

## Massasoit Community College

**Instructor:**

**Office:**

**Email:**

**Phone:**

**Office Hours:**

**Course:** College Algebra

**Course Number:** MATH203-XX

**Semester:**

**Classroom:**

**Day and Time:**

**Course Description:** This course covers the algebra necessary for successful completion of the Precalculus/Calculus sequence while introducing functions, graphing, and graphing utilities. Topics include the operation and use of graphing utilities, polynomial operations and functions, absolute value equations and functions, radical and rational exponent functions, piecewise functions, composite functions, and complex numbers. Prerequisite: C- or higher in MATH003 Preparation for College Math III or MATH012 Intermediate Algebra; waiver by placement testing results; or department approval.

### Required Text and Materials:

1. Bittinger, Beecher, Ellenbogen, and Penna, *Precalculus: Graphs and Models, A Right Triangle Approach*, 6<sup>th</sup> edition, Pearson Education, plus MyMathLab Student Access Kit. ISBN 9780134379968. Note: this textbook comes packaged with MyMathLab, which is a requirement for this course. Homework for this course will be assigned through MyMathLab. If you do not purchase your textbook through the bookstore, please make sure that it comes with a MyMathLab access code.
2. A TI-83/84 graphing calculator is required for this course. All assessments will assume that you have a graphing calculator. A TI-83/84 can be rented through the library for a small fee. You may not use any other technologies, such as cell phones, iPods, tablets, laptops, etc. on in-class assessments. You also may not borrow/share calculators, or borrow mine. Also, any calculator with a computer algebra system, such as a TI-89, TI-89 Titanium, TI-92, TINSpire, or others may NOT be used on in-class assessments!

### Course Topics:

- Chapter 1: Graphs, Functions, and Models
  - 1.1 Introduction to Graphing
  - J-6 Interval Notation
  - 1.2 Functions and Graphs
  - 1.3 Linear Functions, Slope, and Applications

- 1.4 Equations of Lines and Modeling (Mathematical Models, Curve Fitting, and Linear Regression are optional)
- 1.5 Linear Equations, Functions, Zeros, and Applications
- 1.6 Solving Linear Inequalities
- Chapter 2: More on Functions
  - 2.1 Increasing, Decreasing, and Piecewise Functions; Applications
  - J-11 Addition and Subtraction of Polynomials
  - J-12 Multiplication of Polynomials
  - 2.2 The Algebra of Functions
  - 2.3 Composition of Functions
  - 2.4 Symmetry
  - 2.5 Transformations
  - 2.6 Variation and Applications (section is optional)
- Chapter 3: Quadratic Functions and Equations; Inequalities
  - 3.1 Complex Numbers
  - J-14 Factor Polynomials; The FOIL Method
  - J-15 Factor Polynomials; The ac-Method
  - J-16 Special Factorizations
  - 3.2 Quadratic Equations, Functions, Zeros, and Models (curve fitting is optional)
  - 10.2 The Circle and the Ellipse (The Standard Form of the Equation of a Circle only)
  - 3.3 Analyzing Graphs of Quadratic Functions
  - 3.4 Solving Rational Equations and Radical Equations
  - 3.5 Solving Equations and Inequalities with Absolute Value
- Chapter 4: Polynomial Functions and Rational Functions
  - 4.1 Polynomial Functions and Modeling (curve fitting is optional)
  - 4.2 Graphing Polynomial Functions (intermediate value theorem is optional)
  - 4.3 Polynomial Division; The Remainder Theorem and the Factor Theorem (cover long division of polynomials; theorems and synthetic division are optional)
  - 4.4 Theorems about Zeros of Polynomial Functions (section is optional)
  - 4.6 Polynomial Inequalities and Rational Inequalities (Polynomial Inequalities only)

**Teaching Procedures:** This course will be taught in a lecture/discussion format with ample opportunity for student questions. Generally, class will begin with a question and answer session on the most recent homework assignment. New material will then be presented in a lecture format and homework be assigned to reinforce the topics covered in class.

**Instructional Objectives:**

COURSE OUTCOMES	OUTCOMES ACTIVITIES
A student will be able to	
Use the built-in graphing capabilities of a graphing calculator in order to graph and analyze functions introduced in this course and in other mathematics and related courses.	<ol style="list-style-type: none"> <li>1. Graph functions. (CT,TS)</li> <li>2. Adjust the graphing window to obtain a complete graph. (TS,CT)</li> <li>3. Use ZOOM and TRACE appropriately. (TS,CT)</li> <li>4. Use TABLE and TBLSET appropriately. (TS,CT)</li> <li>5. Use other features such as 'zero', 'minimum', 'maximum', and 'intersect' appropriately. (TS,CT)</li> <li>6. Use SOLVE appropriately. (TS,CT)</li> </ol>
Perform operations on polynomials in order to have the skills necessary to analyze and solve problems involving polynomials and polynomial functions.	<ol style="list-style-type: none"> <li>1. Review addition, subtraction, and multiplication of polynomials. (CT,QS)</li> <li>2. Divide polynomials, including polynomial long division. (CT,QS)</li> <li>3. OPTIONAL: Divide polynomials using synthetic division. (CT,QS)</li> <li>4. Solve polynomial equations and inequalities. (CT,QS)</li> <li>5. Convert between interval notation, inequalities, and number line graphs. (CT,QS)</li> <li>6. OPTIONAL: Apply the Remainder Theorem and the Rational Root Theorem. (CT,QS)</li> </ol>
Apply formulas from analytic geometry and solve various types of equations in order to use these skills to solve related problems as they are introduced in this course and other mathematics and related courses.	<ol style="list-style-type: none"> <li>1. Solve absolute value equations and inequalities. (CT,QS)</li> <li>2. Solve radical equations and rational exponent equations. (CT,QS)</li> <li>3. Apply the distance formula. (CT,QS)</li> <li>4. Apply the midpoint formula. (CT,QS)</li> </ol>
Solve problems involving circles in order to apply the technique of completing the square and to demonstrate facility in transferring knowledge back and forth between graphical and analytical.	<ol style="list-style-type: none"> <li>1. Find an equation of a circle. (CT,QS)</li> <li>2. Graph circles by hand and by using a graphing utility. (CT,QS, TS)</li> <li>3. Find the center and radius of a circle given the equation in standard form. (CT,QS)</li> <li>4. Find the center and radius of a circle given the equation in general form by completing the square. (CT,QS)</li> </ol>
Demonstrate knowledge of the basic properties of functions in order to apply this knowledge to analyze and graph different types of functions as they are introduced in	<ol style="list-style-type: none"> <li>1. Determine if a relation is a function. (CT,QS)</li> <li>2. Find the domain and range of a function. (CT,QS)</li> <li>3. Find the intercepts of a function algebraically. (CT,QS)</li> <li>4. Determine if the graph of a function is symmetric with respect to the y-axis or the origin. (CT,QS)</li> </ol>

<p>this course and other mathematics and related courses.</p>	<ol style="list-style-type: none"> <li>5. Determine if the graph of an equation is symmetric with respect to the x- axis. (CT,QS)</li> <li>6. Add, subtract, multiple, and divide functions and determine the domain of the resulting functions. (CT,QS)</li> <li>7. Evaluate the difference quotient for polynomial and radical functions. (CT,QS)</li> <li>8. Evaluate the composition of functions. (CT,QS)</li> <li>9. Use the graph of a function to identify domain and range, intervals of increase and decrease, relative extrema, and intercepts. (CT,QS,TS)</li> </ol>
<p>Analyze and graph polynomial functions (including linear and quadratic functions), absolute value functions, and radical and rational exponent functions in order to apply and expand upon these skills and knowledge in this course and other mathematics and related courses.</p>	<ol style="list-style-type: none"> <li>1. Graph and identify the graphs of a basic library of functions including <ol style="list-style-type: none"> <li>a. <math>y = K</math>,</li> <li>b. <math>y = x^n</math>,</li> <li>c. <math>y = \sqrt{x}</math>,</li> <li>d. <math>y =  x </math>,</li> <li>e. <math>y = \lfloor x \rfloor</math>,</li> <li>f. <math>y = \sqrt{r^2 - x^2}</math>. (CT,QS,TS)</li> </ol> </li> <li>2. Use vertical and horizontal shifts, vertical and horizontal reflections, and vertical stretching and shrinking to graph functions. (CT,QS)</li> <li>3. Graph piecewise functions. (CT,QS)</li> <li>4. Graph and analyze the graphs of polynomial functions, absolute value functions, and radical and rational exponent functions. (CT,QS)</li> <li>5. Solve applied problems involving quadratic functions. (CT,QS,R)</li> </ol>
<p>Solve problems involving complex numbers in order to apply these skills in this course and other mathematics and related courses.</p>	<ol style="list-style-type: none"> <li>1. Add, subtract, multiply, and divide complex numbers. (CT,QS)</li> <li>2. Calculate powers of <math>i</math>. (CT,QS)</li> <li>3. Solve quadratic equations whose solutions are complex numbers. (CT,QS)</li> </ol>
<p>To strengthen Core Competencies** in order to increase success in this and other courses and in the workplace.</p>	<p>Referenced above</p>

\*\*Indicate the Core Competencies that apply to the outcomes activities and assessment tools: Critical Thinking (CT); Technology Skills (TS); Oral Communications (OC); Quantitative Skills (QS); Reading (R); Writing (W).

**Basis for Student Grading:** Grades for this course will be assigned as follows:

Grade	Average
A	93%-100%
A-	90%-92%
B+	87%-89%
B	83%-86%
B-	80%-82%
C+	77%-79%

Grade	Average
C	73%-76%
C-	70%-72%
D+	67%-69%
D	63%-66%
D-	60%-62%
F	0-59%

The grade you earn is the grade you will receive in this course. Grades are not negotiable. You will not be allowed to make up work, substitute alternative assignments, or submit extra assignments in order to improve your grade during the semester or after the semester ends.

Grades of incomplete are given only in situations when extenuating circumstances prevent a student from taking the final exam or fulfilling a specific requirement in the course. The grade of "I" cannot be used to give students additional time to complete course assignments in order to raise their grade.

**Basis for Evaluating Student Performance:** The grade for this course will be weighted based on the following categories:

- *Homework (10%):* Homework will be assigned in MyStatLab at the end of each section. It is due by the next class period, and loses 10% of its available credit each day that it is late.
- *Exams (60%):* There will be four in-class exams given throughout the semester, approximately every 3 weeks. Exams must be taken during the regular class time and no make-up exams will be given. The lowest exam grade will be dropped. Your exam average will account for 60% of your final grade.
- *Final Exam (30%):* The course will culminate in a cumulative final exam. It will be worth 30% of your final grade.

There is no extra credit available for this course.

**Tentative Test Schedule/Assignment(s) Schedule:**

Assignment:	Tentative Date:
Test 1	
Test 2	
Test 3	
Test 4	
Final Exam	

**Attendance:** Attendance for this course is mandatory. After the third absence, students will lose two points per absence thereafter from their final average. I will take attendance at the beginning of every class, and students not present at that time will be marked absent for the class, even if they show up late. If you must miss a regular class, you are still responsible for the material that was presented in class. The average student needs to attend all class meetings in order to be successful in this course.

**Accommodations Statement:** Massasoit's Disability Services office provides accommodations to students who qualify for services based on a documented disability. Students interested in accessing classroom or testing accommodations must contact Disability Services directly. In an effort to avoid any lapse in services, new and returning students are encouraged to contact Disability Services at the beginning of each semester to receive an Accommodation Letter for the current semester. Students on all campuses can contact Disability Services at 508-588-9100 X 2132 or by e-mail at [DisabilityServices@massasoit.edu](mailto:DisabilityServices@massasoit.edu) for further information or questions.

**Title IX Statement:** Massasoit Community College is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, stalking, or retaliation, we encourage you to report it to *Yolanda Dennis, Chief Diversity Officer and Title IX Coordinator, Office of Diversity and Inclusion, at 508-588-9100, x1309 or [ODI@massasoit.edu](mailto:ODI@massasoit.edu)*. While you may talk to a faculty member, understand that as a "responsible employee" of the College, the faculty member must report what you share to the College's Title IX Coordinator. On and off campus resources and interim measures are available to assist you. Information about both of these policies can be found at [www.massasoit.edu/title-ix](http://www.massasoit.edu/title-ix) and [www.massasoit.edu/eo](http://www.massasoit.edu/eo). We are here to support you.**Academic Integrity:** Academic dishonesty will not be tolerated. In particular, the use of cellphones is prohibited during exams and any use will result, at a minimum, of a grade of 0 for the exam. Please see the following URL for more information on the college's policies on academic integrity:

<http://www.massasoit.edu/academics/policies/academic-honesty/index>