MATHEMATICAL INVESTIGATIONS IV
Course Description and Expectations

Mathematical Investigations is a four semester pre-calculus sequence of courses. MI-4 is the fourth course in this sequence. Prior to entry into MI-4, the student should demonstrate a strong background in Algebra and Geometry. This background includes a thorough understanding of the underlying concepts of both disciplines, a demonstrated ability with algebraic skills and geometric reasoning, and a schemata which encourages mathematical thinking. Upon successful completion of MI-4 or its equivalent, the student will enter a calculus sequence.

Course Outcomes for Mathematical Investigations:

All students will

- define and demonstrate techniques of problem solving in a variety of intra- and inter-disciplinary situations. These techniques should include the identification and development of strategies, the application of mathematical modeling, and the application of algorithmic and geometric processes.
- make conjectures and present logical, valid arguments for mathematical assertions, including direct proofs, indirect proofs, and proofs by mathematical induction.
- communicate in both written and oral form using the language of mathematics, including the correct use of proper mathematical symbols and terms.
- demonstrate mastery of sufficient mathematical knowledge and skills to engage in the study of calculus.
- demonstrate an understanding of functions and relations, both continuous and discrete, their geometric, algebraic, and numeric representations, and the algebra of functions.
- demonstrate an appreciation of the role and significance of mathematics in the development of our contemporary society.

Student Expectations:

All students are expected to

- be involved in class discussions and explorations.
- maintain a notebook containing class notes, homework assignments, Problem Sets, vocabulary list, formula lists, and other handouts.
- complete all assignments and problems sets in a timely manner.
- take responsibility for learning certain basic skills and relationships.
- take responsibility for seeking additional help as it is needed.
- have a graphing calculator and computer with them during each class.
- adhere to academic honesty guidelines as outlined in Student Handbook.

Teaching Philosophy:

Students need to be engaged in the exploration of mathematical concepts so that they can make those concepts their own. Often this takes more effort on the student's part than simply absorbing what the teacher is saying. Computer and calculator technology can provide tools for these investigations, but the student must provide the positive attitude and honest effort. In order to be successful in mathematics, students must eventually learn a basic set of skills and relationships and have them "at hand" to use when necessary. Students develop a basic set of understandings through conscientious attention to regular class assignments. If assignments are not completed, or are done at the last minute, such understandings are usually not learned as thoroughly as they need to be. Students are also encouraged to develop their abilities to express mathematical ideas orally and in writing, to explain what they are doing, what conjectures they are forming, and what conclusions they have reached. It is hoped that by expressing these experiences in words, the student will gain a deeper understanding of them.

Course Content:

This fourth course will concentrate on the study of advanced sequences and series, mathematical induction, two and three dimensional vector spaces, advanced trigonometry concepts, polar and complex coordinates, and the pulling together of many previously presented concepts to enhance the later study of calculus. In addition to regular class

work, the students will be given a set of problems to be completed each week. These sets are designed to (a) review, enhance and make connections with the student's past knowledge, (b) work with current concepts being discussed in class, and (c) preview ideas and techniques that will become important in the near future. Student work on these sets is evaluated on the basis of *complete* solutions (not just answers) which are to be written *neatly* and *legibly*. Occasionally students will find a concept on the set that is new or in need of review. Therefore, students are permitted and encouraged to obtain help with the concepts on these sets from books, teachers, other students, and the mathematics department instructional program aides; however, each student is responsible for turning in his or her own work. The use of calculators and computer software is encouraged.

• Notebook: (3-ring binder, at least 1.5 in., solely for Math, with clearly defined section dividers for daily work/notes, quizzes, and problem sets, chronologically ordered.) Must have in class daily.

• Daily Worksheets: Must be completed in a timely manner. Some parts may need to be finished up outside of class. Work collaboratively, and check your answers with each other.

• Problem Sets: Will usually be handed out each "A" day to be turned in at the beginning of class the following "A" day. Late problem sets will incur the following penalties: Turned the same day, –20%; turned in by noon the next class day, –50%. Later problem sets should be turned in, but will get "0" points credited.

• WebWork: Will usually be assigned each "B" day to be completed by the next "B" day by 5 PM. Late submissions will not be accepted, as the system will stop taking submissions by that time. This is counted as part of the Problem Set grade.

• SMART Goals: In each unit of study, learning targets will be identified that you will be expected to achieve. Those targets which are *most* critical to the unit and further learning will be identified, and a SMART Goal (Specific, Measurable, Attainable, Result-Oriented and Time-Bound) will be set for that skill or concept. This means that we will expect ALL students to demonstrate proficiency in those skills. If a student's original assessment score(s) on these item(s) is less than 80%, additional support and retesting for those items will occur at designated times.

Assessment/Evaluation:

Students have a variety of opportunities to demonstrate their abilities to fulfill the expectations of this course. Primarily, students will be evaluated on the quality and completeness of their notebooks, their involvement in class discussions and explorations, homework assignments, successful completion of the weekly problem sets, writing assignments, and their demonstration of knowledge and skills on exams.

Quarterly grades will be averaged using the following weighting:

Individual Assessments	70%
Weekly Problem Sets/Projects	20%
Notebooks	10%

Semester grades will be averaged using the following weighting:

Cumulative semester work	80%
Semester Final Exam	20%

I-day help session: 1:00pm - 2:00pm Room A152

MI-4 Faculty Fall 2018

Ms. Julie Dowling	Dr. Micah Fogel	Ms. Marti Shirley	Mrs. Valentina Sorescu
jdowlin@imsa.edu	fogel@imsa.edu	mshirley@imsa.edu	vsorescu@imsa.edu