

# Syllabus

## Pre-Calculus Mathematics

### Math 143 GH – Fall 2018

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|-------------------------|--|
| <b>Course Title</b>     | Pre-Calculus Mathematics   |
| <b>Credit Hours</b>     | 6  |
| <b>Length of Course</b> | 16 weeks   |
| <b>Prerequisites</b>    | Math 99 with a grade of C or better, or Placement Test, or Consent of Department Chairperson.  |
| <b>Section</b>          | 143 GH (section number: 35114)   |
| <b>Classes</b>          | Tuesday, Thursday, 9:30 AM – 12:15 PM in Room 3150   |
| <b>Instructor</b>       | Marta Hidegkuti      e-mail: <a href="mailto:mhidegkuti@ccc.edu">mhidegkuti@ccc.edu</a><br>Office: Room 3812   |
| <b>Office Hours</b>     | Monday, Wednesday 10:45 AM – 11:30 PM in Room 3812<br>Monday, Wednesday 2:00 PM – 2:30 PM in Room 3812<br>Tuesday, Thursday 12:30 PM – 1:30 PM in Room 3812<br>Friday 10:45 AM – 11:15 AM in Room 3812<br>or by appointment.<br>Please note that some office hours might be cancelled or re-scheduled due to meetings. |

#### WEB SITES

All handouts and announcements will be available on the class's web site, at [http://www.teaching.martahidegkuti.com/Math143/math143\\_fa18/Math143.html](http://www.teaching.martahidegkuti.com/Math143/math143_fa18/Math143.html). Practice and some quizzes will be assigned on **MyOpenMath**. The use of MyOpenMath is mandatory but it is completely free. Students can log in at [www.myopenmath.com](http://www.myopenmath.com) and enroll using course ID **35224** and enrollment key **Math143fa18**.

#### TEXTBOOK

Precalculus by Jay Abramson. The textbook is free to download as a pdf file at <https://openstax.org/details/books/prec calculus>. The purchase of a physical book is not necessary. Most topics will be covered by handouts posted on the course's web site.

#### CALCULATOR

The use of a scientific calculator is strongly recommended. Students are expected to bring the calculator to class. The optimal calculator is **TI-30X II S**. The price of this model is between \$15 and \$20. Do NOT purchase a different calculator if it is significantly more expensive. Any calculator different from TI-30X II S has to be approved by the instructor first. If a calculator is able to compute symbolically, (f.e. that  $\sqrt{12} = 2\sqrt{3}$ ), then it is not allowed to be used during quizzes and exams. **During quizzes and exams, students are not allowed to use a graphing calculator. Students are not allowed to use a cell phone as a calculator any time during class.**

#### ADDITIONAL RESOURCES

Open the pdf file of this syllabus to click on the links below.

[Previously Taught Courses](#) (check out my last Math 143 class if you want to study ahead!)

[Lecture Notes](#) (if you need a review of Beginning Algebra or Intermediate Algebra)

[Khan Academy](#)

Self-Study Courses on [MyOpenMath](#)

#### IMPORTANT DATES

First class: Tuesday, August 28

Exam 1: Thursday, September 20

Exam 2: Thursday, October 18

Exam 3: Thursday, November 15

No Class, Holiday: Thursday, November 22

Last Day for Student Initiated Withdrawal: Saturday, November 17

Exam 4 (same as the Final Exam): Thursday, December 13

End of Semester: Saturday, December 15

## ATTENDANCE POLICY

Attendance is an essential part of the course. Regular attendance is expected of all students in the course. Attendance will be taken each class period. Students are expected to be on time and to attend the entire session. Please make every effort to arrive on time. If you are absent, you are responsible for all work and assignments covered in class that day.

### No-Show Withdrawal (NSW)

Students who do not attend the first two class sessions will be withdrawn from the class by the instructor and issued an NSW.

### Administrative Withdrawal (ADW)

Students will be administratively withdrawn at midterm (October 18) if at least two of the following apply:

1. Less than 70% of quizzes and tests up to the midterm (October 18) have been attempted.
2. Less than 70% of class sessions up to the midterm (October 18) have been attended.
3. Student missed 4 consecutive classes by October 18.

## WITHDRAWAL FROM THE COURSE

Not attending classes does not constitute withdrawal from the course. After midterm, instructors can no longer drop students from the course. If students stop attending classes after the midterm, the instructor can only assign a grade of F. **If you no longer attend classes, it is essential that you stop by at the registrar's office and officially withdraw from the course to protect your average.** The last day for student initiated withdrawal is Saturday, November 17. Before withdrawing from the course, students are encouraged to consult the instructor.

## GRADING POLICIES

**All assessments (quizzes and exams) will be cumulative.** Students who register late are responsible for all course work they missed due to their absence. Occasionally, extra credit assignments may be assigned. In all cases, **extra credit cannot count for more than 5%** of the course grade. Please retain all class-related material until you receive your final grade for the course. The final exams will not be distributed. They will be kept by the instructor for a calendar year after the course and then they will be destroyed.

### Grading Scale

Grading of all assignments, quizzes, and exams will be based on the following scale.

90-100: A      80-89: B      70-79: C      60-69: D      0-59: F

### Midterm Grade

The midterm grade will be the weighted average of the grades shown below with their weights.

Exam 1: 30%      Exam 2: 35%      Quizzes: 35%

Before determining the grade given for quizzes, the lowest two quiz scores will be dropped.

### Final Grade

The final grade will be the weighted average of the grades shown below with their weights.

Exam 1: 15%      Exam 2: 15%      Exam 3: 20%      Exam 4: 25%      Quizzes: 25%

Before determining the grade given for quizzes, the lowest three quiz scores will be dropped.

### Quizzes and Quiz Reviews

In this class, there will be two types of quizzes. Both types of quizzes will all be cumulative.

**Online Quizzes:** Quizzes 0, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, and 21 will be taken online, using MyOpenMath. The deadline for the online quizzes will be 11:30 PM on the night before the class as shown on the Calendar of Events. After the deadline passed, the link to the quiz will no longer be available. To practice for online quizzes, students are provided with online Quiz Reviews that can be repeated many times. These reviews cover the necessary course material and also prepare the students to give answers in the format in which MyOpenMath will accept it as correct.

**In-class Quizzes:** Quizzes 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, and 22 will take place during classes on Thursdays. To prepare for these quizzes, students will be provided written quiz reviews. Quiz reviews will be posted a week in advance of the quiz. Students are expected to study the quiz review during the weekend and ask questions about it on Tuesday. On Thursday, quiz review questions will not be answered in class.

## MAKE-UP POLICY

**Without exception, there will be no making up quizzes.** Permission to make-up an exam is subject to the discretion of the instructor, and will be granted only in cases of emergency. If an absence is anticipated, the student should notify the instructor prior to the absence. Students need to present written documentation to make-up an exam. Without exception, students can only make up one exam in the course. All make-up exams will take place on Friday, December 8.

## ACADEMIC INTEGRITY

The City Colleges of Chicago has no tolerance for violations of academic integrity., Plagiarism and cheating of any kind are serious violations of these standards and will result, minimally, in a grade of F. All course work will be checked for academic integrity. In this course, the first violation will result in an F for the assignment; the second violation will result in course failure. Make-ups and revisions are not available after an infraction of academic integrity. For further information, please refer to the [Academic and Student Policy](#).

Students must work on their own to solve homework problems. To complete any assignment in the course with the help of software or website that solves mathematics problems constitutes cheating.

## CLASS ROOM ETIQUETTE

### General

At all times, please treat the instructor, other students, and their opinions with respect.

Writing on or otherwise marking tables and other CCC property is prohibited and will not be tolerated. Please use paper for computations or notes. If you use the chalk board, please refrain from touching it with your hand, as the oil from our skin tends to damage the board.

**Eating and chewing gum are not allowed in the class rooms.** Students are allowed to eat only in designated areas such as the cafeteria or student lounge. Writing or drawing on the tables or otherwise marking them are prohibited.

### Avoid Distractions

Tardiness is a distraction to the learning environment. **Please make every effort to arrive on time for class.** Our class starts at 9:30. If you walk in at 9:30, you are late. At that time, students are expected to have arrived, seated, finished greeting each other, and are ready for the class to begin. If you are arriving late, please do not interrupt the class with an apology or greeting. Try to come in and join the class as quietly as you can. Students coming late are responsible for all content they have missed.

Before arriving to class, please **turn off all cell phones, pagers, and other loud devices.** The use of cell phone during class is not allowed. If you are in the habit of texting, facebooking, or otherwise entertain yourself using your cell phone, you will be asked to please put away the phone. Students are expected to pay attention to what is going on in the class, follow along, and ask and answer questions. Students do not need to raise their hand to speak. Lectures are intended to be a whole-group discussion. Please refrain from starting a parallel conversation.

Repeated noises such as sniffing, moaning or sighing are generally normal behavior but are very distracting during quizzes and exams. **Students are to refrain from making such noises during quizzes and exams.** If there is a medical reason making that impossible, the instructor must be notified in advance so that arrangements can be made for a separate room for that student.

### Questions

When new material is presented, questions are welcome. It is essential that students understand the concept being covered. No questions are bad or silly!

At the beginning of class, students have a chance to ask questions about homework problems, review problems, and generally, old material. The more specific these questions are, the better. Class time is precious as there is a great deal of material to go through. If a question is as general as “Can you show again how to do this type of a problem?”, two times is the limit. If a particular concept or problem was already presented in class as new material, and presented again at the beginning of class in its entirety, it will not be presented *during class* for the third time. Not only we do not have the class time for this, but it is also unfair to students who understood the problem the first time around. Such questions belong to office hours.

Quiz reviews will be posted a week in advance of the quiz. Students are expected to study the quiz review during the weekend and ask questions about it on Monday. On Wednesday, quiz review questions will not be answered.

If you need an extensive review (for example, due to absence) of material presented in class, please see the instructor during office hours. Valuable class time can not be spent on assisting one or a few students to the detriment of the entire class. Office hours are designated to address these problems.

### **Office Hours**

Arrive to office hours prepared. If you have missed a class, be sure to obtain and read all class-related material (handouts, text book section, and class notes). Have a list of specific questions. If you need help with a problem, bring your work on the problem with you – that will greatly expedite things. After your questions are answered, please leave so that the next student can enter. Please do not bring food to the instructor’s office.

### **Contact**

At all times, email is the fastest and most efficient method to contact the instructor. If you wish to contact the instructor about grades or attendance or other administrative issues via email, please use your CCC student account. FERPA (Family Educational Rights and Privacy Act) is a federal law that protects the privacy of student educational records: [www.ed.gov/policy/gen/guid/fpco/ferpa/index.html](http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html). Faculty cannot reveal information about students, or discuss student records over the phone or unsecure e-mail. CCC student e-mail meets FERPA requirements.

If a student wants to receive class-related information via e-mail to an e-mail address different from the student ccc account, they must first complete a release form posted at <http://www.teaching.martahidegkuti.com/shared/resources/ferpa.pdf>.

When e-mailing the instructor, please identify yourself and the class you are taking. Your instructor just met 105 new students. Please take the effort to use correct English and proper capitalization and punctuation in your e-mail correspondence. Communications such as “*can u pls reset my hw*” are unacceptable in an academic setting just as much as they would be unacceptable in a job.

## **ACADEMIC SUPPORT SERVICES**

**The Math Center** provides an open space to work on mathematics homework, emphasizing group study with roaming staff of tutors (adjunct instructors as well as student/peer tutors). One-on-one appointments are available for certain courses and circumstances. Computers, textbooks and calculators are available on site for student use.

Hours: Monday–Thursday: 9am-9pm, Friday, Saturday: 11am-4pm

Location: Room 1176, Main Building

Website: <http://www.ccc.edu/colleges/truman/departments/Pages/Math-Center.aspx>

Contact: 773-907-6832 – Cary Tucker, Coordinator – [etucker@ccc.edu](mailto:etucker@ccc.edu)

**The Tutoring Center** offers 1-on-1 50-minute appointments for tutoring in Accounting & Economics, French & Spanish, Humanities, History, Adult Education: ESL Levels 1-8, GED Writing, GED Math (in English & Spanish). Students can make appointments through GradesFirst, at our front desk, by phone, or they can walk-in.

Hours: Monday–Thursday: 9am-7pm, Friday: 9am-5pm, Saturday: 9am-2pm

Temporary Location\*: Room 2300A, Main Building

Website: <http://www.ccc.edu/colleges/truman/Pages/Search-Results.aspx?q=tutoring+center>

Contact: 773-907-4785 – Raeann Caldwell, Tutoring Center Coordinator – [rcaldwell1@ccc.edu](mailto:rcaldwell1@ccc.edu)

**The Disability Access Center** is located in Room 1435. The Center verifies needs pursuant to the American Disabilities Act (ADA), determines student academic accommodations, and issues accommodation letters. Registration is required at the start of each semester. (773) 907 - 4725, web site: <http://www.ccc.edu/colleges/truman/departments/Pages/Disability-Access-Center.aspx>

**The Wellness Center** is located in room 1946. Services include: Personal, individual counseling, support groups, stress and time management coaching, referrals to community resources, special support for victims of relationship violence and sexual assault includes one-on-one counseling; safety planning; and referrals to medical care, legal services, and emergency child care. Contact: (773) 907-4786 for an appointment or information. Web site: <http://www.ccc.edu/colleges/truman/departments/Pages/Wellness-Center.aspx>

**GradesFirst** is a student support system that will be used by faculty, advisors and tutors to help students achieve success in their classes. Use GradesFirst to schedule tutoring or advising appointments, or to see communications about your course progress generated by me or your other professors.

## TIPS FOR SUCCESS

**Make sure that you are enrolled into a class that you can handle.** Many students fail a class because they are enrolled into the wrong course. A significant source of trouble passing Math 143 is poor placement. Despite a successful enrollment, despite a conversation with an advisor, despite a qualifying score on a placement test, many students are simply not ready for the course and need to take Math 99 or Math 140.

**Do not take too much upon yourself.** Enrolling into a 6 credit-hour class automatically means that you agree to study 12 hours per week outside of classroom. A common reason for failure is that students are taking one too many course.

**Read the course syllabus!** It is your contract with the instructor about how the course will go.

**Attend every class and pay attention.** Make sure you ask questions immediately if you don't understand what is going on. Don't wait until you get completely lost. Remember, when new concepts are presented, all questions are fair game and welcome. (Also, your instructor has a strong accent, so do not be shy.)

If students are sleep deprived, exhausted, sick, in pain, hungry, or intoxicated, they cannot learn. Showing up is not enough - you need to be mentally and physically ready to learn. **Make sure that you come to class well rested, sober, and ready to learn.**

Mathematics is not a spectator sport. **Efficient studying is problem solving without the aid of notes, books, or videos.** Reading notes, reading the textbook, or watching videos without practice will only lead to the illusion of preparedness. After reading and watching, practice solving problems without those aids.

**Do not get behind!** Mathematics is cumulative by nature. Yesterday's concepts are necessary for mastering today's material. If you miss a class, make sure you catch up with the course work immediately. Keep up with the homework. If you get behind, credit is not the only thing you will lose. More importantly, you will not be able to understand new material and therefore you can not get the full benefit of class meetings.

**Format matters.** Try to follow your instructor's suggestions with respect to format and philosophy.

Form or join study groups! Students who study together outside of class tend to do better than students who do not.

**Get help!** Your tuition (which was recently raised) includes the funding of the Math Center and Tutoring Center and your instructor's office hours. Make sure to visit these places at least once before you give up on them. Remember, you paid for those services.

**Understand that you are part of learning community.** Try not to completely withdraw or dominate the class by answering every question. You can not rewind a live lecture, so you need to pay attention. Put that phone away!

Avoid self-fulfilling prophecies such as "I am not good at math" or "I will never get this". This is a common misconception in the United States. Mathematics is just another skill, and we constantly work on it to improve. The more you apply yourself, the better you get at it. You might be surprised to find that you are actually good at it!

## CALENDAR OF EVENTS

Please note that the Calendar of Events is subject to change. To save class time, some quizzes might be cancelled. (Usually one or two each semester).

|  | Tuesday   | Thursday  |
|--|---|---|
| Week 1                                 | <b>Class 1 – August 28</b>  | <b>Class 2 – August 30</b>                            |
| Week 2                                 | <b>Class 3 – September 4</b><br>Quiz 0 and Quiz 1 online<br>due Monday, September 3 at 11:30 PM | <b>Class 4 – September 6</b><br>Quiz 2                |
| Week 3                                 | <b>Class 5 – September 11</b><br>Quiz 3 online<br>due Monday, September 10 at 11:30 PM          | <b>Class 6 – September 13</b><br>Quiz 4               |
| Week 4                                 | <b>Class 7 – September 18</b><br>Quiz 5 online<br>due Monday, September 17 at 11:30 PM          | <b>Class 8 – September 20</b><br>Exam 1               |
| Week 5                                 | <b>Class 9 – September 25</b>   | <b>Class 10 – September 27</b><br>Quiz 6              |
| Week 6                                 | <b>Class 11 – October 2</b><br>Quiz 7 online<br>due Monday, October 1 at 11:30 PM               | <b>Class 12 – October 4</b><br>Quiz 8                 |
| Week 7                                 | <b>Class 13 – October 9</b><br>Quiz 9 online<br>due Monday, October 8 at 11:30 PM               | <b>Class 14 – October 11</b><br>Quiz 10               |
| Week 8                                 | <b>Class 15 – October 16</b>  | <b>Class 16 – October 18</b><br>Exam 2                |
| Week 9                                 | <b>Class 17 – October 23</b><br>Quiz 11 online<br>due Monday, October 22 at 11:30 PM            | <b>Class 18 – October 25</b><br>Quiz 12               |
| Week 10                                | <b>Class 19 – October 30</b><br>Quiz 13 online<br>due Monday, October 29 at 11:30 PM            | <b>Class 20 – November 1</b><br>Quiz 14               |
| Week 11                                | <b>Class 21 – November 6</b><br>Quiz 15 online<br>due Monday, November 5 at 11:30 PM            | <b>Class 22 – November 8</b><br>Quiz 16               |
| Week 12                                | <b>Class 23 – November 13</b>   | <b>Class 24 – November 15</b><br>Exam 3               |
| Week 13                                | <b>Class 25 – November 20</b><br>Quiz 17 online<br>due Monday, November 19 at 11:30 PM          | <b>No Class - November 22</b><br>Thanksgiving Holiday |
| Week 14                                | <b>Class 26 – November 27</b><br>Quiz 19 online<br>due Monday, November 26 at 11:30 PM          | <b>Class 27 – November 29</b><br>Quiz 20              |
| Week 15                                | <b>Class 28 – December 4</b><br>Quiz 21 online<br>due Monday, December 3 at 11:30 PM            | <b>Class 29 – December 6</b><br>Quiz 22               |
| Week 16                                | <b>Class 30 – December 11</b>   | <b>Class 31 – December 13</b><br>Exam 4               |
| End of Semester: Saturday, December 15 |   |   |

Midterm Date: Wednesday, October 24 – Last day for student initiated withdrawal: Saturday, November 17

## PROJECTED COURSE OUTLINE

Please note that the Course Outline is just a prediction, and is subject to change. The class's web site contains a link to the actual Course Outline that will be updated after each class.

- Week 1**      [Course Information \(Syllabus, Textbook Information, Calculator Information\)](#) [Simplifying Algebraic Expressions](#), [Review of Equations](#), [Factoring A](#), [Exponents 1](#), [Graphing Straight Lines](#), [Fractions and Decimals](#), [The Real Number System - Part 1](#), [Completing the Square Parts 1, 2, and 3](#), [Factoring 1](#), [Linear Word Problems](#)
- Week 2:**      [Radical Expressions](#), [Graph of a Parabola 1](#), [Completing the Square - Part 4](#), [Triangle Inequality](#), [The Pythagorean Theorem](#), [Systems of equations by substitution](#), [by elimination](#)
- Week 3:**      [Integer Exponents](#), [Writing Equations of Lines](#), [Complex Fractions](#), [Inequality and Interval Notation](#), [Linear Inequalities](#), [Graphical Solutions](#) (interval and inequality notation), [Similar Triangles](#),
- Week 4:**      [Graph of a Parabola - 2](#), [Quadratic Wordproblems](#), [Introduction to Construction](#), [Exam 1 Review and Exam 1](#)
- Week 5:**      [Quadratic Inequalities](#), [Optimization 1](#), [Grouping and the AC-Method](#), [Non-linear Systems](#), [The Quadratic Formula](#), [Right Triangle Trigonometry](#),
- Week 6:**      [Famous Trigonometric Values](#), [Simplifying Trig Expressions](#), [Circles - Part 1](#), [Rational Exponents](#), [Arithmetic, Geometric, and Harmonic Means](#), [Non-Linear Systems](#), [Summation 1](#), [Functions](#), [Computing Trigonometric Expressions](#), [Radical Equations](#), [Basic Percent Problems](#)
- Week 7:**      [Logarithms 1](#), [the number e](#), [Basic Exponential and Logarithmic Equations](#), [Trigonometric Identities 1](#), [Arcs and Sectors in Circles](#), [Domain of Functions](#),
- Week 8:**      [Basic Exponential and Logarithmic Equations](#), [Basic Functions and their Properties](#), [Rotational Angles](#), [Rational Inequalities](#), [Exam 2 Review and Exam 2](#)
- Week 9:**      [Unit Circle Definitions](#), [Inverse Functions](#), [Graphing Polynomials - 1](#), [Symmetries of the Unit Circle](#), [Trigonometric Identities 2](#), [Induction](#)
- Week 10:**     [Radian Measure](#), [Trigonometric Equations 1](#), [Logarithms 2](#), [Graphing Polynomials 2](#)
- Week 11:**     [Proof of the Sum Formulas](#), [Trigonometric Identities 3](#), [Trigonometric Identities 4](#), [Trigonometric Equations 2](#), [Trigonometric Equations 3](#)
- Week 12:**     [Graphing Trigonometric Functions](#), [Exponential Equations](#), [Exam 3 Review and Exam 3](#)
- Week 13:**     [Trigonometric Equations 4](#), [Reciprocal of a Graph](#), [Law of Sines - Part 1 and Part 2](#), [Inverse Trigonometric Functions](#), [Inverse Trigonometric Expressions](#), [Law of Cosines \(Solving Triangles\)](#), [Discontinuities of Rational Functions](#), [Vectors 1](#)
- Week 14:**     [Arithmetic Sequences](#), [Tangent Lines](#), ([By Completing the Square](#), [Using the Discriminant](#)), [Vectors 2](#), [Half-Angle Formulas](#), [Division of Polynomials](#), [Trigonometric Equations 5](#), [Vectors 3](#), [Complex Numbers](#)
- Week 15:**     [Transformations on Graphs](#), [Product-Sum Identities](#), [Limits at Infinity - Part 1 and Part 2](#), [Summation Notation](#), [Why  \$i^2 = -1\$](#) , [Graphing Rational Functions](#), [Vectors 4](#), [Graphing Trigonometric Functions](#)
- Week 16:**     [The Remainder Theorem](#), [Polar Form of Complex Numbers](#), [Final Review and Final Exam](#)

## COURSE INFORMATION

### Catalogue Description

Emphasizes the notion of a function as a unifying concept for the topics of college algebra and trigonometry. Families of functions and their characteristics include: polynomial functions; rational functions; exponential and logarithmic functions; and trigonometric functions; and applications involving problem-solving skills. Writing assignments, as appropriate to the discipline, are part of the course.

### Course Objectives

Solve equations, inequalities, and systems of equations and inequalities of various types.

Solve geometry problems using methods of coordinate geometry.

Analyze the graphs of various families of functions.

Apply the models and characteristics of various families of functions to scenarios in order to solve real-world problems.

Demonstrate an understanding of trigonometric functions and their behaviors.

## Truman College General Education Goal(s)

Upon successful completion of this course, students will demonstrate the ability to think critically, abstractly, and logically.

### Student Learning Outcomes

Upon satisfactory completion of the course, students will be able to:

Determine whether a number is real or not, and if so, if it is rational or irrational.

Solve equations, inequalities, and systems of equations of the following types: linear, quadratic, quadratic in form, polynomial, rational, radical, with absolute value, logarithmic, exponential, and trigonometric.

Solve equations over the complex numbers.

Apply the concepts of conics to a contextual (real-world) situation.

Apply the arithmetic-geometric means theorem to a contextual (real-world) situation.

Apply the concepts of arithmetic and geometric sequences to a contextual (real-world) situation.

Apply permutations and combinations to a contextual (real-world) situation.

Apply the concept of probability to a contextual (real-world) situation.

Prove trigonometric identities.

Prove statements by induction.

#### Polynomial Functions:

Identify the characteristics of a quadratic function (i.e., vertex, axis of symmetry, and concavity).

Compute roots/zeros of a polynomial function by factoring techniques.

Estimate the roots/zeros of a polynomial function using graphs.

Solve polynomial inequalities.

Solve systems of linear equations using matrices and determinants.

Solve systems of linear inequalities.

Solve systems of non-linear equations.

#### Rational Functions:

Simplify rational expressions using the division algorithm.

Identify points of discontinuity of a rational function.

Identify vertical/horizontal asymptotes and end behavior of rational functions.

Solve rational inequalities.

#### Exponential and Logarithmic Functions:

Define exponential and logarithmic functions.

Simplify exponential and logarithmic expressions using their properties.

Solve exponential and logarithmic equations.

Formulate and apply exponential and logarithmic functions to a contextual situation.

#### Trigonometric Functions:

Define the sine, cosine, tangent, and secant functions and their inverses, including the unit circle definition of these functions.

Solve trigonometric equations.

Apply right triangle trigonometry to a scenario.

Verify trigonometric identities.

Identify a trigonometric function from its graph.

Graph a trigonometric function using its properties (e.g., periodicity, amplitude, phase shifts, etc.).

Apply trigonometric functions to basic concepts of physics (e.g., velocity, pendulum movement, basic current).

The following student learning outcomes (Characteristics of Functions) will be embedded as appropriate in the study of the family of functions listed above.

Identify the domain and range of a function.

Determine intervals on which functions are decreasing/increasing, continuous/non-continuous, or piecewise.

Identify functions from multiple sources of information (i.e., verbal descriptions, graphs, equations, and tables of values).

Relate the effect of transformations (i.e., translations, rescaling, or reflections) on graphs of functions and their corresponding equations.

Perform operations (i.e., addition, subtraction, multiplication and division) on functions, including the composition of functions.

Decompose a function into a composition of two or more functions.

Formulate and apply a function to a contextual situation.

Determine the conditions under which a function has an inverse.

Identify the inverse of a function from multiple representations.

Reformulate a given function into various representations (i.e., verbal, graphical, algebraic, or tabular).

**Have a pleasant, productive, and rewarding semester!**

**Marta Hidegkuti**