Quinsigamond Community College
School of Math and Science

Instructor's Information:

Instructor: <Professor XXXX>
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Course Information:

Course: MAT 123 College Mathematics I: Pre-Calculus – Section ##
Meets on: <Mondays, Wednesdays, Fridays from 8:00am – 8:50am>
Credits: 3 credit hours
Semester: <Fall2021>

Course Description:

This course focuses on the knowledge and skills necessary for advanced mathematics. Students expand binomial expressions using the binomial theorem; solve non-linear, and rational inequalities and write their solutions using interval notation; determine and write linear equations in several forms; explain the concept of function; graph functions using symmetry test; recognize and graph functions, including constant, linear, quadratic, polynomial, rational, exponential, and logarithmic functions; use function transformation techniques; perform composition and arithmetic operations on functions; find and graph inverses of functions; use properties of logarithms; and solve logarithmic and exponential equations.

Pre-requisite:

MAT 100 or appropriate placement score

Required Textbook/Materials/Website:

Textbook: *Algebra and Trigonometry*, by Robert Blitzer, Pearson Publishing, 7th edition, © 2022
Materials: Graphing calculator
Website: Access to www.mymathlab.com

Student Learning Outcomes & Instructional Objectives:

This course is designed to achieve the following student outcomes and objectives:

- Explain the development of the binomial theorem, and solve problems using binomial coefficients.
- Use Pascal's triangle.
- Solve nonlinear and rational inequalities.
- Graph the solutions of inequalities using open, closed, half-open, and infinite interval notation.
- Make an accurate graph of a given equation in x and y; use symmetry tests.
- Discuss the meaning of variable and the domain of a variable.
- Explain the meaning of function in terms of domain, range and one-to-one relation.

- Explain the meaning of identity function, and identify a constant function, even function, and odd function.
- Given the graph of a function, state the interval(s) over which it is increasing, decreasing, and constant.
- Graph a given function.
- Demonstrate how to shift a graph horizontally and vertically.
- Demonstrate how to reflect and/or stretch a graph.
- Recognize the equation of a linear function.
- Demonstrate and explain the meaning of, and how to determine, the slope of a line.
- Write the standard form of a given linear equation in x and y.
- Find the equation of a line using point-slope and slope-intercept forms.
- Demonstrate how to add, subtract, multiply, and divide functions.
- Determine the specified composite function of two given functions.
- Determine the inverse function of a given one-to-one function.
- Determine if a given function is one-to-one.
- Identify the form of an equation of a quadratic function.
- Graph a given quadratic function.
- Find the maximum or minimum value of a given quadratic function.
- Employ synthetic division where appropriate.
- Sketch the graph of a polynomial function, using transformations, the leading coefficient test and the zeros (multiplicity included) of the polynomial.
- Sketch the graph, including all intercepts and linear asymptotes, of a given rational function.
- Evaluate exponential functions.
- Sketch the graph of a given exponential function.
- Use and solve models for exponential functions.
- Evaluate logarithmic functions.
- Identify logarithmic and exponential functions as inverses of one another.
- Sketch the graph of a given logarithmic function.
- Use the properties of logarithms to expand and condense logarithmic expressions.
- Change logarithmic bases using appropriate formulas.
- And solve logarithmic and exponential equations.

Optional:

- Demonstrate the remainder and factor theorems and the rational root theorem.
- Demonstrate the fundamental theorem of algebra.
- Use Descartes' rule of signs.

Teaching Procedures:

Most classes will be a combination of lecture, group activities, and in-class assignments. You will be given homework assignments to be completed outside of class, with due dates/times. There will occasionally be a quiz or exam given in class.

Course Topics & Required Assignments/Readings:

Sequences, Induction, and Probability

- The Binomial Theorem

Function and Graphs

- Basics of Functions and Their Graphs
- More on Functions and Their Graphs
- Linear Functions and Slope
- More on Slope
- Transformations of Functions
- Combinations of Functions; Composite Functions
- Inverse Functions

Polynomial and Rational Functions

- Quadratic Functions
- Polynomial Functions and Their Graphs
- Dividing Polynomials; Remainder and Factor Theorems
- Zeros of Polynomial Functions
- Rational Functions and Their Graphs
- Polynomial and Rational Inequalities

Exponential and Logarithmic Functions

- Exponential Functions
- Logarithmic Functions
- Properties of Logarithms
- Exponential and Logarithmic Equations
- Exponential Growth and Decay; Modeling Data

Grading Breakdown:

25% Homework
15% Quizzes
10% Attendance
20% Exams
30% Final Exam/ Final Project

A	95 – 100	B –	80 – 82	D +	67 – 69
A –	90 – 94	C +	77 – 79	D	63 – 66
B +	87 – 89	C	73 – 76	D –	60 – 62
B	83 – 86	C –	70 – 72	F	0 – 59

Attendance Policy:

Students are expected to attend all classes, for the entire period. Attendance will be taken during every class and counts towards your final course grade. If you are absent from class, a doctor's note will excuse your absence.

Accessibility Statement:

If you have a disability which may require an accommodation, please notify me as soon as possible. You are responsible for forwarding your Accommodation Letter to me and discussing arrangements for this course. Your accommodations for this course begin upon my receipt of your Accommodation Letter; accommodations are not retroactive. You may request

accommodations at any time during the semester, but instructors must be provided with reasonable notice prior to exams or deadlines. Student Accessibility Services works to promote access to ensure an accessible college experience for students. If you have further questions, contact Student Accessibility Services (SAS). All discussions are confidential.

Contact Information for Student Accessibility Services:
Call: 508-854-4471
Sorenson Video Phone: 508-502-7647
Email: disabilityservices@qcc.mass.edu

Services for Veterans:
If you are a veteran of the armed forces, please visit the Veteran Affairs Office located in 258A (Administration Building) or contact them at veteranaffairs@qcc.mass.edu

Academic Honesty and Plagiarism:
Our purpose in the classroom is to seek the truth; this work requires trust and honesty between teacher and student. If we are not honest about what we know and don't know, our learning will always be impaired. Because our teaching and learning depends on this honest communication, we expect all students to understand what plagiarism is and why it is unacceptable.

Plagiarism means taking someone else's ideas or words and presenting them as one's own. The offense can take many forms including cheating on a test, passing in a paper taken from the Internet or from another student, or failing to properly use and credit sources in an essay. Sometimes the issue is subtle, involving getting too much help on an assignment from someone else. In every instance, plagiarism means cheating both oneself and the owner of the source. Since the cheating sabotages a student's learning experience, consequences range from no credit for the assignment to failure for the course and possible expulsion from the college.

For further information concerning plagiarism, refer to the QCC Student Handbook.

Math Center & QCC Math YouTube Channel:
The Math Center provides free, drop-in tutoring assistance for students in any QCC mathematics course. Located on the second floor of the Harrington Learning Center (HLC), the Math Center is a welcoming place where students have the opportunity to work collaboratively with tutors and classmates. Students can work intensively to improve their mathematical skills or simply drop by to ask a few questions. In addition to tutoring, the Math Center houses various math-related resources, and computers and software for math coursework. Visit their website for details and the semester schedule: https://www.qcc.edu/services/tutoring/math-center

For further help, visit the QCC Math YouTube channel. This channel has a playlist specifically for this course, with many short videos created with students like you in mind, covering many of the topics in this course: https://www.youtube.com/user/QCCmath