MA 112C: College Algebra

Prerequisites: MA 100 or equivalent.

Course Description

Primary emphasis is development of skills in algebraic manipulation. Graphing calculator required. Not available for credit to students who have successfully completed precalculus or calculus in high school or a course equivalent to MA 130 or higher. Exceptions must be approved by the chair of the department of mathematics and computer science. Prerequisite: MA 100 or equivalent.

Course topics include, but are not limited to:

- linear and quadratic equations and inequalities in one and two variables
- systems of equations
- polynomials
- rational expressions and functions
- exponents and radicals
- linear and quadratic functions
- direct and inverse variation
- introduction to analytic geometry

Required Course Textbook:


Dr. Frank Rudolph Spring, 2004
Tuesday, Thursday 4:00 – 5:15 PM Three credits

Office Location: Off campus
Office Hours: By Appointment
Home phone: 603 891-3545
Office phone: 603-620-7255
OR ½ hour before class (In the classroom) e-mail address: fjr@controlsmith.com
Note that the office hours are often conducted in the classroom with which they are associated. Any students from any course are welcome during those times.

Brief Course Description: Course topics include, but are not limited to, linear and quadratic equations and inequalities in one and two variables, systems of equations, polynomials, rational expressions and functions, exponents and radicals, linear and quadratic functions, direct and inverse variation and a brief introduction to analytical geometry.


Required Materials (bring to every class meeting): A three-ring binder with pockets, hole punch, miniature stapler, and a 6” ruler, two colored pencils. You are also expected to have a graphing calculator and its manual. The overhead-projector calculator used in class will be a TI-83, and your instructor is most familiar with the TI-83.

Course Objectives:

• To involve students in the active doing of mathematics
• To engage students in mathematical thinking and problem solving
• To develop students’ abilities to approach algebra topics graphically, numerically, symbolically, and verbally
• To engage students in developing mathematical models of problems and in solving problems
• To help students learn to read mathematics and to become independent learners of mathematics
• To develop students’ conceptual understanding of the major ideas of College Algebra
• To engage students in the solution of problems, especially open-ended problems
• To develop students’ abilities to write clearly and concisely about mathematical ideas and problem solutions
• To help students learn basic algebraic techniques
• To develop students’ abilities to work together
• To give students hands-on experience on the effective and appropriate use of calculators.

Teaching Strategies:

• Active student engagement in group work and discussions
• Exploratory, intuitive activities that involve students in doing mathematics
• Lecture and group discussions with an expectation of student participation and questioning
• Student reading of mathematics and studying of examples
• Student writing about mathematical ideas
• Problem solving
Classroom time management strategies:

In class, you should adopt the habit of arriving at least a few minutes early. Take this time to decide which homework problems you had difficulty with. Write on the upper left corner of the board any problem numbers you need to have discussed in class. If a problem appears on this list that you know how to do, please write your initials next to it, so you can work it out on the board. You may elect someone else to write it on the board and you can "talk them through it", if you find this more comfortable.

Course Requirements:

- Homework (collected or checked each class period)
- Active participation and engagement in full-class and small-group discussions and activities
- A short quiz at least once each week
- A project portfolio
- Tests
- Final examination

Examinations:
Note that any test may contain items from previously tested chapters. Algebra builds in complexity. Each new idea depends on your understanding of previously learned concepts. Dates to be finalized on course assignment outline.
- Final Examination: date to be announced

Methods of Assessment and Computation of Grades:

Learning/Instructional Methods

1. Library/Internet search
2. Lecture
3. Laboratory Projects
4. Homework Assignments

Performance Evaluation

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Method</th>
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<tbody>
<tr>
<td>1. In-class participation*</td>
<td>10%</td>
<td>Subjective 0-100%</td>
</tr>
<tr>
<td>2. Homework</td>
<td>15%</td>
<td>Rubric</td>
</tr>
<tr>
<td>3. Quizzes</td>
<td>20%</td>
<td>Objective 0-100%</td>
</tr>
<tr>
<td>4. Tests</td>
<td>20%</td>
<td>Objective 0-100%</td>
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5. Portfolio of work 20%  
6. Final Exam 15%  

*Active engagement in class activities and discussions, attendance, punctuality, and respect for others.

**Resources**

Mathematics Conference Room (in Regis Hall, see the MACS Administrative Assistant if the room is locked).
Please feel free to use the Mathematics Conference Room whenever a faculty meeting is not being held (see schedule on door). You may bring snacks and beverages as long as you clean up after yourself.
FYI: The Math Conference Room:
- Contains Algebra books with solutions for your use.
- Is a great place to meet others from your class for collaboration on assignments.
- Is one of the places where the free math tutor holds tutoring sessions.
- Is near my office for quick questions when you get stuck.
- Is a cozy place to study.

**The Math Tutor:**

- See the campus-wide email message (to your Rivier account) for the tutor's hours
- Please send her (or him?) email with your questions.

**Classroom Policies**

**Attendance will be taken each class period.**

You are expected to attend all classes.

Missing classes will affect your grade, unless you provide a documented reason for your absence. If you miss class, you are responsible for getting the notes from a classmate and returning to class with all assignments up to date. To be "excused" from a class you must provide documentation from a professional source (physician, court, funeral director, campus nurse, etc.) If you must miss class because of serious illness or emergency, please inform me as far ahead as possible by note, email, or phone message. Students on athletic teams must provide written notice of forthcoming athletic events at least two class meetings before the absence.
You are expected to seek help from the free mathematics tutors provided by the Department and the College. You are expected and required to visit the tutor and me during office hours regularly if you are experiencing difficulty.

Assignments are due on the assigned date whether or not you are present in class. Full credit is given only for assignments handed in on time. Late assignments are reduced by 25% each day they are late and must be submitted before the test on the chapter. If you must miss class, place your assignment in my mailbox in the Dana Center. Please refer to the homework assignment rubric for details of homework assessment.

One of your quiz grades will be dropped. You may not make up a missed quiz. A quiz missed for any and all reasons counts as the dropped quiz grades.

In order to make up a missed test or final examination, you will need a note documented by an appropriate physician or other public figure. (See above). Again, quizzes may not be made up. (See above).

Read and study each section before we discuss it in class. I intend to help you learn to read mathematics. You are responsible for all assigned material. I will try to cover all material in class before it is assigned.

Class participation and active engagement in the class discussions and activities, and group work are required and will be reflected in your grade.

You should expect to average five to eight hours studying for this class each week. This includes reading the textbook, working out text examples on your own, reviewing and “filling-in” class notes, doing homework and graded assignments, and preparing for tests and examinations. If your studying requires significantly more time than this, please see me. You may be underprepared for the course and together we will need to discuss and seek a remedy for the situation. Similarly, if you are spending significantly less than this amount of time, perhaps you already know this material and should be in a different course.

All work submitted on tests must be entirely your own. Test questions may not be discussed with other class members. Behavior contrary to this will result in a failing grade and written notification to the department chair and dean for appropriate action. If you miss more than 5.25 hours of class (three class meetings), your name will be turned in to the department chair and dean. You also must make an appointment to see me to discuss the advisability of your remaining in the course for the remainder of the semester.

- Any behavior that is disruptive to others will not be tolerated.
- Please silence cell phones in class. They are disruptive to the instructor and other students. If you must respond to a silent incoming message, please leave the room quietly and respond in the hall after you have closed the classroom door quietly.
Homework Assessment Rubric

Homework represents 10% of your overall grade.

When I assess homework, I rarely (but occasionally) do a detailed grading of your work. The rationale for this is that I assume you are still learning, thus I do not expect you’ve mastered the content (yet!). So usually I will use a simple rubric for assessing your work.

A rubric is a quality assessment for an assignment that does NOT necessarily take final answer correctness into account.

RUBRIC scores of 0 to 4 and are roughly equivalent to F to A, as in a grade point average.

Here are the criteria for the points:

4 = All problems attempted and finished before handing in.
   - Issues are clearly spelled out on the page when you don’t have a solution.
   - You have reworked any missing problems on your HW pages, using information gained in class.
   - Don’t expect that I’ll remember you asked questions in class. Write the results of your questions into the solution on your homework paper before you turn it in.

3 = Most problems are completed.
   - Missing answers are indicate clearly by “??????” or “I don’t know how to do this”.
   - But no effort was apparent in class to remediate the deficiency.

2 = Some problems are answered. Missing problems are just missing.

1 = Few problems were attempted.

0 = No problems were attempted.

WARNING:

Because there are usually answers in the back of the book for problems you are assigned, an attempt does not count if you don’t clearly show your work. Just transcribing the answers from the back of the book to your homework notebook does not demonstrate mastery.

All the rubric scores are added up and averaged across all the assignments, and the resulting average is then translated into 0 through 100 using the following formula:
\[ y = 12.5r + 50 \]  (If you don't understand this yet, ladies and gentlemen, stick around!! That's what this course is all about! :-) )

where \( r \) is your averaged rubric score and \( y \) is your 0-100 grade.

So, if you do no homework, you will get an "F" for the homework component, but not a zero.
On the other hand, if you do all homework with exceptional effort, you get a full-fledged 100%, and thus completing homework is a winning proposition while not doing homework affects you adversely (in many ways) but cannot, by itself, cause you to fail.

**Project Assessment Rubric**

**Project work represents up to 20% of your overall grade.**

The following criteria establish the rubric grade for each lab.

Pages in your lab portfolio must be numbered at the lower right hand corner, page one immediately follows the table of contents.

Lab reports will be kept in a well organized lab portfolio. It should be a 3-ring binder from which I will remove reports to be graded at unannounced intervals throughout the year.

Each Lab report will be graded on the following scale:

<table>
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<th>4 – exemplary</th>
<th>3 – good</th>
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<tbody>
<tr>
<td>2 – fair</td>
<td>1 – poor</td>
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<tr>
<td>0 = Not attempted</td>
<td></td>
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1. Some material is present. At least an entry in the table of contents guiding the reader to the correct page. All pages are numbered. Less than 2 pages. The problem is not sufficiently complex.

2. All materials presented in the lab report are well articulated and all guiding questions (if any) are answered. Figures are numbered and are referred to in the text by number.

3. All equations are correct. Principles are correctly applied. Answers are (mostly) correct.
4. The material in all the above are flawlessly correct, the drawings are clean and artistic and the English dialog clearly spells out the intent, method and results of the project. There are PLENTY of figures in your report explaining the concepts.

A summary at the end of the report describes what you learned from the exercise. This summary is a place where you should concentrate on what you learned. The material learned is NOT sufficient to satisfy this point, however as you must also describe in some detail the basic principles involved in the problem solution.

**The nature of a project problem:**

A project problem is a real-world application of the problem solving methods you learned in doing homework application ("word") problems. The problem should not be a trivial one. If the report takes less than 2 pages, it is not ambitious enough. If you occupy 2 or more pages describing a problem that is not ambitious enough, you grade will reflect this deficiency.

**You must keep your class notes (and homework) separate.**

At the end of the year, your lab report rubrics will be added up and the total number of points will be scaled. You should have at least 8 examples worked through: if there are 10 lab reports, the total number of points can be 40. If you got 38, then you lab grade will be 38/40*4 = 3.8. If you present an excess of 8 problems in you portfolio, you can receive extra credit, which can help you recover from deficient test scores. The amount of extra credit depends on the difficulty of the problems tackled and the effort expended in solving them -- the way this works is that for every additional project problem you tackle, I will increase the weight of your portfolio by 2% and decrease you test weight by 2%. Similarly, if you have fewer than 8 portfolio problems, I will decrease you portfolio weight by 2% and increase your test weight by 2%. If you do 3 portfolio problems, the test weight will be 30% and the portfolio weight will be 10%. Neither test nor portfolio may be less than 10%.

In averaging you rubric grade into the rest of your grade, the rubric grade will be interpreted as if it were a “grade point average”. 4 = A, 3 = B, 2 = C, 1 = D and 0 = F.

So 4 is like 100 and 0 is like 50, and all grades in between are scaled proportionally.

The scale equation, if you are interested, is \( y = 12.5x + 50 \), where \( y \) = your numeric grade from 0 to 100 and \( x \) = your rubric grade of 0 through 4.

A caution about ZEROES. This is a very fair and compliant grading method. Your first zero doesn’t hurt all that much (it automatically translates into a 50%). Don’t abuse this favor. More than one zero in your project portfolio will require me to change the above linear equation. For each zero, the equation will have its y intercept dropped by 10 points. Note that this will adversely affect the entire body of your work.
In practice, I will maintain a table of criteria for projects that I will check off by placing a 0, 1/2 or 1 in each column. The columns will be labeled, "works", "organization", "discussion", "illustrated", "difficulty", etc. So the rubric may not be an integer. In general, if you get a 3.5 or 4.0 on a lab exercise, it is something to brag about. Casual and sloppy work will not be awarded such scores.

I like to think that I am assessing a different part of you skills in project and homework scores. I am more concerned here about process, exploration, creativity, etc. than when grading tests and quizzes. Think of this part of the course as the right-brain assessment and the tests and quizzes as left-brain assessment. Take this time to be creative! Project time is NOT a test, it is an adventure. Take the time to enjoy it. Do not get stressed out if you are having difficulties. Include a discussion of your difficulties in your report. But ask questions first and let me know you are having difficulties. I will be very unhappy to find that the first I hear of your difficulties is in your final project report!

**General format of a project report:**

**TITLE**

**Introduction:** Here is a brief description of the project activity.

**Body:** Here are sketches, collected data, tables, and calculations, all well labeled so I know what you are doing.

**Discussion:** Here is where you should explain the principles involved and describe your problem solving method. If you work from a specific project description I give you, you should answer all questions I give you by stating the question followed by the answer. The questions must be clearly numbered, followed by the answers, clearly indented.

Also: Include what did or did not go right. You should air your complaints, but IT IS NOT SUFFICIENT TO COMPLAIN ABOUT THE LAB TO GET FULL CREDIT HERE!

**Conclusion:** Here you should summarize your results and describe (briefly) what you learned.

Don't forget to number all pages and figures and refer to the page numbers and figure numbers by number in the text of your report, where appropriate.