MATHEMATICAL INVESTIGATIONS I/II- 2nd semester

Course Description and Expectations

Mathematical Investigations is a four semester pre-calculus sequence of courses. MI-1 is the first course in this sequence. Students enrolled in MI-1 typically have completed a course in Algebra, but have some gaps in their understanding of the underlying concepts of algebra or in their ability to apply algebraic skills. One of the main purposes of MI-1 is to help students fill in these gaps and to develop 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

- come to class prepared for that day's work.
- be involved ***actively*** and ***collaboratively*** in class discussions and explorations.
- maintain a notebook containing class notes, worksheets, homework assignments, Problem Sets, 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 with them during each class.
- have a positive attitude and be willing to do his/her best.
- treat others with respect and politeness, to keep a sense of adventure, to have patience, and to be willing to try new stuff!

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 first course will concentrate on the study of the basic rules of algebra, exponents, functions, relations and equations, linear thinking, and polynomial and quadratic functions. 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.

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, and their demonstration of knowledge and skills on quizzes and exams.

Problem Sets:

You are responsible for completing one set per week. The problem sets will be handed out each Thursday (**C** day) and will be collected the following Thursday (**C** day), at the beginning of class. If the problem sets are late the following penalties apply:

Not turned in by class time, but turned in by 4:30 p.m. of the same day	-20%
Not turned in on time, but turned in by noon the following class day	-50%
Turned in later than noon the following class day	No credit

Quarterly grades will be averaged using the following weightings: MI-2

Individual Assessments (quizzes and the like)	55%
Weekly Problem Sets	25%
Binder (unit worksheets, etc.), Participation, etc.	20%

Semester grades will be averaged using the following weighting:

Cumulative semester work	80%
Semester Final Exam	20%

MI1 instructor for Spring 2018

Ms. Dowling
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Office Hours: 6th-8th mod daily. There will be I-day study sessions from 2-3pm as well.