Course Description:
Honors Precalculus with Trigonometry

Credits Earned:

1 Honors Precalculus with Trigonometry Credit*

> *If Saxon Algebra 2, 2nd or 3rd Edition was taken, which earns ½ Geometry Credit, the second ½ Geometry Credit is also earned in Shormann Precalculus.

Curriculum:

David Shormann, Ph.D. (2017). *Shormann Precalculus with Trigonometry* . Digital Interactive Education, USA.

Course Description:

> Shormann Precalculus is an honors level algebra and trigonometry based course that provides a comprehensive teaching of standard precalculus topics, with a special emphasis on advanced algebra and trigonometry topics found on the CLEP & AP Precalculus Exams. Functions are a priority, with both standard and real-world applications of the following types: linear, quadratic, cubic, polynomial, rational, exponential, logarithmic, absolute value, trigonometric and piecewise-defined. Students learn to work with functions presented in graphic, symbolic, verbal and numeric form. Students learn to use technology such as spreadsheets and graphing calculators to solve problems. Calculus fundamentals are also presented and practiced, which improves student confidence and success in college-level Calculus I. Attached is a copy of the Table of Contents.

Grades:

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

Grading Scale:

> A – 93-100
> B –84 – 92
> C – 74 – 83
> D – 65 – 73
> F – 64 or below
> I – Incomplete

Shormann Precalculus with Trigonometry

Table of Contents

NOTE: To build a firm foundation, Lessons 1-25 introduce fundamental rules and definitions covered in Shormann Precalculus, plus a review of Shormann Algebra 2 with Integrated Geometry.

Geometry

Week 2 Quiz

Lesson 9   Analytical Geometry I: Identifying Functions - Evaluating Functions - Operations with Functions - Domain and Range

Lesson 10   Analytical Geometry II: Linear Inequalities - Linear System Word Problems

Lesson 11   Analytical Geometry III: Nonlinear Systems - Nonlinear Inequalities - Nonlinear System Word Problems

Lesson 12   Analytical Geometry IV: Identifying Conic Sections - Conics and Nonlinear Systems - Nonlinear Systems of Inequalities

Week 3 Quiz

Lesson 13   Analytical Geometry V: Piecewise Functions - Domain, Range, and Extrema from Graphs - Conic/Conic Systems

Lesson 14   Measurement I: Why Standards Matter - Unit Conversions - Rate Conversions and Other Conversions - Arc Lengths and Sectors

Lesson 15   Measurement II: Length, Area, and Volume Conversions - Perimeter, Area, Surface Area, and Volume - Special Volume Conversions

Lesson 16   Trigonometry I: Trigonometry Basics - Inverse Trig Functions - Graphing Trig Functions

Week 4 Quiz

Lesson 17   Trigonometry II: Periodicity and Unit Circles - Rectangular to Polar Coordinates - Polar to Rectangular Coordinates - The Parallelogram Law and Resultant Vectors

Lesson 18   Trigonometry III: Basic Trig Identities - Pythagorean Theorem Applications - Other Right Triangle Applications

Lesson 19   Calculus I: To Understand Calculus, Just Believe - Limits

Week 5 Quiz

Lesson 20   Calculus II: Calculus is About Rates of Change - Derivative Means Slope - Derivative of $f(x) = x^2$

Lesson 21   Calculus III: More on Limits - Derivative Applications - The Integral

Lesson 22   Statistics I: The Normal Distribution - Measures of Central Tendency - Probability

Week 6 Quiz

Lesson 23   Statistics II: The Least Squares Algorithm for Linear Regressions - The Fundamental Counting

Principle and Permutations - Combinations

Lesson 24   Computer Math I: Pixels, Bits, and the Binary Numeral System - Matrices - Boolean Algebra

Lesson 25   Computer Math II: Sequences - Series - Sums - Infinite Series

Week 7 Quiz

Exam 1, Week 8:   Practice Test 1 & 2, Quarterly Exam 1

Lesson 26   Sum and Difference Two Cubes; Polynomial Division: Sum and Difference of Two Cubes -

Polynomial Division

Lesson 27   Game Playing with Logarithm Laws; Taking the Logarithm of: Game Playing with Logarithm Laws

- Taking the Logarithm of

Lesson 28   Synthetic Division and the Remainder Theorem; Factor Theorem: Synthetic Division and the

Remainder Theorem - Synthetic Division and the Factor Theorem

Lesson 29   Nonstandard Absolute Value Equations; Finding Roots of Polynomial Equations - Nonstandard

Absolute Value Equations - Finding Roots of Polynomial Equations

Week 9 Quiz

Lesson 30   Pascal's Triangle and the Binomial Theorem; Distinguishable Permutations: Pascal's Triangle and

the Binomial Theorem - DIstinguishable Permutations

Lesson 31   Advanced Radical Equations

Lesson 32   Polar Form of a Complex Number; More Rate Problems: Polar Form of a Complex Number -

More Rate Problems

Lesson 33   Factorable Trig Equations

Week 10 Quiz

Lesson 34   Composite Functions; Products of Complex Numbers: Composite Functions - Products of

Complex Numbers

Lesson 35   Inverse Functions; Inverse Logarithms: Inverse Functions - Inverse Logarithms

Lesson 36   Modeling of Linear Functions

Lesson 37   Even and Odd Functions

Week 11 Quiz

Lesson 38   Reciprocal Trig Equations; Advanced Trig Equations: Reciprocal Trig Equations - Advanced Trig

Equations

Lesson 39   New Domains, Ranges, and Intervals after Operations; Decomposing Functions: New Domains,

Ranges and Intervals from Operations - Decomposing Functions

Lesson 40   Operations with Numerical Representation of Functions

Lesson 41   The t-Test; Factoring Polynomials with Imaginary Roots: The t-Test - Factoring Polynomials with

Imaginary Roots

Week 12 Quiz

Lesson 42   Locus Definition of a Circle; Coordinate Geometry Proofs: The Locus Definition of a Circle -

Coordinate Geometry Proofs

Derivatives)

Week 17 Quiz

Lesson 59   Nonstandard and Other Representations of Square Root Functions

Lesson 60   Balancing Chemical Equations:

Lesson 61   Modeling of Square Root Functions

Lesson 62   Nonstandard and Other Representations of Degree 3+ Polynomial Functions, Part I

Week 18 Quiz

Lesson 63   Nonstandard and Other Representations of Degree 3+ Polynomial Functions, Part II

Lesson 64   Nonstandard and Other Representations of Rational Functions

Lesson 65   Nonstandard and Other Representations of Exponential Functions

Lesson 66   Nonstandard and Other Representations of Logarithmic Functions

Week 19 Quiz

Lesson 67   Modeling of Exponential and Logarithmic Functions

Lesson 68   Graphing Reciprocal and Inverse Trig Functions

Lesson 69   Transformations of Trig Functions:

Week 20 Quiz

Lesson 70   Modeling of Degree 3+ Polynomials

Lesson 71   Derivatives of Polynomials; Trig Equations of $n\theta$: Derivatives of Polynomials -

Trig Equations of $n\theta$

Lesson 72   Transformations of Reciprocal Trig Functions

Week 21 Quiz

Lesson 73   Symbolic Forms of Piecewise Functions from Graphs

Lesson 74   Locus Definition of a Hyperbola

Lesson 75   Comparing General Forms of Conic and Linear Equations

Week 22 Quiz

Exam 3, Week 23:   Practice Test 1 & 2, Quarterly Exam 3

Lesson 76   Trig Problem Solving

Lesson 77   Law of Sines

Lesson 78   Nonstandard Solutions for Conics

Lesson 79   Law of Cosines

Lesson 80   More with Inverse Trig Functions

Week 24 Quiz

Lesson 81   Sum and Difference Trig Identities

Lesson 82   Double-Angle, Half-Angle, and Tangent Sum and Difference Trig Identities

Lesson 83   Cramer's Rule; Gas Law Problems

Lesson 84   More Trig Problem Solving; Angular Velocity: Trig Problem Solving - Angular Velocity

Week 25 Quiz

Lesson 85   Partial Fractions; Recurrence Problems: Partial Fractions - Recurrence Problems

Lesson 86   More Modeling of Trig Functions

Lesson 87   Non-Periodic Functions: Damping Functions - The Sinusoidal Fibonacci Function

Lesson 88   Integrals II: Sums of Rectangles

Week 26 Quiz

Lesson 89   Interest Rate, Savings and Debt

Lesson 90   Deriving formulas for infinite series