Instructor: Dr. Carol Bell  
Office: Jamrich 2212  
Office Phone: (906) 227-1603  
email: cbell@nmu.edu  
Office Hours: MF 12:00-1:00, WR 2:00 – 4:00, or by appointment

*** "Walk-in’s” are welcome as long as I do not have a prior commitment. E-mail is a good way to contact me to ask questions or voice your concerns related to the class.

Course Overview:
MA 351 Models and Problem Solving for the Elementary School Teacher focuses on problem solving, with topics drawn from historical mathematics, number theory, algebra, geometry, trigonometry and recreational mathematics.

Prerequisite:
Grade of C or higher in MA 250 and MA 231.

Text and Other Course Requirements:

This course uses EduCat so you must have Internet access in order to complete assignments and receive course information. Your user id and password should be the same as your NMU campus email user id and password.

We will also use the software program The Geometer's Sketchpad by Key Curriculum Press. As long as you have a university issued laptop, you may have the program (version 5) installed at no charge to you at the computer help desk. If you are using a non-university issued laptop, it is your responsibility to purchase the program. Please have the program installed on your computer by class time Tuesday, January 20.

Learning Outcomes:
Upon successful completion of this course, a student should be able to:

1. Apply problem-solving strategies to solve problems drawn from historical mathematics, number theory, algebra, geometry, trigonometry and recreational mathematics;
2. Write coherent explanations of problem solutions;
3. Verbalize solution processes of a variety of problems;
4. Apply both inductive and deductive reasoning to the proof of mathematical results.

Evaluation of these learning outcomes will be done through assignments and exams.
Course Goals:
- To enrich your mathematics background by studying a number of topics that may be new and unfamiliar to you.
- To develop your problem-solving ability and increase your repertoire of problem-solving techniques.
- To analyze the problem-solving process, investigate sources of problems, and identify ways to promote the development of problem-solving skills.
- To write coherent explanations of problem solutions and to verbalize solution processes, including unsuccessful as well as successful strategies, to others in the class.
- To reflect on problem solutions and strategies and examine their connections to other topics of mathematics and to a variety of applications.
- To apply both inductive and deductive reasoning to the proof of mathematical results.
- To increase your enjoyment of and enthusiasm for mathematics.

Assessment Format: Specific information on each assessment measure is provided below.
- **Class Participation (10%):** You are required to attend all classes and participate in class discussions. An “active participant” attends class every day, arrives on time, completes all assignments by their deadlines, asks and answers questions in class, and engages in group discussions and problem-solving activities. Points will be deducted for classes missed, for late arrivals, and for lack of participation.

- **Problem Sets (40% - 30% written and 10% presentation):** Problems from the concepts discussed in class will be assigned regularly. There are two components that you will be graded on for each problem set: written work turned-in and presentation of problems to the class. All problem sets will have two deadlines: presentation and written work to be turned-in.
  - **Written Work**
    - All written work must be neat, organized, and may not be submitted on paper with jagged edges. When writing up solutions, it is essential that you give complete explanations and explain your thinking (how you got the answer). The instructor reserves the right to make you re-submit your written work, if it is not legible and organized. Working with other students and discussing ideas with them can be very beneficial and is recommended. However, you are required to write your own solutions in your own words when completing assignments. Past-due assignments will be penalized 50% and will be accepted only up to one class period after the original due date for written work to be turned-in.
  - **Presentation**
    - Part of your overall problem set grade will be based on your ability to present assigned problems to the class at the board. Beginning the class period following a problem set assignment, any student who is able to work one or more of the problems will present a solution to the class at the board. It is possible that more than one method exists for solving the problem. In this case, several presentations are possible so different students may do a presentation of the same problem.
Problem presentations are worth 2.5, 1.5, 0.5, or 0. A grade of 2.5 will be awarded if you give a correct explanation and solution. A grade of 1.5 will be awarded if you give a correct solution, but not a very good explanation. A grade of 0.5 will be awarded if you do not give a correct solution, and a score of 0 will be given if you do no presentations. You may not ask the instructor for help on any exercises prior to the presentation deadline. This is to help you gain confidence in your own mathematical abilities and to help you improve your abilities to explain mathematical concepts. You are required to do a minimum of four problem presentations. The four best problem presentations will be used to determine your presentation grade. Additional problem presentations that are scored for full credit may count toward extra credit.

- **Examinations (50%)**: Each exam will consist of questions from the material discussed in class. A university-approved excuse is generally a prerequisite for rescheduling any exam. The final exam will be comprehensive. The date and time of the final exam are **Monday, April 27, 4:00 – 5:50pm**. The final exam schedule is also available online.

**Grading Scale (%)**: Your course grade will be based on the percentages outlined under Assessment Format. Corresponding grades as a percentage of the total are listed below.

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>100 – 95.0</td>
<td>A</td>
</tr>
<tr>
<td>94.9 – 89.5</td>
<td>A-</td>
</tr>
<tr>
<td>89.4 – 86.5</td>
<td>B+</td>
</tr>
<tr>
<td>86.4 – 82.5</td>
<td>B</td>
</tr>
<tr>
<td>76.4 – 72.5</td>
<td>C</td>
</tr>
<tr>
<td>72.4 – 69.5</td>
<td>C-</td>
</tr>
<tr>
<td>62.4 – 59.5</td>
<td>D-</td>
</tr>
<tr>
<td>69.4 – 66.5</td>
<td>D+</td>
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<tr>
<td>66.4 – 62.5</td>
<td>D</td>
</tr>
<tr>
<td>59.4 – 0</td>
<td>F</td>
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</tbody>
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**Appropriate Classroom Laptop Use**: Although having a laptop in class opens up new learning possibilities for students, sometimes students utilize it in ways that are inappropriate. Refrain from instant messaging, e-mailing, surfing the Internet, playing games, writing papers, doing homework, etc. during class time. Acceptable uses include taking notes and working on assigned in-class activities, projects, and discussions that may be enhanced by laptop use. It is easy for your laptop to become a distraction to you and to those around you so please use good judgment in using your laptop during class.

**NMU’s Non-Discrimination Statement**: Northern Michigan University does not unlawfully discriminate on the basis of race, color, religion, sex, national origin, age, height, weight, marital status, familial status, handicap/disability, sexual orientation, or veteran status in employment or the provision of services, and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities an equal opportunity to participate in all programs and activities.

Anyone having civil rights inquiries may contact the Equal Opportunity Office, 502 Cohodas Hall, telephone number 906-227-2420.

**ADA Statement**: If you have a need for disability-related accommodations or services, please inform the
Coordinator of Disability Services in the Disability Services Office by: coming into the office at 2001 C. B. Hedgcock; calling 227-1700; or e-mailing disserv@nmu.edu.
Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

**Important Deadlines**
- Last day to drop with 100% refund (No grade): Monday, January 13, 5:00pm
- Last day to drop with "W" grade: Friday, March 27