

**Wilson Area School District  
Planned Course Materials**

**Course Title:** Honors Pre-Calculus

**Textbook:** Advanced Mathematics – A Precalculus Approach  
Prentice Hall  
Copyright 1993

**Supplemental Books:** None

**Teacher Resources:** Infinite Algebra 2 Generator (software)

## Curriculum Map

**August:** Functions

**September:** Functions, Graphing Functions

**October:** Graphing Functions, Polynomial Functions

**November:** Polynomial Functions, Exponential and Logarithmic Functions

**December:** Exponential and Logarithmic Functions, Conic Sections

**January:** Conic Sections, Trigonometric Functions

**February:** Trigonometric Functions, Graphs and Inverses of Trigonometric Functions

**March:** Graphs and Inverses of Trigonometric Functions, Applications of Trigonometry

**April:** Applications of Trigonometry, Trigonometric Identities and Equations

**May:** Trigonometric Identities and Equations, Sequences and Series

**June:** Sequences and Series

## Wilson Area School District Planned Course Guide

**Title of planned course:** Honors Pre-Calculus

**Subject Area:** Mathematics

**Grade Level:** 11<sup>th</sup>

**Course Description:** This is an honors level course dealing with functions, graphing functions, trigonometric functions and their graphs and inverses, applications of trigonometry, trigonometric equations, polynomial functions, inequalities and linear programming, exponential and logarithmic function, conic sections, and an introduction to limits.

**Time/Credit for this course:** 1 Academic Year / 1.0 Credit

**Curriculum Writing Committee:** Kimberly Kauffman

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Functions

**Time Frame:** 14– 16 days

**State Standards:** 2.6.11.C, 2.6.11.E, 2.8.11.B, 2.8.11.D

**Anchor(s) or Adopted Anchor:** M11.E.2, M11.E.4, M11.D.2, M11.D.1

**Essential Content/Objectives:** At the end of the unit, students will be able to:

- use modeling/regression to write a linear or quadratic function
- apply properties of functions
- use relations and functions to find domain and range
- form and evaluate composite functions
- find inverses of functions
- define functions

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- regression activities

**Extensions:**

- define operations on a set that is closed, associative, has an identity, and in which each element has an inverse but which is not commutative

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Quizzes
- Tests

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Graphing Functions

**Time Frame:** 14 – 16 days

**State Standards:** 2.8.11.B, 2.8.11.D, 2.11.11.A

**Anchor(s) or Adopted Anchor:** M11.D.2, M11.D.1

**Essential Content/Objectives:** At the end of the unit, students will be able to:

- use symmetry to graph functions
- graph functions using transformations and reflections
- graph linear functions and determine the equation of linear functions
- graph quadratic functions
- use graphs to find solutions and approximate zeros of quadratic equations
- use graphs to find solutions and approximate zeros of polynomial equations
- use graphs to find the distance from a point to a line or between two parallel lines

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- Present a real-world application (different than book examples) of how quadratic functions can be used

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Tests / Quizzes

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Polynomial Functions

**Time Frame:** 16-18 days

**State Standards:** 2.1.11.B, 2.8.11.B, 2.8.11.D

**Anchor(s) or Adopted Anchor:** M11.A.1, M11.D.2, M11.D.1

**Essential Content/Objectives:** At the end of the students will be able to:

- use and apply synthetic substitution and division
- apply the remainder and factor theorems
- identify and graph polynomial functions
- find the integral and rational zeros of polynomial functions
- apply the fundamental theorem of algebra
- apply the complex conjugate and radical theorems
- approximate zeroes of polynomial functions using the Location theorem, Intermediate Value Theorem, and Upper and Lower Bound theorem
- graph rational functions
- find asymptotes and discontinuity in rational functions
- graph and solve radical functions

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- students will write a polynomial function working backwards using topics learned

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Quizzes
- Tests

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Exponential and Logarithmic Functions

**Time Frame:** 16 – 18 days

**State Standards:** 2.1.11.F, 2.8.11.B, 2.8.11.D, 2.11.11.B

**Anchor(s) or Adopted Anchor:** M11.A.2, M.11.D.2, M.11.D.1

**Essential Content/Objectives:** At the end of the unit, students will be able to:

- simplify and evaluate expressions with rational exponents
- graph and solve exponential functions
- graph and evaluate logarithmic functions
- express logarithms using the change of base formula
- condense and expand logarithms
- solve logarithmic and exponential equations and inequalities
- use compound interest and continuous compound interest formulas
- solve exponential growth and decay problems

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- students will apply compound interest and continuous compound interest at local banks

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Test / Quizzes



## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Conic Sections

**Time Frame:** 12 – 14 days

**State Standards:** 2.10.11.B

**Anchor(s) or Adopted Anchor:**

**Essential Content/Objectives:** At the end of the unit, students will be able to:

- determine the relationship between the equation of a circle, and its center and radius
- graph a circle
- determine the relationship between the equation of an ellipse and its foci and intercepts
- graph an ellipse
- determine the relationship between the equation of a hyperbola and its foci, intercepts, and asymptotes
- graph a hyperbola

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- students will create a conic for a classmate to solve

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Tests / Quizzes

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Trigonometric Functions

**Time Frame:** 20-22 days

**State Standards:** 2.10.11.A, 2.10.11.B

**Anchor(s) or Adopted Anchor:**

**Essential Content/Objectives:** At the end of the students will be able to:

- measure angles in rotations and degrees
- measure coterminal angles
- measure and convert angles in radians and degrees
- measure arcs and sectors of circles
- define and evaluate sine and cosine functions of an angle at a given point
  - define and evaluate tangent, cosecant, secant and cotangent functions of an angle at a given point
- to find the six trigonometric functions of special angles and quadrantal angles (special triangles OR the unit circle)
- to find approximations for the six trigonometric functions
- to find the measure of an angle for which the trigonometric value is known
- prove trigonometric identities

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- students will create a conic for a classmate to solve

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Tests / Quizzes

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Graphs and Inverses of Trigonometric Functions

**Time Frame:** 14 – 16 days

**State Standards:** 2.10.11.B

**Anchor(s) or Adopted Anchor:**

**Essential Content/Objectives:** At the end of the students will be able to:

- graph sine, cosine, tangent, cosecant, secant and cotangent functions
- graph the six trigonometric functions with amplitude, period, vertical shift and phase shift
- define, evaluate expressions and graph inverse sine and cosine functions
- define, evaluate expressions and graph the inverse tangent, cotangent, secant and cosecant functions
- rewrite trigonometric expressions as algebraic expressions
- model harmonic motion

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- students will model harmonic motion with a real world example

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Tests / Quizzes

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Applications of Trigonometry

**Time Frame:** 14-16 days

**State Standards:** 2.10.11.A

**Anchor(s) or Adopted Anchor:**

**Essential Content/Objectives:** At the end of the unit, students will be able to:

- solve a right triangle given one angle and one side
- solve a right triangle given two angles
- use the Law of Sines to solve triangles, including the Ambiguous Case
- use the Law of Cosines to solve triangles
- find the area of a triangle using Heron's Formula or given two sides and the included angle
- find the area of a segment of a circle or a shaded region

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- student will draw an object in which a classmate will have to find the area of the shaded region

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Test / Quizzes

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Trigonometric Identities and Equations

**Time Frame:** 18-20 days

**State Standards:** N/A

**Anchor(s) or Adopted Anchor:**

**Essential Content/Objectives:** At the end of the students will be able to:

- apply sum/difference identities for sine, cosine and tangent
- verify trigonometric identities using a graphing calculator
- apply double-angle/half-angle identities for sine, cosine and tangent
- apply product/sum identities for sine and cosine
- solve trigonometric equations and inequalities
- solve trigonometric equations and inequalities in quadratic form

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- students will create a system of two trigonometric inequalities that generate a periodic design whose intersection is symmetric about the x-axis

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Tests / Quizzes

## Curriculum Scope & Sequence

**Planned Course:** Honors Pre-Calculus

**Unit:** Sequences and Series

**Time Frame:** 10-12 days

**State Standards:** 2.8.11.C

**Anchor(s) or Adopted Anchor:** M11.D.1

**Essential Content/Objectives:** At the end of the students will be able to:

- find a rule for a sequence
- find specified terms and the common difference in an arithmetic sequence
- find specified terms and the common ratio in a geometric sequence
- find arithmetic and geometric means
- use sigma notation to represent the sum of a series
- find the partial sum of arithmetic and geometric series

**Core Activities:** Students will complete/participate in the following:

- modified lecture
- guided and independent instruction
- graphing activities

**Extensions:**

- Investigate the Fibonacci sequence and look for other real world sequences

**Remediation:**

- Study Island
- Extra practice worksheets
- Teacher/Peer tutoring

**Instructional Methods:**

- Notes in Smart Notebook with examples
- Higher order questions
- Graphing calculator examples

**Materials & Resources**

- Textbook
- Worksheets
- Smartboard
- Internet
- Calculators/Computer

**Assessments:**

- Homework assignments
- Planned questioning to check for understanding
- Tests / Quizzes