

# Course Description: Pre-Algebra

## Credits Earned:

1 Credit: Pre-Algebra

## Curriculum:

David Shormann, Ph.D. (2014). *Shormann Pre-Algebra*. Digital Interactive Education, USA.

## Course Description:

*Shormann Pre-Algebra is a 21st Century course that* teaches all the concepts required to build a firm foundation for upper level mathematics courses. Reviewing arithmetic calculation, measurements, geometry and other skills, this course introduces pre-algebra, square roots, ratios, prime and composite numbers, probability and statistics. Students learn adding/subtracting/multiplying fractions, equivalent fractions, the metric system, repeating decimals, scientific notation, Pi, graphing inequalities, multiplying algebraic terms, the Pythagorean Theorem, the slope-intercept form of linear equations, discrete mathematics, and more.

## Grades:

- Practice Sets: 30%
- Weekly Quizzes: 30%
- Quarterly Exams: 40%

## Grading Scale: Standard

A – 90 -100

B –80 – 89

C – 70 – 79

D – 60 – 69

F – 59 or below

I – Incomplete

# Table of Contents

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