STUDYWALKS · COURSE SYLLABUS

Algebra 1 — High School Course

Algebra 1 is first-year high school algebra, the course that comes before Geometry and College Algebra. It starts with numbers, operations and expressions, then works through quantities and units, solving linear equations and inequalities, absolute value, graphing lines and slope, systems of equations, functions and their graphs, sequences, exponents and radicals, exponential growth and decay, polynomials and factoring, quadratic functions and equations, and describing data with statistics. Its scope is modeled on the high school Algebra I course described in the Common Core State Standards for Mathematics (Appendix A). It has its own StudyWalks final exam, and the homeschool parent grants the high school credit. College Algebra reviews these topics quickly and assumes them; Algebra 1 teaches them from the start.

CREDIT LABEL	HOURS GOAL	STUDYWALKS LEARNING HOURS	SUGGESTED OFFLINE HOURS
1.0 credit	**120 h**	**33 h**	**87 h**
high school, with the study plan	the 1.0-credit convention	measured runtime plus assessment time	working problems and review

33 h StudyWalks (8.8 h of lessons, 15.5 h of lectures, 8.8 h of quizzes and exams) + **87 h** suggested offline study = **120 h**. 580 lessons in 26 units.

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 Started: Numbers, Operations and Expressions** How the course works · Sets of numbers · Working with integers · Exponents and the order of operations · Properties and expressions	22	32 min
2	**Quantities, Units and Writing Expressions** Quantities, rates and conversions · Accuracy · From words to expressions · Costs, percents and formulas · Expressions in context	20	29 min
3	**Solving Linear Equations** Equations and solutions · The properties of equality · Parentheses and variables on both sides · Fractions, decimals and a general strategy · When the variable cancels · Reasons for every step · Number problems · Answers that make sense	24	40 min (2 parts)
4	**Writing Equations and Rearranging Formulas** From a situation to an equation · Percent equations · Interest and motion · Value problems and formulas · Solving a formula for a letter · Shapes and right triangles · Temperature, units and the whole unit	22	40 min (2 parts)
5	**Inequalities in One Variable** What an inequality says · Solving inequalities · Compound inequalities · Absolute value · Limits from a situation	22	37 min

Unit	Title and lecture topics	Lessons	Lecture
6	**Graphs of Equations, Slope and Rate of Change** Points and solutions · Graphing lines · Slope · Rate of change · Equations from situations	22	30 min
7	**Writing and Graphing Linear Equations** Slope-intercept form · Point-slope form and standard form · Special lines and parallel lines · Perpendicular lines · Lines from tables and words · Direct variation and linear models · The unit in one problem	26	41 min (2 parts)
8	**Systems of Linear Equations** Systems and their solutions · Graphing a system · Substitution · Elimination · Choosing a method and setting up · Word problems · Solutions in a story · The unit in one problem	26	42 min (2 parts)
9	**Linear Inequalities and Systems of Inequalities in Two Variables** Graphing one inequality · Limits in stories, and systems · Corners, plans and budgets · The unit in one problem	18	29 min
10	**What a Function Is: Notation, Domain and Range** Functions from pairs and tables · Functions from graphs and words · Function notation · Working backward and reading meaning · Variables, domain and range · Domains in a story · Rules, and the unit in one problem	24	36 min (2 parts)
11	**Reading Graphs: Features and Average Rate of Change** Key features of a graph · Average rate of change · Comparing two functions · Features in a story, and the unit in one problem	22	30 min
12	**Linear Functions, Transformations, Piecewise Functions and Inverses** Linear functions from stories · Shifts, flips and stretches · Absolute value and piecewise functions · Step functions · Root functions · Inverse functions · The unit in one problem	24	42 min (2 parts)
13	**Sequences: Arithmetic and Geometric** Sequences and their kinds · Recursive and explicit formulas · Sequences as functions · Sequences in use	20	33 min
14	**Exponent Rules, Rational Exponents and Radicals** The exponent rules · Zero and negative exponents · Scientific notation · Square roots and cube roots · Multiplying roots and rational exponents · Rational and irrational numbers · The unit in one problem	26	48 min (2 parts)
15	**Exponential Growth and Decay** Exponential growth · Decay and percent rates · Tables and graphs · Models in stories and money · Half-life, doubling and rates · Inputs, and the unit in one problem	24	42 min (2 parts)
16	**Linear or Exponential? Comparing Models** Telling the two kinds apart · Exponential growth wins in the end · Building and reading both models · Choosing and explaining a model	18	29 min
17	**One-Variable Statistics: Displays, Center and Spread** Data and displays · The center · Quartiles and spread · Box plots and outliers · Spread, and comparing data sets · The unit in one problem	24	37 min (2 parts)
18	**Two-Way Tables and Scatter Plots** Two-way tables · Relative frequencies and association · Scatter plots · The unit in one problem	18	28 min
19	**Lines of Fit, Residuals and Correlation** Lines of fit and prediction · Residuals and the least-squares line · Correlation · Cause, and the right model	22	31 min

Unit	Title and lecture topics	Lessons	Lecture
20	**Polynomials: Adding, Subtracting and Multiplying** Naming polynomials · Adding and subtracting · Multiplying · Dividing, structure and the whole unit	22	35 min
21	**Factoring** Common factors and grouping · Trinomials with a leading 1 · Trinomials with a leading number, and squares · Perfect squares and sums of squares · Factoring completely, with a strategy · Checking, negatives and zeros · The unit in one problem	26	48 min (2 parts)
22	**Quadratic Functions and Their Graphs** Quadratic functions and their tables · The parabola · Standard form · Factored form and vertex form · Moving and writing parabolas · Converting between forms · Quadratics in context · The unit in one problem	26	43 min (2 parts)
23	**Solving Quadratics by Square Roots and Factoring** Quadratic equations and square roots · Solving by factoring · From solutions back to equations · Problems, and checking	22	33 min
24	**Completing the Square and the Quadratic Formula** Completing the square · The quadratic formula · The discriminant · Answers and methods · Vertex form by completing the square · Errors, fractions and graphs · The unit in one problem	24	43 min (2 parts)
25	**Quadratic Models, Linear–Quadratic Systems and Choosing a Model** Height, area and revenue · A line meets a parabola · Choosing a model · Models and data	22	33 min
26	**Capstone: The Course in One Thread** Getting ready for the final · Numbers, equations and functions · Models, data and quadratics · The course in one thread	14	24 min

Assessment and grading

- **Unit quizzes.** 26 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 1–13, drawn fresh each time and scored at the end with a breakdown by content area. Untimed; retakes are unlimited.
- **Final exam.** 48 questions, 90 minutes, on the whole course. Scored 20–80; 50 passes (32 of 48 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 87 offline hours are spread over the units in proportion to each unit's StudyWalks time. For each unit: work the practice problems in the matching lessons of OpenStax Algebra 1 (free online; this course never reproduces them) or the matching sections of Wallace's Beginning and Intermediate Algebra, check the answers, and rework the unit quiz misses by hand. Log the time as you go.

Unit	Title	StudyWalks	Offline, suggested	Unit total
1	Getting Started: Numbers, Operations and Expressions	52 min	3 h 5 min	3 h 57 min
2	Quantities, Units and Writing Expressions	47 min	2 h 50 min	3 h 37 min
3	Solving Linear Equations	1 h 2 min	3 h 40 min	4 h 42 min
4	Writing Equations and Rearranging Formulas	1 h	3 h 35 min	4 h 35 min
5	Inequalities in One Variable	57 min	3 h 25 min	4 h 22 min
6	Graphs of Equations, Slope and Rate of Change	50 min	3 h	3 h 50 min
7	Writing and Graphing Linear Equations	1 h 5 min	3 h 50 min	4 h 55 min
8	Systems of Linear Equations	1 h 6 min	3 h 55 min	5 h 1 min
Lessons and lectures		**24 h 22 min**	**87 h**	**111 h 22 min**
Quizzes, mid exam and final (stated time)		**8 h 48 min**	**—**	**8 h 48 min**

Unit	Title	StudyWalks	Offline, suggested	Unit total
9	Linear Inequalities and Systems of Inequalities in Two Variables	45 min	2 h 40 min	3 h 25 min
10	What a Function Is: Notation, Domain and Range	58 min	3 h 25 min	4 h 23 min
11	Reading Graphs: Features and Average Rate of Change	50 min	3 h	3 h 50 min
12	Linear Functions, Transformations, Piecewise Functions and Inverses	1 h 4 min	3 h 50 min	4 h 54 min
13	Sequences: Arithmetic and Geometric	51 min	3 h	3 h 51 min
14	Exponent Rules, Rational Exponents and Radicals	1 h 12 min	4 h 15 min	5 h 27 min
15	Exponential Growth and Decay	1 h 4 min	3 h 50 min	4 h 54 min
16	Linear or Exponential? Comparing Models	45 min	2 h 40 min	3 h 25 min
17	One-Variable Statistics: Displays, Center and Spread	59 min	3 h 30 min	4 h 29 min
18	Two-Way Tables and Scatter Plots	44 min	2 h 40 min	3 h 24 min
19	Lines of Fit, Residuals and Correlation	51 min	3 h	3 h 51 min
20	Polynomials: Adding, Subtracting and Multiplying	55 min	3 h 15 min	4 h 10 min
21	Factoring	1 h 11 min	4 h 15 min	5 h 26 min
22	Quadratic Functions and Their Graphs	1 h 6 min	3 h 55 min	5 h 1 min
23	Solving Quadratics by Square Roots and Factoring	53 min	3 h 10 min	4 h 3 min
24	Completing the Square and the Quadratic Formula	1 h 5 min	3 h 50 min	4 h 55 min
25	Quadratic Models, Linear–Quadratic Systems and Choosing a Model	53 min	3 h 10 min	4 h 3 min
26	Capstone: The Course in One Thread	37 min	2 h 15 min	2 h 52 min
Lessons and lectures		**24 h 22 min**	**87 h**	**111 h 22 min**
Quizzes, mid exam and final (stated time)		**8 h 48 min**	**—**	**8 h 48 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:** Lynn Marecek, MaryAnne Anthony-Smith, Andrea Honeycutt Mathis, Jay Abramson et al. *Algebra 1*. OpenStax, Rice University (2025). CC BY-NC-SA 4.0
- **Anchor:** Lynn Marecek, MaryAnne Anthony-Smith and Andrea Honeycutt Mathis. *Elementary Algebra 2e* and *Intermediate Algebra 2e*. OpenStax, Rice University. CC BY-NC-SA 4.0
- **Anchor:** Barbara Illowsky and Susan Dean. *Statistics* (high school). OpenStax, Rice University. CC BY 4.0
- **Witness:** Tyler Wallace. *Beginning and Intermediate Algebra* (2010). CC BY 3.0
- **Witness:** David Diez, Mine Çetinkaya-Rundel and Christopher Barr. *OpenIntro Statistics*, 4th edition. CC BY-SA 3.0
- **Witness:** Carl Stitz and Jeff Zeager. *Precalculus*, 4th edition. CC BY-NC-SA

This StudyWalks final is an end-of-course exam built from the Algebra 1 course, whose scope is modeled on the high school Algebra I course described in the Common Core State Standards for Mathematics (Appendix A). Scores are StudyWalks scores on a 20–80 scale. The course and exam have not been reviewed, certified or endorsed by any state, standards body or testing organization, and passing does not award credit: high school credit is granted by the homeschool parent.

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