

Math 101- Mathematical Ideas

COURSE DESCRIPTION

Mathematical Ideas is a course in math appreciation which meets three times each week for one semester. It is designed to acquaint the student with an understanding of what mathematics is. The course shows how mathematicians must think and, in so doing, encourages the students to think as mathematicians in seeing how mathematics applies to various everyday phenomenon.

MATERIALS

1. Textbook - *Mathematics, A Human Endeavor*, by Harold Jacobs, W H. New York.
2. Ruler calibrated in centimeters and inches
3. Graph paper
4. Compass
5. Protractor
6. Calculator

CONTENT

- ▶ The course begins with an activity-based explanation of inductive and deductive reasoning using common, everyday items such as paper clips, coins, cards, blocks, and billiard tables.
- ▶ The focus of chapter two centers on the existence of sequences in the world around us. A variety of arithmetic and geometric sequences are presented among which are the binary sequence, the sequence of squares, the sequence of cubes, and the Fibonacci sequence. Again, evidence is given which prevents the students from gaining the impression that math is an isolated subject by giving examples of where these sequences can be found in the student's surroundings.
- ▶ The topic of functions and their equations and graphs is next explored with examples being taken from everyday experiences. Students discover situations which can be represented by a function, develop equations of the function, and finally graph the equation of the function. In the process, students learn the difference between linear, parabolic, and hyperbolic curves.
- ▶ The subject of symmetry is covered by use of regular polygons, polyhedra, the Platonic solids, semiregular polyhedra, the Archimedean solids, pyramids, and prisms. Students both practice identification of these solids as well as engage in the construction of models of selected solids.
- ▶ The topic of mathematical curves, introduced earlier in the book, is further developed in a succeeding chapter with opportunities to construct physical models of various mathematical curves. The concept of curves as conic sections is introduced and models of each presented in the text with projects presented to create physical models of each.
- ▶ The final topic presented is that of the Fundamental Counting Principle along with the connected topics of permutations and combinations. Once again, the topic is explored by showing how the Fundamental Counting Principle can be applied to many instances encountered in everyday life. Such common items considered in the presentation are car keys, slot machines, travel plans, true-false tests, card games, and ZIP codes.
- ▶ As time permits, the topics of probability, statistics, and topology are also presented.

ATTENDANCE

Class attendance for Math 101 is required and is graded. Many of the lessons require discussion and other activities that cannot be duplicated outside of the class setting. Each class period will be assigned 5 points. If you are present and participate in the classroom activity of the day, you will be given the 5 points. If you happen to be tardy, 3 points is given. (Attendance will be taken as soon as the bell rings. You are expected to be in a desk ready to begin class.) The 3 points given on the day of a tardy may be altered if the length of class missed is substantial. If you are absent, 0 points are given. Attending the semester exam period will be given a point value of 10 points. These attendance guidelines remove the necessity of bringing excuses, since points are awarded only on the basis of attendance. Approximating the number of class periods at 3 per week for 18 weeks gives a point total of 270 points

for regular daily attendance. With the addition of the semester exam period, the total points for attendance will be approximately 280 points. Under certain circumstances special arrangements may be made for an extended absence.

GRADING

Three areas of work will contribute to the grade for Math 101. Importance of each to the final grade are as follows:

1. Attendance, Participation 5%
2. Classwork 45%
3. Chapter Tests 40%
4. Independent Project 10%

Attendance & Participation is weighted at 5% of the semester grade. As stated above, each day you attend you will receive 5 points toward this grade. The point total may be diminished by tardiness or absence. Points also may be deducted for inappropriate participation in class. No negative scores will be given in this category.

Classwork and homework will constitute 45% of the course grade. Some work in this category will be done during class in the form of projects or computer work on Geometer's Sketchpad. Other work in this category will include assignments to be done outside of class.

Chapter Tests are weighted at 40% of the semester grade. Each test covers 2 chapters. They include questions taken from the chapter reviews found in the textbook as well as additional questions arising during the class discussion. Textbooks, however, are not used during the test.

The Independent Project is weighted at 10% of the semester grade. The project must consist of some independent work in some area of mathematics. The project must be approved by the instructor. The topic may be chosen from the Problems for Further Exploration section of the textbook, but must include some research from sources outside the textbook. Further details on your project will be distributed at a later date.

LETTER GRADE

Letter grades for the semester will be based upon the following per cents:

96-100	A
93-95	A-
90-92	B+
87-89	B
84-86	B-
81-83	C+
78-80	C
75-77	C-
72-74	D+
69-71	D
66-68	D-
0-65	F