

# Scope & Sequence

## Shormann Pre-Algebra

Scroll down to view the scope by topic.

Lesson	
1	Welcome!; What is mathematics?
2	A Brief History of Mathematics
3	Thinking about Number; Origin of Modern Numerals and Arithmetic Symbols
4	Place Value and Expanded Notation; Reading and Writing Whole Numbers
5	Types of Numbers; Number Lines; Sequences
6	Arithmetic with Whole Numbers and Money; Subtraction with Negative Results
7	Adding and Subtracting Fractions with Common Denominators; Multiplication with Fractions and Reciprocals
8	Properties of Arithmetic Operations; Evaluating Expressions
9	Arithmetic with Missing Numbers
10	Factors and Divisibility; Prime and Composite Numbers
11	Fractions and Percents
12	Points, Lines, Rays and Angles; Measuring Angles with a Protractor
13	Addition and Subtraction with Decimal Numbers; Rounding to the Nearest Whole Number
14	Equivalent Fractions and Reducing; Improper Fractions; Addition with Mixed Numbers and Regrouping
15	Measuring with Inch and Metric Rulers; Subtraction with Mixed Numbers and Regrouping
16	Story Problems About Addition and Subtraction
17	Least Common Multiples; Equivalent Division Problems; Distributive Property of Multiplication
18	Multiplication and Division with Decimal Numbers; Reading and Writing Decimal Numbers
19	Multiplication with Mixed Numbers, Including Exponents; Story Problems About

	Differences
20	Adding and Subtracting Fractions with Different Denominators
21	Reducing Fractions Using Prime Factorization; Least Common Multiples and Prime Factorization; Multiplying and Dividing Signed Numbers
22	Order of Operations; Simplifying Exponents
23	Dividing Fractions; Division by Zero and by Infinitesimals
24	Division and Writing Answers as Mixed Numbers and Decimals; Dividing by Decimal Numbers
25	U.S. and Metric Length Conversions
26	Operations with Signed Numbers; Graphing Inequalities on a Number Line
27	Absolute Value; Story Problems About Equal Groups
28	The History of Ratio; Story Problems About Parts of a Whole; Two Part Story Problems
29	Rational and Irrational Numbers; Number Sets and Number Lines; Prime Factorization and Addition/Subtraction
30	Working with Square Roots; Prime Factorization and Perfect Squares
31	More Operations with Fractions and Decimals; Repeating Decimals
32	Fraction/Decimal/Percent Equivalents
33	Fraction of a Whole Story Problems; Fraction/Decimal Part of a Number Story Problems, Part I of II
34	Average, Part I of II
35	Rate; Working with Sales Tax
36	What is Algebra?; More Complex Evaluations; Invisible Ones
37	Similarity and Scaling; Rate as a Conversion Factor
38	Unit Conversions: Capacity (Volume)
39	Simplifying Algebraic Expressions; Solving Basic Algebra Equations
40	Algebraic Subtraction
41	Algebraic Word Problems
42	Perimeter

43	Simplifying Algebraic Expressions: Adding Like Terms
44	Euclid; Classifying Triangles
45	Probability: Simple Events
46	Simplifying Algebraic Expressions: Multiplying; Expanding
47	Inductive Reasoning; Construction; Estimating Magnetic Compass Headings
48	Simplifying Algebraic Expressions: Factoring
49	Finding Missing Angles
50	Unit Conversions: Temperatures and Exchange Rates
51	The Coordinate Plane
52	More Decimal and Fraction Story Problems (Part II of III)
53	Comparing Similarity and Congruence; Similar Triangles; Polygons
54	Product of Square Roots Rule; Pythagorean Theorem
55	Deductive Reasoning and Proofs; Average, Part II(Average Given)
56	More on Finding Missing Angles, Including Transversals; Transversals and Proportions
57	Solids and Nets; Power Rule for Exponents
58	Foundations of Analytical Geometry; Percent of a Number Story Problems
59	Geometry in Art (Perspective); Scientific Notation with Large Numbers
60	More on Polygons and Angles; Transformations
61	More Simplifying with Negative Exponents; More Order of Operations with Signed Numbers
62	Functions and Relations (no graphing)
63	Fraction/Decimal/Percent of a Number Story Problems: Solving for P, D and F (Part III); Percent Increase
64	Scientific Notation with Small Numbers
65	Collecting Data; Making Tables and Graphs
66	Domain and Range; Proportion Word Problems, Part I of II
67	Area

68	Functions with Graphing: Linear Functions and x-y Tables
69	Volume; Right and Oblique Solids with a Given Base Area
70	Functions with Graphing: Linear Functions and Slope-Intercept Method
71	Proportion Word Problems, Part II: Ratios Involving Totals, Including Percent
72	Operations with Scientific Notation
73	Functions with Graphing: Nonlinear Functions
74	Data Interpretation and Representation with Charts
75	The Binary Numeral System; Pixels
76	Functions with Graphing: Domain and Range from Graphs; Dividing Terms and Canceling
77	More on Linear Functions: Creating a Linear Equation to Solve a Problem
78	Simplifying More Complex Operations with Exponents; Evaluating Scientific Formulas
79	More on Linear Functions: Creating a Linear Equation from a Graph
80	More on Linear Functions: Horizontal and Vertical Lines
81	Logic: Converse, Inverse and Contrapositive; What is Calculus?
82	Two Step Equations, Inequalities
83	More on Linear Functions: Linear Inequalities
84	Systems of Equations; More on Roots and Radical Signs
85	Addition and Subtraction with Mixed Measures; Simplifying Complex Fractions
86	Trigonometry Basics
87	Word Problems and Data from a Chart; Bits, Bytes and Binary Numbers
88	Logic: The Syllogism; Surface Area
89	Infinitesimals and the Limit
90	The Derivative and Slope; Solving Multivariable Equations
91	Calculus and the Trinity; Area and Volume Conversions
92	More on Derivatives and Tangent Lines; Calculus and the Study of Speed
93	Interest Rate, Savings and Debt

94	The Integral and Counting Squares; Imaginary Numbers
95	Mean, Median, Mode and Range
96	Probability: Compound Events
97	Linear Regression and Best Fit
98	Sequences and Series
99	Sigma Means Sum
100	Matrices

## Scope by Topic

<b>What is Mathematics?</b>
Comparing abstract and concrete
Describing mathematics as “the language of science”
Using the Bible to understand mathematics
God’s attribute of unity and diversity, and connection to mathematics
Discuss math history and founders of modern mathematics
<b>Numbers and Operations</b>
<b>Numeration</b>
Digits
Reading and writing numbers
Ordinal Numbers
Place value
Number line
Expanded notation
<b>Operations</b>
<b>Addition</b>

Addends and sum
Adding whole numbers
Regrouping
Adding decimals
Adding fractions and mixed numbers
Adding signed numbers
<b>Subtraction</b>
Difference, subtrahend, and minuend
Subtracting whole numbers
Regrouping (borrowing)
Subtracting decimals
Subtracting fractions and mixed numbers
Subtracting signed numbers
Mental subtraction strategies
<b>Multiplication</b>
Multiplication as repeated addition
Factors and product
Multiplication table
Regrouping
Multiplication notations: $a \times b$ , $a \cdot b$ , and $a(b)$
Multiplying whole numbers
Multiplying decimals
Multiplying fractions and mixed numbers
Multiplying signed numbers
Mental multiplication strategies
Using "Invisible ones" as factors
<b>Division</b>
Dividend, divisor, and quotient
Dividing with whole numbers

Remainders
Dividing with decimals
Dividing with fractions and mixed numbers
Dividing with signed numbers
Mental division strategies
Division notations: division box, division sign, and division bar
Using “Invisible ones” in the denominator to create a fraction
<b>Powers</b>
Powers as repeated multiplication
Base and exponent
Powers of whole numbers
Powers of decimals
Powers of fractions
Negative exponents
Scientific notation
Relationship of place value to powers of 10
Using “Invisible ones” as exponents
<b>Roots</b>
Square roots
Cube roots
Index
Using a calculator to find roots
Mastering basic facts
Order of operations
Inverse operations
<b>Fraction Concepts</b>
<b>Fractions and Mixed Numbers</b>
Reading and writing fractions and mixed numbers
Numerator and denominator

Fractional part of a whole, group, set, or number
Comparing and ordering fractions
Equivalent fractions
Reducing
Improper fractions
Least common denominator
Converting fractions to decimals and percents
Reciprocals
Complex fractions
<b>Decimals</b>
Reading and writing decimals
Comparing and ordering decimals
Converting decimals to fractions and percents
<b>Percents</b>
Reading and writing percents
Identify/find percent of a whole, group, set, or number
Converting percents to fractions and decimals
Percents greater than 100%
Percent of change
<b>Other Fraction Concepts</b>
Ratios and proportions
Rates
<b>Estimation</b>
Rounding whole numbers
Rounding decimals
Rounding mixed numbers
Estimating sums
Estimating differences
Estimating products



Estimating quotients
Estimating roots
Using estimation to verify reasonableness of calculations
<b>Number Theory</b>
Fact families
Even and odd
Factors, multiples, and divisibility
Prime and composite numbers
Greatest common factor (GCF)
Least common multiple (LCM)
Divisibility tests
Prime factorization
Infinity
Infinitesimals
<b>Number Sets and Number Systems</b>
Counting numbers (natural numbers)
Whole numbers
Decimal number system
Negative numbers
Integers
Rational numbers
Irrational numbers
Real numbers
Roman numerals
Base 2
<b>Measurement</b>
<b>Units</b>
<b>U.S. Customary</b>

Length (inch, foot, yard, mile)
Capacity (cup, pint, quart, gallon)
Weight (ounce, pound, ton)
<b>Metric</b>
Prefixes (milli-, centi-, deci-, deka-, hecto-, kilo-)
Length (meter)
Capacity (liter)
Mass (kilogram)
<b>Temperature</b>
Fahrenheit scale
Celsius scale
<b>Time</b>
Seconds, minutes, and hours
<b>Time Value of Money</b>
Interest rate, savings and debt
Simple interest
What the Bible says about savings and debt
<b>Other Measurement Concepts</b>
Square units
Cubic units
Degrees of arc
Magnetic compass heading
Standard abbreviations
Nonstandard units
<b>Unit Conversion</b>
Conversion in the U.S. Customary System
Conversion in the metric system
Conversion between systems

Simplifying mixed measures
Unit multipliers
Conversion between temperature scales
Using rate as a conversion factor
Currency (money) exchange rates
<b>Measuring</b>
Length
Angles
Benchmarks for measurements
Measurement activities
Estimating activities
Selecting appropriate units
Using metric scales to reinforce decimal concepts
Determining whether measures are reasonable
Determining the precision of a measuring tool
<b>Indirect Measure</b>
Scale factor
Using similar triangles
Transversals and proportions
Scale drawings (two-dimensional)
<b>Tools</b>
Ruler (U.S. Customary and metric)
Protractor
Compass (drawing)
Compass (magnetic)
Thermometer
What the Bible says about correct use of measurement tools
The idea that mathematics is a God-given tool for us to use

<b>Geometry</b>
<b>Basic Terms</b>
Points
Segments
Rays
Lines
Angles
Planes
<b>Lines</b>
Parallel, perpendicular, and intersecting
Horizontal, vertical, and oblique
Slope
<b>Angles</b>
Acute, obtuse, right, and straight
Complementary and supplementary
Angles formed by transversals
Calculate to find unknown angle measures
Angle bisectors
Vertical
Adjacent angles
<b>Polygons</b>
Describing and classifying
Drawing
Sides and vertices
Perimeter
Area
Regular
Similarity and congruence

Complex figures
Interior and exterior angles
Sum of angle measures
Diagonals
<b>Triangles</b>
Perimeter and area
Acute, obtuse, and right
Equilateral, isosceles, and scalene
Proportional triangles
Pythagorean theorem
<b>Quadrilaterals</b>
Squares
Rectangles
<b>Circles</b>
Center
Radius and diameter
Circumference
Pi
Area
Arcs
<b>Solids</b>
Describing and classifying
Faces, edges, and vertices
Drawing
Volume
Surface area
Polyhedrons
Nets (maps)

<b>Perimeter</b>
Polygons
Circles
Complex figures
<b>Area</b>
Triangles
Rectangles
Parallelograms
Trapezoids
Circles
Semicircles and sectors
Complex figures
<b>Volume</b>
Prisms
Cylinders
Pyramids
Cones
Spheres
Estimating volume
<b>Coordinate Geometry</b>
Naming and graphing ordered pairs
Origin
Intercepts of a line
Slope of a line
Creating straight-line drawings
Solving a system of linear equations
<b>Patterns</b>
Defining mathematics as a God-given tool for measuring pattern and shape

<b>Constructions</b>
Circles
Congruent segments
Congruent angles
Angle bisectors
Perpendicular bisectors
Using technology (geometry apps) to do constructions
<b>Transformational Geometry</b>
Rotation
Reflection
Translation
Graphing transformations on the coordinate plane
<b>Geometry in Art</b>
Vanishing point
One-point perspective
Divine proportion
<b>Euclidean Geometry</b>
Euclid and foundations of modern geometry
Axioms
Postulates
<b>Deductive reasoning and Logic</b>
Aristotle and foundations of logic
Comparing inductive and deductive reasoning
Proof
Converse/inverse/contrapositive
Syllogism
Comparing logic and truth
<b>Trigonometry</b>

Basic trigonometry ratios (sine, cosine, tangent)
Connection of trigonometry to right triangles
Connection of trigonometry to proportion
hypotenuse
Using trigonometry buttons on a calculator
Trigonometry applications (measure height)
<b>Algebra</b>
<b>Patterns</b>
Numeric patterns
Geometric patterns
Story-problem patterns
<b>Sequences and Series</b>
Terms
Arithmetic sequences
Geometric sequences
Relationship between sequences and series
Arithmetic series
Geometric series
<b>Sums</b>
Summation Notation
Working with Sums
<b>Integers</b>
Adding and subtracting integers/signed numbers
Multiplying and dividing integers/signed numbers
Absolute value
<b>Algebraic Concepts and Procedures</b>
Variables
Symbols of inclusion



Evaluating
Substitution
Constants
Coefficients
Polynomials
Simplifying
Factoring
Combining like terms
<b>Equations</b>
Solving for an unknown
Solving multi-step equations
Writing an equation for a given word problem
Writing a word problem for a given equation
Transforming equations (using the addition rule and the multiplication rule)
"= means equal," $x=a$ and $a=x$ are the same
Nonlinear equations
Solving simple quadratic equations
Literal equations
Creating and solving a system of equations
<b>Inequalities</b>
Solving
Graphing on a number line
Graphing on a coordinate plane
<b>Functions</b>
Formulas
Input-output tables
Function rules
Graphs
Linear functions

Creating a linear function to solve a problem
Nonlinear functions
Connecting symbolic forms to their graphical shapes
Analyzing functional relationships
Rates
Comparing functions and relations
<b>Properties</b>
Associative property of addition
Commutative property of addition
Associative property of multiplication
Commutative property of multiplication
Identity property of multiplication
Distributive property
Zero property of multiplication
<b>Graphing</b>
Number line
Coordinate plane
Origin
Quadrants
Graphing points
Graphing lines
Graphing parabolas
Graphing hyperbolas
Graphing absolute value functions
Graphing square root functions
Graphing cubic functions
Graphing exponential functions
Graphing inequalities
Slope-intercept form

Writing linear equations from graphs
Writing linear inequalities from graphs
Writing and graphing vertical and horizontal lines
<b>Statistics, Data Analysis, and Probability</b>
<b>Statistics and Data Analysis</b>
<b>Organizing and Analyzing Data</b>
Tables
Frequency tables
Average
Mean, median, mode, and range
Selecting the best measure of central tendency for a given situation
Identifying misleading graphs
Making predictions based on statistics
Linear regression and best fit
<b>Representing Data</b>
Legend (key)
Bar graph
Comparative bar graphs (double-bar graphs)
Histograms
Line graphs
Double-line graphs
Circle graphs (pie graphs)
Pictographs
Venn diagrams
Coordinate planes
Scatterplots and estimating rate of change
<b>Probability</b>
Notations for expressing probability

<b>Theoretical Probability</b>
Simple probability
Chance
Odds
Outcomes
Independent events
Dependent events
<b>Experimental Probability</b>
Performing probability experiments
Accuracy of predictions as affected by number of trials
Compound experiments
Experiment tables
<b>Computer Mathematics Basics</b>
Connection to binary numbers (base 2)
Pixels
Matrices
Connection of computers to idea of continuity and discreteness
Computer memory calculations
Sequences and Series
Sums
<b>Calculus Basics (using prealgebra concepts)</b>
<b>Limits</b>
Understanding Limits
Connecting limits and infinitesimals
Limits of discontinuous functions
<b>Derivatives</b>
Derivative means slope of a line
Notation for derivatives

Connecting derivatives and limits
Derivatives and tangent lines
Calculus and the study of speed (rate of change)
<b>Integrals</b>
Integrals and counting squares on a graph
Connecting integrals and infinitesimals
<b>Problem-Solving Strategies</b>
Break a problem into simpler parts
Act out the problem
Use logical reasoning
Draw a diagram
Draw a picture
Find a pattern
Work backward
Make a chart, graph, or list
Guess and check (trial and error)
Making an educated guess (hypothesis)
Distinguish between relevant and irrelevant information
Find missing information
Extend patterns
Apply solution strategies for simple problems to complex problems
Use an algorithm
Importance of using your imagination in problem solving
Importance of “invisible ones” in problem solving