Stony Brook University
Mathematics Department
Kristen Pagano (Course Coordinator)

Proficiency Algebra
MAP 103 - 3 Credits
Fall 2023

Syllabus

Course Description: An intensive review of high school algebra as preparation for calculus and other mathematics. Students should not only be able to do the mathematics, but understand the foundational ideas and concepts behind the problem solving. Students should be able to critically think and use properties in new ways to solve problems.

Course credit is not accumulated in the final credit count of a transcript, but instead used as an avenue to succeed. A through C/Unsatisfactory grading only. The Pass/No Credit option may not be used.

It is necessary to pass this course with a grade of C or better to move onto MAT 122 or MAT 123. You may also enter AMS 102, MAT 118, and a few other courses such as PSY 202 with a 2+ on the placement exam, but admittance into MAT 122 and MAT 123 requires a 3 or a passing grade in MAP 103. This course does NOT satisfy the SBC QPS requirement but does satisfy the S1 skills requirement.

This course has been designated as a High Demand/Controlled Access (HD/CA) course. Students registering for HD/CA courses for the first time will have priority to do so.

Prerequisite: Level 2 on the mathematics placement examination or MAP 101.

Grading Scheme:

- **20%:** Test 1 Wednesday 10/4 from 8:30 PM to 9:50 PM
- **20%:** Test 2 Thursday 11/9 from 8:30 PM to 9:50 PM
- **30%:** Cumulative Final Exam Wednesday 12/18 from 2:15 PM to 5:00 PM
- **10%:** Quiz Average
- **10%:** DeltaMath Homework
- **10%:** Quiz Preparation

Grading Scale: A 93-100, A- 87-92, B+ 83-86, B 78-82, B- 73-77, C+ 68-72, C 63-67

Undergraduate Grading Scale

*NOTE: These letter grades are threshold scores only. Actual final scores needed to earn a certain letter grade may be lowered if warranted based on the difficulty of the exams. In other words, if your final total points in the course equal 87%, you will not earn less than an A-; however, the threshold for a A- may be lower.

There will be no extensions for (or exemptions from) any HW, Quiz, or Exam unless your absence is based on a well-documented extenuating circumstance. There will be no extra credit given to any student on an individual basis.

Response Time and Feedback on Assignments: Assignments and assessments should be handed back with grades and feedback within a week of their submission. Sometimes this timeline is not possible. Instructors should make announcements about when to expect items to be returned.

Quiz Preparation: This quiz preparation will be due on Brightspace each week.

Brightspace: This will be our main resource for sharing information regarding grades, announcements, and course materials so please check it regularly.

DeltaMath: Enroll in the section of your course with your Stony Brook gmail account. The code will be shared in class. If you enroll late, contact your instructor for their DeltaMath code.

Calculators: Will not be permitted during any quiz or test. It is also strongly encouraged that you stay away from them while you work through your homework.

Textbook: There is no textbook that you need to purchase. All the materials for the course will be generated by the instructors of the course.

What If You Have a Question? First, ask your instructor before or after class, during office hours, or through email. Your instructor may direct you to the course coordinator if necessary.

When To Email the Instructor: Instructors welcome your emails. (Requests for extenuating circumstances with documentation, questions that arise between classes, clarification, etc.)

Attending Office Hours: Please feel free to attend these hours to ask questions about the material or course questions. They are on a walk-in basis and you do not need an appointment.

Meeting Times: A complete an updated table of meeting times and locations can be found by clicking here.

Contact Info: You can find the office hours and contact info for your professors by clicking here.

Campus Academic Support Services

There are multiple resources, university offices, and help desks that are available to assist you with everything from advising, tutoring, accessibility and much more. Review some Academic Success Strategies and visit the Student Resources page for links to resources on campus.

Math Learning Center (MLC): Free math tutoring for all students. No appointment is required, just come in and ask for help. The MLC is located in the basement of the Mathematics Tower and virtually through Zoom. For more information:

http://www.math.stonybrook.edu/mlc/center-hours.html

PAL Sessions: Free Test Review Sessions https://www.stonybrook.edu/commcms/academic_success/about/pal.php

Academic Success and Tutoring Center: Campus Provided Tutoring Services https://www.stonybrook.edu/commcms/academic_success/

Weekly Schedule

Week 1 (8/28 - 9/3): Syllabus, Classification/Properties of Numbers, and Elementary Operations (with a concentration on operating with fractions).

- DeltaMath Assignment 1 due 9/3 at 11:59pm
- **9/3: Last Day to Drop without Tuition Liability**

Week 2 (9/4 - 9/10): Properties of Integer Exponents No class Monday 9/4. Monday classes may shift their due dates by one class meeting.

- Quiz Prep 1 Due.
- Quiz 1 in class.
- DeltaMath Assignment 2 due 9/10 at 11:59pm.

Week 3 (9/11 - 9/17): Rational Exponents, Roots and Radicals

- **9/11: Last Day to Add/Swap/Drop Classes without a W**
- Quiz Prep 2 Due
- Quiz 2 in class.
- DeltaMath Assignment 3 due 9/17 at 11:59pm.

Week 4 (9/18 - 9/24): Order of Operations and Expressions with Multiple Operations

- Quiz Prep 3 Due
- Quiz 3 in class.
- DeltaMath Assignment 4 due 9/24 at 11:59pm.

Week 5 (9/25 - 10/1): Factoring

- Quiz Prep 4 Due
- Quiz 4 in class.
- DeltaMath Assignment 5 due 10/1 at 11:59pm.

Week 6 (10/2 - 10/8): Review Test 1 and Start Rational Expressions ***Test 1 (Covering Week 1 to 5) on Wednesday 10/4 from 8:30pm-9:50pm***

- No QUIZ or QUIZ PREP
- No DeltaMath Due

Week 7 (10/9 - 10/15): Finish Rational Expressions No Monday and Tuesday classes 10/9 and 10/10.

- **10/13: Last Day to Drop Down**
- Quiz Prep 5 Due
- Quiz 5 in class.
- DeltaMath Assignment 6 due 10/15 at 11:59pm.

Week 8 (10/15 - 10/22): Linear and Absolute Value Equations

- Quiz Prep 6 Due
- Quiz 6 in class.
- DeltaMath Assignment 7 due 10/22 at 11:59pm.

Week 9 (10/23 - 10/29): Linear Inequalities

- Quiz Prep 7 Due
- Quiz 7 in class.
- DeltaMath Assignment 8 due 10/29 at 11:59pm.
- **10/27: Last Day to Withdraw, GNPC or Change Section**

Week 10 (10/30 - 11/5): Linear Equations in Two Variables

- Quiz Prep 8 Due
- Quiz 8 in class.
- DeltaMath Assignment 9 due 11/5 at 11:59pm.

Week 11 (11/6 - 11/12): Test 2 and Start Systems of Linear Equations ***Test 2 (Covering Week 6 to 10) on Thursday 11/9 from 8:30pm-9:50pm***

- No Quiz Prep Due
- No Quiz in class.
- No DeltaMath Assignment.

Week 12 (11/13 - 11/19): Finish Systems of Linear Equations

- Quiz Prep 9 Due.
- Quiz 9 in class.
- DeltaMath Assignment 10 due 11/19 at 11:59pm.

Week 13 (11/20 - 11/26): Quadratic Equations

- Quiz Prep 10 Due.
- Quiz 10 in class.
- DeltaMath Assignment 11 due 11/26 at 11:59pm.

Week 14 (11/27 - 12/3): Parabolas

- Quiz Prep 11 Due.
- Quiz 11 in class.
- DeltaMath Assignment 12 due 12/3 at 11:59pm.

Week 15 (12/4 - 12/10): Review for Final Exam.

- Quiz Prep 12 Due
- Quiz 12 in class.

Cumulative Final Exam on Monday, December 18^{th}, from 2:15PM to 5:00 PM

Learning Outcomes for Students

Week 1:

- Express symbolically the properties of of commutativity and associativity of addition and multiplication
- Explain why division by 0 does not make sense
- Explain why subtraction and division are neither commutative nor associative
- Classify Numbers and Describe the Number Sets: Natural, Whole, Integers, Rational, Irrational, and Real Numbers
- Understand that the Real Numbers Complete the Number Line
- Introduce a letter and how it follows the same properties as numbers.
- Understand Elementary Operations of Addition, Multiplication, and their inverses: Subtraction (adding a negative) and Division (multiplying by the reciprocal)
- Identify the Identity Elements of Addition, 0, and Multiplication, 1, how they are used in simplifying and solving many problems (including operating with fractions).
- Understanding fractions in a tangible way and operating with fractions using addition, subtraction, multiplication, division, reducing fractions (using properties of factoring out the identity element of 1).

Week 2:

- Understand that an exponent is a symbol used to describe repeated multiplication.
- List the first 15 squares, first 6 cubes, first 3 quartics, and the base of 2 with powers up to 6.
- Understand the properties that result from operating with exponents and use the product/quotient rule of exponents and the power rule of exponents.
- Explore negative and zero exponents and the connection to rules above.
- Fluently use these properties.
- Understand properties of exponents with fractional bases or letter bases.

Week 3:

- Understand that a root is a rational exponent and is the inverse of raising to a integer power. *New identity element: power of 1.
- Understand that fractional and integer exponents operate the same.
- Contrast the difference between repeated division (negative exponents) and roots (rational exponents).
- List the square roots of the first 13 squares.
- Understand the principal root results in a positive number. (Contrasted to the square root property of equivalence.)
- Find simplest radical form.
- Operate roots with multiplication and addition.
- Rationalize a denominator. (Exclude conjugates this week.)
- Contrast the result of odd-ordered and even-ordered roots of negative numbers.

Week 4:

- Operate with variables and constants (addition, multiplication, and exponents).
- Evaluate an expression and its contrast to solving an equation (substitute by understanding equivalency).
- Multiply polynomials and using the short multiplication formulas (squaring binomials and multiplying conjugates).
- Understand that distribution is another property of numbers and can be done prior to simplifying inside the parentheses, but not prior to an expression being raised to an exponent.
- Identify polynomial expressions.

Week 5:

- Factor out the greatest common factor.
- Identify a polynomial in the form of difference of two squares and factor it.
- Factor using Vieta's Theorem.
- Understand when to use the A/C Method and factor doing so.
- Factor a polynomial completely.
- Reducing to a polynomial to quadratic form to factor.

Week 6/7:

Students should become fluent in the concepts from Weeks 1-5 to review for Test 1. Students should be able to distinguish between problems, understand mistakes made on homework and quizzes, and be aware of misunderstandings and how to get help.

- Define a rational expression.
- Evaluate a rational expression.
- Use factoring and properties of fractions to simplify rational expressions.
- Perform multiplication, division, addition, and subtraction of rational expressions.
- Rationalize a denominator using the product of conjugates.

Week 8:

- Distinguish between an expression and an equation (difference between an unknown and a variable) and understand the number of solutions of a linear equation and why that is so.
- Using properties of expressions prior to properties of equivalence to solve a linear equation.
- Understand absolute value as an operation that describes the distance from zero (piece-wise definition).
- Solve an absolute value equations and understand the number of possible solutions.
- Transform formulas to solve for a variable.

Week 9:

- Describe the concept of an inequality.
- Solve linear inequalities and understand that these solution(s) yield a solution set.
- Explain why multiplying/dividing both sides of the inequality by a negative results in changing the direction of the solution(s) on the number line.
- Represent the solution(s) geometrically (on the number line).
- Represent the solution(s) in interval notation to describe a segment, ray, or union of intervals on the number line
- Understand the difference between including/excluding an endpoint and the concept of positive and negative infinity.
- Solving compound linear inequalities and absolute value inequalities and the connection to the idea of the intersection of solutions. (*Optional Differentiation and Extension* for stronger students and time variability)

Week 10:

- Use the Cartesian/Rectangular coordinate plane to graph points and lines.
- Understand that points are locations identified by their coordinates.
- Identify linear equations as equations of first degree.
- Graph lines: using slope and a point (sometimes the y-intercept), and using two-points (sometimes two intercepts).
- Recognize the equations of vertical and horizontal lines, graph these lines, and describe their slope.
- Understand lines can be represented in general form, slope-intercept form, and point-slope form and how each is useful and can be transformed into the others.
- Understand what the intercepts of a line are and how to find their coordinates.
- Understand the algebraic and geometric description of the slope of a line.

Week 11/12:

Students should become fluent in the concepts from Weeks 6-10 to review for Test 2. Students should be able to distinguish between problems, understand mistakes made on homework and quizzes, and be aware of misunderstandings and how to get help.

- Graph a system and identify the solution geometrically, if it exists.
- Check if a coordinate pair is a solution to a system.
- Explain why parallel lines have the same slope, and provide no solutions to the system.
- Identify parallel lines algebraically/geometrically.
- Explore why perpendicular lines have negative reciprocal slopes and identify perpendicular lines algebraically.
- Solve systems by substitution and by elimination.
- Understand linear systems that yield infinite solutions are the same line.

Week 13:

- Identify a quadratic equation.
- Solve quadratics through factoring using the zero factor property.
- Solve using the square root property (and contrast to the principal root).
- Solve using the quadratic formula (from memory).
- Solve by completing the square.
- Solve polynomial equations reducible to quadratic form *(Optional Extension)*
- Understand that the quadratic formula comes from completing the square of the general form. This is why this method provides all solutions. (*Optional Extension*)

Week 14:

- Find the vertex, zeroes, y-intercept, axis of symmetry, and other points to graph a parabola.
- Understand what the discriminant is and how it affects the roots of the equation
- Use formula for the vertex and axis of symmetry of a parabola from memory. (*Optional Extension* vertex form and transforming a parabola in PreCalculus).

Week 15:

Students should become fluent in all the concepts and apply those concepts in new ways.

- Distinguish between problems.
- Understand mistakes made on homework and quizzes.
- Understand more deeply the topics covered.
- Being aware of misunderstandings and how to get help.
- Use high order thinking: create, apply, innovate.

University Policies

Drop/Swap/Add Policies: If you need to drop or withdraw from the course, it is your responsibility to be aware of the tuition liability deadlines listed on the registrar Academic Calendar. Before making the decision to drop/withdraw you may want to [contact me or] refer to the University policies: Undergraduate Course Load and Course Withdrawal Policy

Incomplete Policy Under emergency/special circumstances, students may petition for an incomplete grade. Circumstances must be documented and significant enough to merit an incomplete. If you need to request an incomplete for this course, contact me for approval as far in advance as possible. You should also read the Universityâ€™s policies that apply to you: Undergraduate Bulletin

Student Accessibility Support Center (SASC) Statement: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: https://ehs.stonybrook.edu//programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Professions, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

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Technical Requirements and Assistance: D2L Brightspace is the Stony Brook University digital learning environment. It is used for the facilitation of communications between faculty and students, submission of assignments, and secure posting of grades and feedback in your courses.

To access Brightspace, go to mycourses.stonybrook.edu and use your SBU NetID and password.

If you are unsure of your NetID, visit Finding Your NetID and Password for more information. Sometimes submitting coursework via a tablet and/or mobile device can be challenging.

Computers equipped with the appropriate software are available for use at the various SINC site computer labs. Both physical and virtual labs are available. You can also borrow a computer through SBU Laptop Loan Program. Visit the Technical Requirements page for additional information regarding hardware and software options.

Please use the following information if you need technical assistance at any time during the course or to report a problem with Brightspace:

Brightspace Support via SUNY Helpdesk

Phone: 1-844-673-6786 Submit a ticket or chat online

Stony Brook University: Academic Technology Services

Phone: 631-632-9800 Email: AcademicTechnologies@stonybrook.edu