**Lawrence Humanities Leadership and Development**

70 -71 North Parish Rd., Lawrence, Mass. 01840

Phone: 978-946-0724

Course: Pre Calculus Academic Year : 2015 - 2016

Teacher Name: Mr. Tanaka Room Number: 406

Grade Level(s): 10 Number of Credits: 5 credits

Pre-requisite Courses: Geometry, Algebra 2

**Course Description**

Precalculus combines the trigonometric, geometric, and algebraic techniques needed to prepare students for the study of calculus, and strengthens students’ conceptual understanding of problems and mathematical reasoning in solving problems. Facility with these topics is especially important for students intending to study calculus, physics, and other sciences, and/or engineering in college. Because the standards for this course are (+) standards, students selecting this Model Precalculus course should have met the college and career ready standards.

For the high school Model Precalculus course, instructional time should focus on four critical areas: (1) extend work with complex numbers; (2) expand understanding of logarithms and exponential functions; (3) use characteristics of polynomial and rational functions to sketch graphs of those functions; and (4) perform operations with vectors.

1. (1)  Students continue their work with complex numbers. They perform arithmetic operations with complex numbers and represent them and the operations on the complex plane. Students investigate and identify the characteristics of the graphs of polar equations, using graphing tools. This includes classification of polar equations, the effects of changes in the parameters in polar equations, conversion of complex numbers from rectangular form to polar form and vice versa, and the intersection of the graphs of polar equations.
2. (2)  Students expand their understanding of functions to include logarithmic and trigonometric functions. They investigate and identify the characteristics of exponential and logarithmic functions in order to graph these functions and solve equations and practical problems. This includes the role of *e*, natural and common logarithms, laws of exponents and logarithms, and the solutions of logarithmic and exponential equations. Students model periodic phenomena with trigonometric functions and prove trigonometric identities. Other trigonometric topics include reviewing unit circle trigonometry, proving trigonometric identities, solving trigonometric equations, and graphing trigonometric functions.
3. (3)  Students investigate and identify the characteristics of polynomial and rational functions and use these to sketch the graphs of the functions. They determine zeros, upper and lower bounds, *y*-intercepts, symmetry, asymptotes, intervals for which the function is increasing or decreasing, and maximum or minimum points. Students translate between the geometric description and equation of conic sections. They deepen their understanding of the Fundamental Theorem of Algebra.
4. (4)  Students perform operations with vectors in the coordinate plane and solve practical problems using vectors. This includes the following topics: operations of addition, subtraction, scalar multiplication, and inner (dot) product; norm of a vector; unit vector; graphing; properties; simple proofs; complex numbers (as vectors); and perpendicular components.

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

Massachusetts Curriculum Framework for Mathematics, March 2011

**Textbook(s)**

CME Project Pre Calculus Common Core 2013

Online textbook account is available upon request

**Grading**

Term Grade 80%

1. Class Performance: 40%
   1. See Class Performance Rubric
2. Summative Assessments: 40%
   1. Two Chapter Projects
   2. Investigation Quizzes
   3. Term Exam
3. Homework Assignments: 20%
   1. See Homework section

Semester Grade 20%

1. Semester Project

**Teacher Availability / Other course specific information**

Office hours

Morning: 7:30 – 8:00 am

After school: Upon Request

E-mail: [stanaka@lawrence.k12.ma.us](mailto:stanaka@lawrence.k12.ma.us)

Website: mrtanakaswebsite.weebly.com

Twitter: @hld406

**Classroom Expectation**

1. Be prepared physically and mentally
2. Be in uniform
3. Put electric device(s) away
4. Use proper language
5. Call me Mr. Tanaka, please

**Content**

1. Analyzing Trigonometric Functions
2. Complex Numbers and Trigonometry
3. Analysis of Functions
4. Combinatorics
5. Functions and Tables
6. Analytic Geometry
7. Probability and Statistics
8. Ideas of Calculus

**Class Performance Rubric**

Criteria for Success

1. Read and understand the problems
   1. Mathematically proficient students read a problem independently, analyze givens, constraints, relationships, and goals
2. Work with peers
   1. Mathematically proficient students work with peers collaboratively, using verbal descriptions, graphs, tables, and mathematical expressions and equations.
3. Make connections
   1. Mathematically proficient students think deeply about new, unfamiliar ideas, making connections to previously learned knowledge
4. Monitor progress
   1. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?"
5. Take good notes
   1. Students take notes to summarize important ideas and examples for deeper comprehension and retention, and to make resources for homework and test prep.

Rubric

3: Sustaining: Always demonstrated

2: Developing: Usually demonstrated

1: Emerging: Frequently demonstrated

0: Inconsistent:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Score** | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 |
| **%** | 100 | 95 | 90 | 85 | 80 | 75 | 70 | 65 | 60 | 55 | 50 |

**Homework**

1 point will be given for a problem solve correctly with the relevant work.

½ point for a problem attempted to solved with the relevant work.

Formula

* Check: 1 point
  + Correct solutions with relevant work
* Check minus: ½ point
  + The answer is incorrect, but the work shows good understanding of the problem.