

**Course Catalog Update**

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**Course Catalog Update Information:** **STU0004**

**Reference Number:** CCU013953 **Date:** 22-OCT-18  
**Level:** 3.00 of 3.00 **Currently On The Worklist Of:** Alison Smith, alisonjs  
**Owner:** Office of Curriculum Services, 330-672-8558 or 330-672-8559, curriculum@kent.edu

**Basic Course Data**

**Change type:** Establish  
**Faculty member submitting this proposal:** Xiaoyu Zheng  
**Requested Effective Term:** 201980  
**Campus:** Kent  
**College:** AS-Arts and Sciences  
**Department:** MATH-Mathematical Sciences  
**Course Subject:** MATH-Mathematics  
**Course Number:** 10675  
**Course Title:** Algebra for Calculus Boost  
**Title Abbreviation:** Algebra for Calculus Boost

**Slash Course and Cross-list Information:**

**Credit Hours**

**Minimum Credit/Maximum Credit:** 5 to 5  
**Contact Hours: Lecture - Minimum Hours/Maximum Hours:** 5 to 5  
**Contact Hours: Lab - Minimum Hours/Maximum Hours:**  
**Contact Hours: Other - Minimum Hours/Maximum Hours:**

**Attributes**

**Is this course part of the LER, WIC or Diversity requirements:** Yes  
**If yes, course attributes:** 1. LMCR-LER-Mathematics and Critical Reasoning 2. 3.  
**Can this course be repeated for credit:** No Repeat **Course Limit:** **OR Maximum Hours:**  
**Course Level:** Undergraduate **Grade Rule:** B-Standard letter

**Rationale for an IP grade request for this course (if applicable):**

**Schedule Type(s):** 1. LEC-Lecture 2. 3.

**Credit by Exam:** N-Credit by exam-not approved

**Prerequisites & Descriptions**

**Current Prerequisite/Corequisite/Catalog Description:**

**Catalog Description (edited):** (Learning Outcomes equivalent to MATH 10775 and MATH 11010) Algebra for Calculus includes an extensive and rich immersion into the structure of functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). Operations with functions including addition, subtraction, multiplication, division, composition, and inversion. Functions are studied as a tool to analyze rates of change in real-world scenarios. The emphasis is on linear, polynomial, exponential, and rational functions, with an extensive problem-solving component. A two-week review of intermediate algebra skills is included in the course, as is extra time studying quadratic functions, absolute value functions, systems of equations, and extended time on logarithms. No credit earned for this course if a student already earned credit for MATH 12001 or MATH 10775 or MATH 11010.

**Prerequisites (edited):** ACT Math score of at least 22; or SAT Math score of at least 530; or ALEKS Math score between 35 and 44; or minimum C grade in MATH 00022.

**Corequisites (edited):**

**Registration is by special approval only:** No

**Content Information**

**Content Outline:**

Content Hours per Course Topic	Topic Description
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9	Review of Intermediate Algebra Skills
11	Reasoning about and representing quantitative relationships
9	Formalizing relationships between quantities: Functions
12	Exponential and logarithmic functions
2	Systems of Equations
11	Polynomial and Power functions
8	Rational Functions and an introduction to limit
13	Reviews and Exams

Display/Hide Delimited Course Outline

**Total Contact Hours: 75****Textbook(s) used in this course:** Carlson, M., Oerhrman, M., & Kevin Moore. (2018). PreCalculus: Pathways to Calculus, A Problem-Solving Approach. Plymouth, MI: Hayden-McNeil, Macmillan Learning.**Writing Expectations:** Students will be expected to write homework and exams.**Instructor(s) expected to teach:** All Math faculty**Instructor(s) contributing to content:** Reed, Tonge**Proposal Summary****Explain the purpose for this proposal:**

The Ohio Department of Higher Education expects that all students enrolling in any of its 37 institutions of higher learning have an opportunity to complete a college-level mathematics course in one academic year. Previously, students who were underprepared for college-level mathematics were placed into remedial coursework. Many students took as much as a full year to complete their remedial requirements, even if they successfully passed all the remedial courses. Needless to say, success rates of those courses, even if at 70%, have a cumulative effect, with a resultant small percentage of students entering, much less succeeding in, a college-level mathematics course. MATH 10675, Algebra for Calculus Boost, will accept students who place into our MATH 10773 course, Algebra for Calculus Stretch I. The two-semester MATH 10773+MATH 10774 (Algebra for Calculus Stretch I and II) sequence will be eliminated. The first two weeks of the MATH 10675 reviews the intermediate algebra skills of MATH 00023 and students take a 20-question "Gateway" exam to show mastery of these skills. During the subsequent weeks, the students study precisely the same concepts and skills that do the regular MATH 10775 students. The learning outcomes and final exam of MATH 10675 are exactly the same as MATH 10775 and MATH 11010. Math department currently offers a pilot version of this course in the form of Corequisite model, students who placed into MATH 00023 are registered in two separate courses: MATH 10775 (4 hours) and a linked MATH 00095 (1-hour special topics) course. This proposal is to permanently combine of these two courses into one 5-credit hour course.

**Explain how this proposal affects program requirements and students in your unit:**

No effect.

**Explain how this proposal affects courses, program requirements and student in other units:**

Students who placed into two-semester sequence MATH 10773 (3 hours) + MATH 10774 (3 hours), and students who placed into CoRequisite courses MATH 10775 (4 hours) and MATH 00095 (1 hour), will take this one-semester MATH 10675 (5 hours), Algebra for Calculus Boost. MATH 10773, 10774 and 00095 will be eventually eliminated. Students will progress faster to degree completion.

**Explain how this proposal affects enrollment and staffing:**

Enrollment for MATH 10773, 10774 and 10775 will decline as enrollments for this course increases. The current teaching staff of MATH 10773, 10774 and 10775 will teach this course.

**Units consulted (other departments, programs or campuses affected by the proposal):**

Regional Campuses.

**Curriculum Services Information:**

<b>Approved by EPC:</b>	<b>Curriculum Bulletin:</b>
<b>Cross-list Banner Code:</b>	<b>OBR Course Level:</b>
<b>OBR Program Code:</b>	<b>OBR Subsidy Code:</b>
<b>CIP Code:</b>	<b>Term Start:</b>
	<b>Term End:</b>

**Comments (500 Character Maximum):**

NOTE: Please do not use the following restricted characters: (~ \* / \ --)

**Comments:**

Date	User	Comment
11/6/2018	Xiaoyu Zheng	
11/1/2018	Mary Ann Haley	Returning per your request.

**History:**

Date	User	Status
12/5/2018	Mary Ann Haley	Approved
11/6/2018	Andrew M. Tonge	Approved
11/6/2018	Xiaoyu Zheng	Submitted
11/1/2018	Mary Ann Haley	Returned For Edit
11/1/2018	Alison J Smith	Returned To Prior Approver
11/1/2018	Mary Ann Haley	Approved
10/30/2018	Andrew M. Tonge	Approved
10/30/2018	Xiaoyu Zheng	Submitted

## Kent Core Course Proposal Questionnaire

Please review the Kent Core Policy Statement before completing and submitting the questionnaire to the University Requirements Curriculum Committee accompanied by a Course Catalog Update workflow and typical course syllabus.

**Date:** November 6, 2018

**Department/School:** Mathematical Sciences

**Course ID:** 10675      **Credit Hours:** 5

**Course Title:** Algebra for Calculus Boost

**Prerequisite(s):** ACT Math score of at least 22; or SAT Math score of at least 530; or ALEKS Math score between 35 and 44; or minimum C grade in Math 00022.

**Select Kent Core Category:**

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> <b>Composition</b>                                   | <input type="checkbox"/> <b>Humanities and Fine Arts</b> | <input type="checkbox"/> <b>Social Sciences</b> |
| <input checked="" type="checkbox"/> <b>Mathematics and Critical Reasoning</b> | <input type="checkbox"/> <b>Humanities</b>               | <input type="checkbox"/> <b>Basic Sciences</b>  |
|   | <input type="checkbox"/> <b>Fine Arts</b>                | <input type="checkbox"/> <b>Additional</b>      |

1. **Explain how the course addresses (a) concepts central to the subject area and (b) the specific Kent Core learning goals listed in the *University Catalog* ([www.kent.edu/catalog/kent-core](http://www.kent.edu/catalog/kent-core))**
  - a. **Acquire critical thinking and problem-solving skills.**  
One primary objective of this course is problem solving.
  - b. **Apply principles of effective written and oral communications.**  
Students will work in small groups and explain their work to their peers, then explain to the entire class as well.
  - c. **Broaden their imagination and develop their creativity.**  
This course will expand the way students perceive the importance and utility of quantitative reasoning in situations that are of relevance to their future careers.
  - d. **Cultivate their natural curiosity and begin a lifelong pursuit of knowledge.**  
Success and positive experiences in this course will help break down the notion that mathematical sciences are not accessible or useful to the average person in everyday situations. The entire course introduces mathematics in practical situations. Thus, students can better relate the mathematics learned to similar real-world situations. This will lead students to expand the domains where they feel confident to pursue their natural curiosity and develop their knowledge.
  - e. **Develop competencies and values vital to responsible uses of information and technology.**

Familiarity with number facts is critical for understanding information in the modern world.

- f. Engage in independent thinking, develop their own voice and vision and become informed, responsible citizens.**

The course takes a reasoning and sense-making approach to mathematics and de-emphasizes memorization and blind adherence to rules and procedures. Since reasoning is emphasized, students learn to depend upon themselves to critique quantitative situations and critically evaluate information given.

- g. Improve their understanding of issues and behaviors concerning inclusion, community and tolerance.**

Not routinely covered in this course.

- h. Increase their awareness of ethical implications of their own and others' actions.**

Not routinely covered in this course.

- i. Integrate their major studies into the broader context of a liberal education.**

The use of algebra to model various situations arises in a number of contexts.

- j. Strengthen quantitative reasoning skills.**

This is a primary goal of the course.

- k. Understand basic concepts of the academic disciplines.**

The use of algebra to model various situations arises in a number of contexts.

- 2. If this course is being proposed for the Composition category or the Mathematics and Critical Reasoning category, indicate the essential skills that the course is intended to teach, sharpen or strengthen. (Skip this question if the proposed course is intended for other categories.)**

This course will prepare students who are planning to take trigonometry or calculus with necessary algebra background, focusing on the understanding and sense-making needed to be successful in trigonometry or calculus.

- 3. State how the course is representative of a field that has attained maturity and substance with critical mass of its own scholarly literature, methodology, community of specialists and conceptual framework.**

Algebra has its roots in antiquity. Algebra as a separate discipline emerged in the 16<sup>th</sup> century, and has been an object of research and study continuously since then.

- 4. Are adequate resources available for this course (e.g., faculty, classroom space, equipment, library holdings)? If yes, explain.**

Yes. Enrollments for MATH 10773 and MATH 10774 will decline as enrollments for this course increases.

- 5. Has this course been offered previously?**

Yes. Currently being offered as a pilot MATH 10775 + MATH 00095.

**6. Given the available Kent Core course options, why is it important that this course be added as an option for students in fulfilling their Kent Core?**

MATH 10675 builds from a lower pre-requisite level but achieves the same ultimate learning outcomes as MATH 10775, Algebra for Calculus Plus and MATH 11010, Algebra for Calculus, which fulfill the Kent Core. Creation of MATH 10675 aligns with the Ohio Math Initiative's Math Pathways focus on establishing co-requisite courses offering variable entry points for math gateway courses. Co-requisite courses are designed to increase student success and accelerate student progress toward graduation by moving students out of math remediation as much as possible. Instead taking an extra semester of math remediation, students are placed directly into college level "co-requisite" courses incorporating extra support. This approach provides students with a shortened one or two semester pathway to completion of their mathematics requirement, aligned to the needs of their majors. Institutions in many states have deployed co-requisite courses and have achieved very significant gains in student success in their math courses, in completion of math gateway courses, and in acceleration toward graduation. MATH 10675 is a co-requisite course achieving the same learning outcomes as MATH 10775 and MATH 11010, but open to many more students who are not adequately prepared for MATH 10775. MATH 10675 provides additional background and extra time to help such students be successful. Students may not receive credit for this course if they already earned credit for MATH 11010 or MATH 10775.

**7. Please complete and attach the Kent Core Learning Outcomes Assessment Plan, and attach a sample syllabus.**

## Kent Core Learning Outcomes Assessment Plan

MATH  
10

Course number, title (credit hours): MATH 11010 Algebra for Calculus (3) and MATH 10775 Algebra for Calculus (4) and MATH 10675 Algebra for Calculus Boost (5)

Department/School: Mathematical Sciences

Proposed Kent Core Category:  Composition  Mathematics and Critical Reasoning  
 Humanities and Fine Arts  Humanities  Fine Arts  Social Sciences  Basic Sciences  Additional

*A sample syllabus must accompany the plan.*

I. Kent Core learning objectives	II. Ohio Transfer Module learning objectives	III. What corresponding learning outcomes are included in this course?	IV. What method(s) will be used to assess student learning?	V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course?
<p>Acquire critical thinking and problem solving skills</p>	<p>Analyze functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). In addition to showing procedural fluency, the student can articulate reasons for choosing a particular process, recognize function families and anticipate behavior, and explain the implementation of a process</p>	<p>Analyze functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). In addition to showing procedural fluency, the student can articulate reasons for choosing a particular process, recognize function families and anticipate behavior, and explain the implementation of a process.</p>	<p>Homework assignments; Performance on in-class activities; Quizzes and exams; Common set of 10 – 15 questions administered as part of the final exam assessing student mastery of key concepts.</p>	<p>Overall student grades will be monitored to track student performance in the course. We will report percentages of students mastering course material in general, i.e. the overall percentage of students scoring 73% or higher on the exam. In addition, we will report mastery of individual learning outcomes based on final exam items.</p>
<p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p>	<p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p>	<p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p>	<p>Kent campus sections will administer the Pre-Calculus Concept assessment, a validated instrument to assess student readiness for Calculus. We will administer this as a pre- and post-test to assess growth of student learning.</p>	<p>Kent campus sections will administer the Pre-Calculus Concept assessment, a validated instrument to assess student readiness for Calculus. We will administer this as a pre- and post-test to assess growth of student learning and report average growth scores.</p>
<p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p>	<p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p>	<p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p>	<p>Purposefully create equivalencies and indicate when they are valid.</p>	<p>Purposefully create equivalencies and indicate when they are valid.</p>

I. Kent Core learning objectives	II. Ohio Transfer Module learning objectives	III. What corresponding learning outcomes are included in this course?	IV. What method(s) will be used to assess student learning?	V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course?
<p>Apply principles of effective written and oral communication</p> <p>Broaden their imagination and develop their creativity</p>	<p>Recognize opportunities to create equivalencies in order to simplify workflow.</p> <p>Determine parameters of a model given the form of the model and data.</p> <p>Determine a reasonable applied domain for the model as well as articulate the limitations of the model.</p> <p>Anticipate the output from a graphing utility and make adjustments, as needed, in order to efficiently use the technology to solve a problem.</p> <p>Use technology to verify solutions to equations and inequalities which are difficult to obtain algebraically and know the difference between approximate and exact solutions.</p> <p>Use technology and algebra in concert to locate and identify exact solutions.</p> <p>Recognize when a result is applicable and use the result to make sound logical conclusions and provide counter-examples to conjectures.</p>	<p>Recognize opportunities to create equivalencies in order to simplify workflow.</p> <p>Determine parameters of a model given the form of the model and data.</p> <p>Determine a reasonable applied domain for the model as well as articulate the limitations of the model.</p> <p>Anticipate the output from a graphing utility and make adjustments, as needed, in order to efficiently use the technology to solve a problem.</p> <p>Use technology to verify solutions to equations and inequalities which are difficult to obtain algebraically and know the difference between approximate and exact solutions.</p> <p>Use technology and algebra in concert to locate and identify exact solutions.</p> <p>Recognize when a result is applicable and use the result to make sound logical conclusions and provide counter-examples to conjectures.</p>		

MAT1



I. Kent Core learning objectives	II. Ohio Transfer Module learning objectives	III. What corresponding learning outcomes are included in this course?	IV. What method(s) will be used to assess student learning?	V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course?
Cultivate their natural curiosity and begin a lifelong pursuit of knowledge				
Develop competencies and values vital to responsible uses of information and technology				
Engage in independent thinking, develop their own voice and vision, and become informed, responsible citizens				
Improve their understanding of issues and behaviors concerning inclusion, community and tolerance				
Increase their awareness of ethical implications of their own and others' actions				
Integrate their major studies into the broader context of a liberal education				
Strengthen quantitative reasoning skills		Review intermediate algebra skills necessary to succeed in the course	Students will take a mastery 20-question Gateway Exam on intermediate algebra skills. No partial credit is given on the exam. Students who score 17 or better will earn 100 points. Students who take the exam at least three times and still do not earn a grade of 17 or	Overall student grades will be monitored to track student performance in the course. We will report percentages of students mastering course material in general, i.e. the overall percentage of students scoring 73% or higher on the exam. In

MAT 12

I. Kent Core learning objectives	II. Ohio Transfer Module learning objectives	III. What corresponding learning outcomes are included in this course?	IV. What method(s) will be used to assess student learning?	V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course?
	<p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p> <p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p> <p>Purposefully create equivalencies and indicate when they are valid.</p> <p>Recognize opportunities to create equivalencies in order to simplify workflow.</p> <p>Interpret the function correspondence and behavior of a given model in terms of the context of the model.</p> <p>Create linear models from data and interpret slope as rate of change.</p> <p>Determine parameters of a model given the form of the model and data.</p> <p>Determine a reasonable applied domain for the model as well as articulate the limitations of the model.</p> <p>Recognize when a result is applicable</p>	<p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p> <p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p> <p>Purposefully create equivalencies and indicate when they are valid.</p> <p>Recognize opportunities to create equivalencies in order to simplify workflow.</p> <p>Interpret the function correspondence and behavior of a given model in terms of the context of the model.</p> <p>Create linear models from data and interpret slope as rate of change.</p> <p>Determine parameters of a model given the form of the model and data.</p> <p>Determine a reasonable applied domain for the model as well as articulate the limitations of the model.</p> <p>Recognize when a result is applicable</p>	<p>higher will earn a percent score, based on the number correct.</p> <p>Homework assignments;</p> <p>Performance on in-class activities;</p> <p>Quizzes and exams;</p> <p>Common set of 10 – 15 questions administered as part of the final exam assessing student mastery of key concepts.</p>	<p>addition, we will report mastery of individual learning outcomes based on final exam items.</p>

MAT 13

I. Kent Core Learning objectives	II. Ohio Transfer Module learning objectives	III. What corresponding learning outcomes are included in this course?	IV. What method(s) will be used to assess student learning?	V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course?
<p>Understand basic concepts of the academic discipline</p>	<p>Analyze functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). In addition to showing procedural fluency, the student can articulate reasons for choosing a particular process, recognize function families and anticipate behavior, and explain the implementation of a process</p> <p>Convert between different representations of a function. Perform operations with functions including addition, subtraction, multiplication, division, composition, and inversion.</p> <p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p> <p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p> <p>Use correct, consistent, and coherent notation throughout the solution process</p>	<p>Analyze functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). In addition to showing procedural fluency, the student can articulate reasons for choosing a particular process, recognize function families and anticipate behavior, and explain the implementation of a process</p> <p>Convert between different representations of a function. Perform operations with functions including addition, subtraction, multiplication, division, composition, and inversion.</p> <p>Recognize function families as they appear in equations and inequalities and choose an appropriate solution methodology for a particular equation or inequality and can communicate reasons for that choice.</p> <p>Demonstrate an understanding of the correspondence between the solution to an equation, the zero of a function, and the point of intersection of two curves.</p> <p>Use correct, consistent, and coherent notation throughout the solution process</p>	<p>Homework assignments; Performance on in-class activities; Quizzes and exams; Common set of 10 – 15 questions administered as part of the final exam assessing student mastery of key concepts.</p> <p>Kent campus sections will administer the Pre-Calculus Concept assessment, a validated instrument to assess student readiness for Calculus. We will administer this as a pre- and post-test to assess growth of student learning.</p>	<p>Overall student grades will be monitored to track student performance in the course.</p> <p>We will report percentages of students mastering course material in general, i.e. the overall percentage of students scoring 73% or higher on the exam. In addition, we will report mastery of individual learning outcomes based on final exam items.</p> <p>Kent campus sections will administer the Pre-Calculus Concept assessment, a validated instrument to assess student readiness for Calculus. We will administer this as a pre- and post-test to assess growth of student learning and report average growth scores.</p>

MATH 14

I. Kent Core learning objectives	II. Ohio Transfer Module learning objectives	III. What corresponding learning outcomes are included in this course?	IV. What method(s) will be used to assess student learning?	V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course?
	to a given equation or inequality. Distinguish between exact and approximate solutions and which methods results in which kind of solutions. Solve for one variable in terms of another. Solve systems of equations using substitution or elimination.	to a given equation or inequality. Distinguish between exact and approximate solutions and which methods results in which kind of solutions. Solve for one variable in terms of another. Solve systems of equations using substitution or elimination.		

MATH 15

Please note:

We will use the final exam to assess strengths and weakness in our students and analyze causes of the weakness and adjust course materials, delivery, or assignments as deemed appropriate.  
A separate entity, perhaps a subcommittee of the USC, will collect, compile, and analyze the data, returning it to course coordinators and the chair of the USC. Data will be requested during final exam week and the compilation will be completed before the first week of the subsequent semester.

**ASSURANCES:**

By submitting this proposal, we assure that:

1. The faculty members who teach this course have agreed to the learning outcomes and assessment methods.
2. Assessment results will be reviewed annually by the faculty and submitted to the University Requirements Curriculum Committee.
3. Modifications to the course and/or assessment plan will be based on the annual review.

*AM Terry*

11-03-18

Department Chair/School Director (or designee) Signature

Date

## SYLLABUS

### MATH 10675- Algebra for Calculus Boost

**Catalog Description:** (Learning Outcomes equivalent to MATH 10775 and MATH 11010)  
Algebra for Calculus includes an extensive and rich immersion into the structure of functions. Routine analysis includes discussion of domain, range, zeros, general function behavior (increasing, decreasing, extrema, etc.). Operations with functions including addition, subtraction, multiplication, division, composition, and inversion. Functions are studied as a tool to analyze rates of change in real-world scenarios. The emphasis is on linear, polynomial, exponential, and rational functions, with an extensive problem-solving component. A two-week review of intermediate algebra skills is included in the course, as is extra time studying quadratic functions, absolute value functions, systems of equations, and extended time on logarithms. No credit earned for this course if a student already earned credit for MATH 12001 or Math 10775 or Math 11010.

**Prerequisite:** ACT Math score of at least 22; or SAT Math score of at least 530; or ALEKS Math score between 35 and 44; or minimum C grade in Math 00022.

**Text:** Carlon, M., Oerhrtman, M., & Kevin Moore. (2018). *PreCalculus: Pathways to Calculus, A Problem-Solving Approach*. Plymouth, MI: Hayden-McNeil, Macmillan Learning.

75 days

#### Review of Intermediate Algebra Skills – 9 days

- Integer and rational exponents
- Polynomial operations
- Factoring
- Rational expressions
- Complex rational expressions

#### Reasoning about and representing quantitative relationships - 11 days

- Quantities and co-variation of quantities
- Change in quantities, constant rate of change
- Linear relationships
- Proportionality
- Average rate of change
- Distance formula and circles
- Absolute Value

**Formalizing relationships between quantities: Functions – 9 days**

- Modeling relationships with functions
- Domains of functions
- Function notation – use and interpretation using tabular, symbolic, and graphical approaches
- Composition of functions
- Inverses of functions
- Difference quotients

**Exponential and logarithmic functions – 12 days**

- Percent change
- Comparing linear and exponential behavior
- One-unit growth and decay factors, initial values
- Partial and n-unit growth and decay factors
- Compound interest
- The number  $e$  and continuous growth and decay
- Logarithmic functions – the inverse of exponentials
- Graphing exponential functions
- Solving exponential and logarithmic equations

**Systems of Equations – 2 days**

- Modeling with systems of linear equations
- Solving systems of 2 linear equations: graphical, substitution, and elimination methods

**Polynomial and Power Functions – 11 days**

- Changing rates of change and concavity
- Transformations of polynomial functions
- Quadratic functions – finding roots and max/mins, both in context and skill/drill practice
- Roots and end behavior of polynomial functions
  - Review of division of polynomials
  - Hand graph polynomial functions
- Solving polynomial inequalities

**Rational Functions and an introduction to limit - 8 days**

- Domains of rational functions
- Vertical asymptotes
- End behavior of rational function and horizontal asymptotes
- Graphing rational functions and introducing limits

62 class lessons  
Pre and Post (Pre-Calculus Concept) Assessment – 2 days  
Gateway exam – 1 day  
Unit exams – 4 days  
Review for final exam – 1 day  
Holidays – 5 days  
**TOTAL: 75 days**

**INSTRUCTOR:**

**OFFICE:**

**PHONE:**

**E-MAIL:**

**OFFICE HOURS**

Other times by appointment. The department offers special Pathways Tutoring times with Pathways instructors as tutors. Please see the tutoring schedule on Blackboard.

**COURSE GOALS:** The purpose of this course is to develop conceptual understanding and fluency with algebraic techniques necessary for success in Calculus. We will study the notions of rate of change, average rate of change, elementary functions and graphs, including polynomial, rational, exponential, and logarithmic functions. For more detailed learning outcomes, click [here](#).

**KENT CORE REQUIREMENT:** This course may be used to satisfy the Kent Core Requirement. The Kent Core is the foundation of the university's mission to prepare students to live in today's complex, global society. It broadens intellectual perspectives, fosters ethical and humanitarian values and prepares students for responsible citizenship and productive careers.

**COURSE PREREQUISITE:** You are expected to have successfully completed (with a grade of C or better) MATH 00022 here at Kent or have ALEKS math score between 35 and 44, or ACT Math score of at least 22, or SAT Math score of at least 530. If you do not satisfy these prerequisites, the Registrar may de-register you from this course.

**MATERIALS NEEDED:**

**TEXT:** Carlson, M., Oehrtman, M., Moore, K. (2016). *Pathways to Calculus, A Problem-Solving Approach. Student Workbook, 7<sup>th</sup> edition*. Published by Hayden-McNeil and available at the KSU bookstore for about \$95. With this workbook, you will have access to an online text and an online homework system. Be sure to purchase the correct package. Pages of the workbook will be checked and/or collected daily, so you need to bring the workbook with you to class EVERY CLASS DAY, beginning the first day of class. I don't believe this new 6th edition is available anywhere except at the bookstore. Please **don't** purchase an earlier edition if you find it online.

**CALCULATOR:** You need a **graphing calculator** for class activities and homework assignments. I will be using a TI\*83 plus or TI\*84 plus for in-class demonstrations and suggest you purchase one of these if you do not currently own a graphing calculator. Please bring the calculator to class **every day**.

**CLICKER:**

**ESSENTIAL WEBSITES:**

**BLACKBOARD:** We have a Blackboard site for this course, which you can enter via flashline. Click on the "Blackboard" icon in the upper right or click on the "Student Tools and Courses" tab, then "Blackboard Single Sign-on" in the upper left corner.

**RATIONAL REASONING:** Buying the workbook gives you access to the **online text** at the website <http://www.rationalreasoning.net>. The text includes videos to watch as part of the readings.

**IMATHAS homework site:** Homework will be completed on the software that accompanies the text. When you register on the Rational Reasoning site, you will automatically have an account created on IMathAS. There's a link to it on the Rational Reasoning site or you could go to it directly at <https://imathas.rationalreasoning.net>. Use the same login and password as you did for the Rational Reasoning site. Our course ID is \_\_\_\_\_ and the enrollment code is \_\_\_\_\_

**ATTENDANCE:** You are expected to attend every class session. If you miss a class due to unforeseen circumstances, it is your responsibility to obtain notes from another class member and complete assignments in a timely manner. Acceptable reasons for missing class include illness and injury (with documentation), disability-related concerns, military service, death in the immediate family, religious observance, academic field trips, and participation in an approved concert or athletic event. Absences for these reasons are considered "excused." Please notify me, in advance if at all possible, if you need to miss class. I do not allow make-ups on quizzes for unexcused absences.

**FLIPPED PEDAGOGY.** In this course we expect you to read and study the e-book and view videos BEFORE coming to each class. You will a "pre-class" assignment on IMathAS due at 8:00 PM THE EVENING BEFORE EVERY CLASS. Each of these assignments is worth 5 points. NO LATE PASSES are available with these pre-class assignments. Class time will be spent working on problems, experiments, and engaging activities either in a group or individually. We hope this course

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organization will help you “learn by doing” and develop a strong understanding of algebraic reasoning. In order to maximize your learning while working with your group, you need to:

- **Speak with Meaning**  
What you say should carry meaning *to others*. Reference quantities – NO pronouns. Explain and justify your approach.
- **Exhibit Intellectual Integrity**  
Base your conjecture on a logical foundation; don't pretend to understand when you don't.
- **Strive to Make Sense**  
Persist in making sense of your peer's thinking.
- **Respect the Learning Process of Others**  
Allow others the opportunity to think, reflect and construct. When assisting your peers, pose questions to help them construct meaning rather than show them how to get the answer.

**HOMEWORK:** You will complete regular homework assignments on IMathAS, the computer software that accompanies our text. You need to keep a notebook showing all work for these assignments and should schedule about 1½ hours daily to complete the work. You may work each problem as many times as you like. Online homework assignments are due at midnight the class day *after* they are assigned, but it is in your best interest to have them completed before the next class, so that you can ask questions about them. In addition to the daily homework assignments, you will have a weekly review assignment due every Sunday night at midnight. I will accept *no* late assignments once the exam has been given on the unit. Exceptions to these deadlines are: a) documented illness, b) death in the immediate family, or c) involvement in a university-sponsored event (sports team, choir, etc.). I will assign periodic paper and pencil homework.

**Late Passes on IMathAS.** I'm allowing each student 10 late passes on IMathAS. This means that you may submit an IMathAS assignment late without asking me for special permission. The trick is, though, that you must click on the “Use Late Pass” WITHIN 48 HOURS of the due date of an assignment. Once you have used your 10 late passes, that's it, unless of course there extenuating circumstances as mentioned in the ATTENDANCE paragraph above. Any late pass NOT USED will be worth a bonus point toward your homework total.

**PRE-CLASS ASSIGNMENTS:** You will a “pre-class” assignment on IMathAS due at 8:00 PM THE EVENING BEFORE EVERY CLASS. Each of these assignments is worth 5 points. NO LATE PASSES are permitted on these.

**QUIZZES:** You will have a paper and pencil quiz about once a week, except if an exam is scheduled that week. You need to be present the *entire class period* in order to earn your points for any in-class quiz. Some of the quizzes may be group quizzes.

**FINAL EXAM:** The final exam is a *block final*, which means all Algebra for Calculus PLUS BOOSTER classes take it at the same time. Please make a note NOW of the day and date: **from 3:15 – 5:30 p.m. in a room TBA.** The final is a cumulative exam.

**MAKE-UP EXAMS:** Given only under extraordinary circumstances with written verification of a university-accepted excuse (documented illness, death in immediate family, university-sponsored event). Please notify me IN ADVANCE, if possible, if an exam is to be missed.

GRADING:		Grading Scale		
Gateway Exam	100		A 93–100	A– 90–92
4 Unit Exams @ 100 points apiece	400	B+ 87–89	B 83–86	B– 80–82
Homework (Includes Pre-Class assignments)	100	C+ 77–79	C 73–76	C– 70–72
Quizzes @ 5 or 10 points apiece	75	D+ 67–69	D 60–66	F 0–59
Quiz on Mod 6	50			
Clicker questions	25			
Final Exam	250			
<b>Total Points Possible</b>	<b>1000</b>	There will be NO CURVE		

**In order to continue on to MATH 11012 (Intuitive Calculus) or MATH 11022 (Trigonometry), you need to earn a grade of C or better in this course.**

**CHEATING AND PLAGIARISM:** University policy 3342-3-01.8 deals with the problem of academic dishonesty, cheating, and plagiarism. None of these will be tolerated in this class. The sanctions provided in this policy

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**STUDENTS WITH DISABILITIES:** University policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Accessibility Services (contact 330-672-3391 or visit [www.kent.edu/sas](http://www.kent.edu/sas) for more information on registration procedures).

**CELL PHONES:** Out of courtesy to your classmates and to me, please turn your cell phones OFF during class and put them away. If you are expecting an emergency call, please set your phone to *vibrate*. If you have your cell/smart phone out during a quiz or exam, you will receive no credit for that quiz or exam.

**REGISTRATION REQUIREMENT:** The last day to add a full term class or change sections of a class is *midnight on* . The last day to drop any or all courses that meet the full semester before grade of "W" is assigned is midnight on . University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashFast) prior to the deadline indicated. Registration errors must be corrected prior to the deadline.

**WITHDRAWAL DEADLINE:** The official withdrawal deadline for this course is at midnight.

**COMMUNICATON:** Please check your university kent.edu email on a regular basis.