

**WARREN COUNTY SCHOOL DISTRICT**  
**PLANNED INSTRUCTION**

**COURSE DESCRIPTION**

**Course Title:** Pre-Calculus

**Course Number:** 00270

**Course Prerequisites:** Recommended grade average of 70% or higher in Algebra I College Preparatory, Algebra II College Preparatory, and Geometry College Preparatory

**Course Description:** (Include “no final exam” or “final exam required”)

Pre-Calculus is an academic course designed to solidify the fundamental concepts of high school algebra and geometry. Major topics include solving and graphing linear and quadratic equations, functions and their graphs, polynomial and rational functions, exponential and logarithmic functions, and trigonometric functions and identities. Optional topics may include conic sections, matrices, and sequences and series. Final exam is required.

**Suggested Grade Level:** 11-12

**Length of Course:**        One Semester   X   Two Semesters        Other  
(Describe)

**Units of Credit:**       1       (Insert NONE if appropriate.)

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certification(s)**

(Insert certificate title and CSPG#) Mathematics #050

**Certification verified by WCSD Human Resources Department:**

  X   Yes        No

**Board Approved Textbooks, Software, Materials:**

**Title:**

**Publisher:**

**ISBN #:**

**Copyright Date:**

**Date of WCSD Board Approval:**

**BOARD APPROVAL:**

**Date Written:** Spring 2013

**Date Approved:** \_\_\_\_\_

**Implementation Year:** 2013-2014

**Suggested Supplemental Materials:** (List or insert None) None

## Course Standards

**PA Common Core Standards:** (List by Number and Description)

- 2.1. Numbers and Operations
- 2.2. Algebraic Concepts
- 2.3. Geometry

### Common Core Standards:

## F-IF Interpreting Functions

## F-BF Building Functions

## F-LE Linear, Quadratic, and Exponential Models

F-TF Trigonometric Functions

**WCSD Academic Standards:** (List or None)

none

**Industry or Other Standards:** (List, Identify Source or None)

none

## SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

**SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND  
ELIGIBLE CONTENT WHERE APPLICABLE**

(List Objectives, PA Standards #'s, Other Standards (see samples at end))

**PA Common Core Standard: 2.1. Numbers and Operations**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>                                                                                 | <b>1</b> | <b>2</b> |
|----|---------------------------------------------------------------------------------------------------------------|----------|----------|
| A. | Apply and extend the properties of exponents to solve problems with rational exponents.                       | X        |          |
| B. | Apply properties of rational and irrational numbers to solve real world or mathematical problems.             | X        |          |
| C. | Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. | X        |          |
| D. | Use units as a way to understand problems and to guide the solution of multi-step problems.                   | X        | X        |
| E. | Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.               | X        | X        |
| F. | Extend the knowledge of arithmetic operations and apply to complex numbers.                                   | X        |          |
| G. | Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.         | X        |          |

**PA Common Core Standard: 2.2. Algebraic Concepts**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>                                                                                                  | <b>1</b> | <b>2</b> |
|----|--------------------------------------------------------------------------------------------------------------------------------|----------|----------|
| A. | Interpret the structure of expression to represent a quantity in terms of its context.                                         | X        |          |
| B. | Write expressions in equivalent forms to solve problems.                                                                       | X        | X        |
| C. | Extend the knowledge of arithmetic operations and apply to polynomials.                                                        | X        |          |
| D. | Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. | X        |          |
| E. | Use polynomial identities to solve problems.                                                                                   | X        |          |
| F. | Extend the knowledge of rational functions to rewrite equivalent forms.                                                        | X        |          |
| G. | Create and graph equations or inequalities to describe numbers or relationships.                                               | X        |          |
| H. | Apply inverse operations to solve equations or formulas for a given variable.                                                  | X        |          |
| I. | Use reasoning to solve equations and justify the solution method.                                                              | X        | X        |
| J. | Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.    | X        |          |
| K. | Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.                                   |          | X        |

**PA Common Core Standard: 2.3. Geometry**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>                                          | <b>1</b> | <b>2</b> |
|----|------------------------------------------------------------------------|----------|----------|
| A. | Apply trigonometry ratios to solve problems involving right triangles. |          | X        |

**Common Core Standard: F-IF Interpreting Functions**

X – performance assessed during that semester

|    | <b>Performance Indicators</b>                                           | <b>1</b> | <b>2</b> |
|----|-------------------------------------------------------------------------|----------|----------|
| B. | Interpret functions that arise in applications in terms of the context. | X        | X        |
| C. | Analyze functions using different representations.                      | X        | X        |

**Common Core Standard: F-BF Building Functions**

|    | <b>Performance Indicators</b>                                          | <b>1</b> | <b>2</b> |
|----|------------------------------------------------------------------------|----------|----------|
| A. | Building a function that models a relationship between two quantities. | X        |          |
| B. | Building new functions from existing functions.                        | X        |          |

**Common Core Standard: F-LE Linear, Quadratic, and Exponential Models**

|    | <b>Performance Indicators</b>                                                       | <b>1</b> | <b>2</b> |
|----|-------------------------------------------------------------------------------------|----------|----------|
| A. | Construct and compare linear, quadratic, and exponential models and solve problems. | X        | X        |
| B. | Interpret expressions for functions in terms of the situation they model.           | X        | X        |

**Common Core Standard: F-TF Trigonometric Functions**

|    | <b>Performance Indicators</b>                                       | <b>1</b> | <b>2</b> |
|----|---------------------------------------------------------------------|----------|----------|
| A. | Extend the domain of trigonometric functions using the unit circle. |          | X        |
| B. | Model periodic phenomena with trigonometric functions.              |          | X        |
| C. | Prove and apply trigonometric identities.                           |          | X        |

## ASSESSMENTS

**Common Core Assessment Anchors Addressed:** The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at [pde@state.pa.us](mailto:pde@state.pa.us).

**Formative Assessments:** The teacher will develop and use standards-based assessments throughout the course.

### Suggested Assessments (but not limited to)

Observations  
Evaluate written work  
Performance Assessment  
Tests  
Quizzes  
Evaluate oral response  
Self-evaluation  
Cooperative Learning  
Homework  
Classroom Diagnostic Tools

**Portfolio Assessment:** \_\_\_\_\_ Yes      X   No

**District-wide Final Examination Required:**                      X   Yes    \_\_\_\_\_ No

### Course Challenge Assessment (Describe):

Course challenge assessment will be based on activities and exams that measure student proficiency at 84%.

## REQUIRED COURSE SEQUENCE AND TIMELINE

(Content must be tied to objectives)

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### Content Sequence

Equations and Inequalities  
Graphing and Functions  
Polynomial and Rational Functions  
Exponential and Logarithmic Functions  
Trigonometric Functions  
Triangle Trigonometry  
Conic Sections  
Systems of Equations and Matrices  
Sequences and Series

- **Refer to Course Map on Performance Plus for Additional Information**

### WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination?        X   Yes             No
2. Does this course issue a mark/grade for the report card?        X   Yes             No
3. Does this course issue a Pass/Fail mark?        X   Yes             No
4. Is the course mark/grade part of the GPA calculation?        X   Yes             No
5. Is the course eligible for Honor Roll calculation?        X   Yes             No
6. What is the academic weight of the course?  
           No weight/Non credit        X   Standard weight  
           Enhanced weight (Describe)