STUDYWALKS · COURSE SYLLABUS

College Mathematics — High School Course with CLEP Preparation

College Mathematics is the math a general-education course asks of every student: sets and logic, numbers, algebra and functions, counting and probability, data and statistics, the math of money, and geometry. This course works through each one rule at a time, with every worked example checked.

CREDIT LABEL	HOURS GOAL	STUDYWALKS LEARNING HOURS	SUGGESTED OFFLINE HOURS
0.5 credit	**60 h**	**15.5 h**	**44.5 h**
high school, with the study plan	the 0.5-credit convention	measured runtime plus assessment time	reading, review and writing

15.5 h StudyWalks (8 h of lessons, 0 h of lectures, 7.3 h of quizzes and exams) + **44.5 h** suggested offline study = **60 h**. 446 lessons in 20 units; prepares for the CLEP College Mathematics exam.

High school credit is granted by the homeschool parent under the state's rules. StudyWalks supplies the record: hours, scores and this syllabus. The credit label is a suggestion; the parent makes the final call.

Course contents

Unit	Title and lecture topics	Lessons	Lecture
1	**Getting Ready: The Exam, the Calculator and Problem Solving** The exam itself · The calculator and the estimate · Solving a word problem · Checking and rounding · The capstone	16	31 min
2	**Numbers and Their Sets** The sets of numbers · Order on the number line · Computing with integers · Fractions, decimals and percents · Properties of the real numbers · The capstone	21	40 min
3	**Number Theory: Factors, Primes and Divisibility** Divisibility rules · Primes and factorization · GCD and LCM · Parity and powers · The capstone	19	36 min
4	**Measurement, Scientific Notation and Precision** Exponent rules · Scientific notation · Converting units · Temperature and precision · The capstone	18	38 min
5	**Sets and Venn Diagrams** Describing a set · Comparing sets and subsets · The universal set and the complement · Combining sets · Counting with Venn diagrams · De Morgan's laws and set identities · The capstone	24	49 min (2 parts)
6	**Logic: Statements, Connectives and Truth Tables** Statements and negation · Quantifiers and their negations · Connectives in letters · Dominance and truth values · Truth tables · Tautologies and De Morgan's laws · The capstone	22	42 min (2 parts)

Unit	Title and lecture topics	Lessons	Lecture
7	**Conditionals, Equivalence and Arguments** The conditional · The biconditional · Related statements and equivalence · Rewriting and negating the conditional · Valid argument forms · Fallacies and truth-table checks · The capstone	22	41 min (2 parts)
8	**Equations, Inequalities and Systems** Expressions · Linear equations · Words and proportions · Inequalities · Absolute value and quadratic equations · Lines · Systems of two linear equations · The capstone	26	54 min (2 parts)
9	**Functions: Representations, Graphs and Transformations** Relations and functions · Function notation and evaluating · Reading graphs · Domains and stories · Rate and direction · Composition · Piecewise functions · Transformations · Symmetry · The capstone	26	55 min (2 parts)
10	**Families of Functions: Linear, Exponential, Logarithmic and More** Linear functions · Add or multiply · Exponential growth and decay · Graphs, doubling and half-life · Doubling and half-life problems · Logarithms · Polynomials and parabolas · Radicals and comparing models · The capstone	26	59 min (2 parts)
11	**Counting: The Multiplication Rule, Permutations and Combinations** The multiplication rule · Tables, trees and adding · Factorials and permutations · Combinations · Conditions, restrictions and the capstone	20	37 min
12	**Probability** Outcomes, sample spaces and the scale · Three ways to get a probability · The complement · Counting with permutations and combinations · Odds and mutually exclusive events · Probability of "or" · Probability of "and" for independent events · Conditional probability and dependent events · Expected value · The capstone	26	55 min (2 parts)
13	**Displaying Data** Data types and tables · Graphs for categories · Displays for numbers and their shape · Change, relationships and honest graphs · The capstone	22	37 min
14	**Summarizing Data and the Normal Distribution** Three measures of center · Means from tables and weights · Outliers, skew and the right center · One new value, and the range · Standard deviation · Percentiles and quartiles · The normal distribution · z-scores · The capstone	28	54 min (2 parts)
15	**Percents and Consumer Math** Percent and the percent equation · Percent change · Discounts, markups and sales tax · Earnings, reverse percents, budgets and the capstone	24	46 min (2 parts)
16	**Interest: Simple, Compound and Continuous** Simple interest · Simple interest, worked · Compound interest · Frequency, e and continuous compounding · Effective yield and the APY · Solving for time · The capstone	26	1 h 1 min (2 parts)
17	**Present Value, Savings and Loans** Present value · Savings annuities and returns · Loans and credit · The capstone	22	51 min (2 parts)
18	**Geometry: Lines, Angles, Triangles and Quadrilaterals** Lines and angles · Parallel lines and a transversal · Triangles · Similarity and scale · Right triangles · Polygons, perimeter and area · The capstone	25	49 min (2 parts)
19	**Circles** Measuring a circle · Angles in a circle · Slices of a circle · Composite figures and the capstone	17	35 min

Unit	Title and lecture topics	Lessons	Lecture
20	**Mixed Problems and Capstone** Reading the exam · Percents and probability · Logic and functions · Geometry, data, counting and the calculator · The course capstone	16	34 min

Assessment and grading

- **Unit quizzes.** 20 quizzes, 10 questions each, checked as the student goes, each answer with the lesson to review. Untimed; retakes are unlimited.
- **Mid exam.** 50 questions on units 1–10, drawn fresh each time and scored at the end with a breakdown by content area. Untimed; retakes are unlimited.
- **Final exam.** 60 questions, 90 minutes, on the whole course. Scored 20–80; 50 passes (40 of 60 correct, about 67%). Retakes are unlimited with a 24-hour wait, each a fresh draw.

Suggested composite grade

Part	Weight
Unit quizzes (average of best scores)	20%
Mid exam (best score)	20%
Final exam (percent correct)	60%

Suggested letter scale

Letter	Composite
A	90–100
B	80–89
C	70–79
D	60–69
F	below 60

Suggested; the parent sets the grade. A passing final is the completion standard for the course record.

Study plan

The 44.5 offline hours are spread over the units in proportion to each unit's StudyWalks time. For each unit: read the matching sections of *Contemporary Mathematics (OpenStax); College Algebra 2e (OpenStax); Math in Society*, review the unit quiz misses, and write a one-page unit summary. Log the time as you go.

Unit	Title	StudyWalks	Offline, suggested	Unit total
1	Getting Ready: The Exam, the Calculator and Problem Solving	48 min	1 h 35 min	2 h 23 min
2	Numbers and Their Sets	1 h 2 min	2 h	3 h 2 min
3	Number Theory: Factors, Primes and Divisibility	56 min	1 h 50 min	2 h 46 min
4	Measurement, Scientific Notation and Precision	57 min	1 h 50 min	2 h 47 min
Lessons and lectures		**22 h 59 min**	**44 h 30 min**	**67 h 29 min**
Quizzes, mid exam and final (stated time)		**7 h 18 min**	**—**	**7 h 18 min**

Unit	Title	StudyWalks	Offline, suggested	Unit total
5	Sets and Venn Diagrams	1 h 15 min	2 h 25 min	3 h 40 min
6	Logic: Statements, Connectives and Truth Tables	1 h 6 min	2 h 10 min	3 h 16 min
7	Conditionals, Equivalence and Arguments	1 h 4 min	2 h 5 min	3 h 9 min
8	Equations, Inequalities and Systems	1 h 21 min	2 h 35 min	3 h 56 min
9	Functions: Representations, Graphs and Transformations	1 h 23 min	2 h 40 min	4 h 3 min
10	Families of Functions: Linear, Exponential, Logarithmic and More	1 h 26 min	2 h 45 min	4 h 11 min
11	Counting: The Multiplication Rule, Permutations and Combinations	58 min	1 h 50 min	2 h 48 min
12	Probability	1 h 23 min	2 h 40 min	4 h 3 min
13	Displaying Data	1 h	1 h 55 min	2 h 55 min
14	Summarizing Data and the Normal Distribution	1 h 24 min	2 h 45 min	4 h 9 min
15	Percents and Consumer Math	1 h 12 min	2 h 20 min	3 h 32 min
16	Interest: Simple, Compound and Continuous	1 h 29 min	2 h 50 min	4 h 19 min
17	Present Value, Savings and Loans	1 h 14 min	2 h 25 min	3 h 39 min
18	Geometry: Lines, Angles, Triangles and Quadrilaterals	1 h 16 min	2 h 25 min	3 h 41 min
19	Circles	53 min	1 h 45 min	2 h 38 min
20	Mixed Problems and Capstone	52 min	1 h 40 min	2 h 32 min
Lessons and lectures		**22 h 59 min**	**44 h 30 min**	**67 h 29 min**
Quizzes, mid exam and final (stated time)		**7 h 18 min**	**—**	**7 h 18 min**

Unit times are the unit's lecture runtime plus its lessons at the course's measured average lesson length; totals can differ from the learning hours by rounding.

Sources

- **Anchor:** Donna Kirk and others. *Contemporary Mathematics*. OpenStax, Rice University. CC BY-NC-SA 4.0
- **Witness:** Jay Abramson and others. *College Algebra 2e*. OpenStax, Rice University. CC BY-NC-SA 4.0
- **Witness:** David Lippman. *Math in Society*, edition 2.5. CC BY-SA 4.0
- **Witness:** Euclid. *The First Six Books of the Elements*, edited by John Casey. Project Gutenberg (central and inscribed angles only). Public domain

StudyWalks finals are modeled on the CLEP exam blueprint in scope, format, and rigor. Scores are StudyWalks scores, not CLEP scores, and are not affiliated with or recognized by the College Board.

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