 (Probability)	Mixed Review Test at the End of the Week
WEEK 16	<p><u>Statistics</u></p> <p>12.1–Measures of Central Tendency</p> <ul style="list-style-type: none"> • The Arithmetic Mean • The Median • The Mode • The Weighted Mean <p>12.2–Measures of Dispersion</p> <ul style="list-style-type: none"> • The Range • The Standard Deviation • The Variance <p>QUIZ 13</p>	<p>p793–807</p> <p>p807–819</p>
Week 17	12.3–Measure of Relative Position	p819–831

TIME	CONTENT	TEXTBOOK PAGES / ASSIGNMENTS
	<ul style="list-style-type: none"> • z-scores • Percentiles • Quartiles • Box-and-Whisker Plots <p>QUIZ 14</p> <p>12.4–Normal Distributions</p> <ul style="list-style-type: none"> • Frequency Distributions and Histograms • Normal Distributions and The Empirical Rule • The Standard Normal Distribution <p>12.5–Linear Regression and Correlation</p> <ul style="list-style-type: none"> • Linear Regression • Linear Correlation Coefficient <p>QUIZ 15</p>	<p>p831–846</p> <p>p846–861</p>
WEEK 18	<u>REVIEW FOR FINAL</u>	
WEEK 19	<u>REVIEW FOR FINAL</u>	
WEEK 20	<u>FINAL EXAM</u>	