MATH-105: COLLEGE ALGEBRA

Effective Term
Fall 2026

BOT Approval Date
12/11/2025

Discipline
MATH - Mathematics

Course Number
105

Course Title
College Algebra

Short Title
College Algebra

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
4.00

Total Units
4.00

Hours

Lecture Contact Hours
64-72

Out of Class Hours Lecture
128-144

Total Contact Hours
64 - 72

Total Out of Class Hours
128 - 144

Total Student Learning Hours
192 - 216

Distance Education
Yes

Distance Education

Distance Education Type
Both Fully Online and Hybrid Online

Fully Online Delivery Requirements:
a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course
b. Any planned face-to-face meetings, such as an orientation or study session, must be optional

c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?

No

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

C-ID (Admin Only)

C-ID MATH 151

Catalog Description

This course covers graphing of polynomial, rational and transcendental functions and conic sections, solving of polynomial, rational, exponential and logarithmic equations and related applications, solving of systems of linear equations utilizing determinants, function theory including notation, combination and composition as well as existence and formulation of inverses, and sequences.

Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)
Appropriate Multiple Measures placement or completion of Intermediate Algebra meets the prerequisite for this course.

Codes

TOP Code (CB 03)

1701.00 - Mathematics, General

CIP Code

27.0101 - Mathematics, General.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications	And/Or
Mathematics (Masters Required)	End

GE Information

Check GE Types Requested

AA/AS G - Math Competency

Cal-GETC Areas

Approved Cal-GETC Area
AREA-2

Learning Objectives

Learning Objectives

Learning Objective
1. Analyze and investigate properties of functions;
2. Synthesize results from graphs and/or equations of functions;
3. Construct the graph of polynomial, rational, exponential, logarithmic, and piece-wise defined functions;
4. Apply transformations (vertical and horizontal shifts, stretches/shrinks and reflections) to the graph of functions;
5. Formulate the inverses of linear, quadratic (with restricted domain) and rational functions, verify they are inverses and recognize the relationship between exponential and logarithmic functions both algebraically and graphically;
6. Solve and apply rational, linear, polynomial, radical, absolute value, exponential, logarithmic and systems of equations;
7. Solve linear, nonlinear, absolute value and systems of inequalities;
8. Determine the formula and domain of a function which is a sum, difference, product, quotient and composition of two functions;
9. Apply techniques, including the Rational Root Theorem, to find all the zeros of polynomials and roots of equations;
10. Apply functions and other algebraic techniques to analyze real-world applications that are culturally relevant and explore diversity and inclusion;
11. Transform general equations of circles, parabolas, ellipses and hyperbolas into standard form and construct their graphs which may not be centered at the origin;
12. Utilize sigma notation to find the sum of the first n terms of an arithmetic or geometric sequence as well as infinite series.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will find the zeros of polynomial functions through synthetic division and factoring.
2. Students will analyze graphs to determine the domain, range, intercepts, and intervals where the function is increasing or decreasing.
3. Students will apply exponential functions to analyze growth or decay in real-world scenarios.

Content

Course Lecture Content

1. Basics of Functions
    a. History and evolution of algebra throughout time and various regions including contributions of mathematicians from underrepresented groups
    b. Functions and Function Notation
    c. Domain and Range
    d. Piece-wise Functions
    e. Rates of Change and Behavior of Graphs
        i. Rates of change in diverse real-world contexts such as comparing wage growth across occupations, changes in housing costs, or access to healthcare
    f. Composition of Functions
    g. Transformation of Functions
    h. Absolute Value Functions
    i. Inverse Functions
2. Polynomial and Rational Functions
    a. Quadratic Functions
    b. Power Functions and Polynomial Functions

   c. Graphs of Polynomial Functions
   d. Dividing Polynomials
   e. Zeros of Polynomial Functions
   f. Rational Functions
   g. Inverses and Radical Functions
   h. Quadratic and Rational Inequalities
3. Exponential and Logarithmic Functions
   a. Exponential Functions
   b. Graphs of Exponential Functions
   c. Logarithmic Functions
   d. Graphs of Logarithmic Functions
   e. Logarithmic Properties
   f. Exponential and Logarithmic Equations
   g. Exponential and Logarithmic Models
      i. Applications involving quantities that represent diverse populations
      ii. Applications of financial literacy
4. Systems of Equations
   a. Systems of Linear Equations: Two Variables
   b. Systems of Linear Equations: Three Variables
   c. Systems of Nonlinear Equations and Inequalities: Two Variables
5. Conic Sections
   a. Circles
   b. Ellipses
   c. Hyperbolas
   d. Parabolas
6. Sequences and Series
   a. Sequences and Their Notations
   b. Arithmetic Sequences
   c. Geometric Sequences
   d. Series and Their Notations

Methods of Instruction

Method

Discussion

Integration

Instructors will guide the class in the discussion of contributions of past mathematicians from a diverse set of backgrounds, specifically present day mathematicians and those from historically underrepresented groups.

DE Adaptations for MOI

Discussion may take place through the CMS features such as an asynchronous discussion board, group chat, and a virtual classroom/white board. Synchronous discussions can be done via accessible video conferencing tools.

Method

Activity

Integration

Students will work in groups of 3 to 4 people to use the Rational Zero Theorem to find all the zeros of a given polynomial, solve a linear system of three equations in three variables, or use sigma notation to find the sum of the first n terms of an arithmetic or geometric sequence.

DE Adaptations for MOI

Students will collaborate using the CMS discussion board, chat, or email. Additionally, synchronous group interactions will take place via accessible video conferencing tools.

Method

Lecture

Integration

Instructors will lecture to present algebraic terminology and demonstrate how to solve absolute value, quadratic, and rational inequalities as well as polynomial, exponential and logarithmic equations.

DE Adaptations for MOI

Lecture will be delivered using an accessible written or video format. Demonstration of theory, concepts, definitions and example problems will be presented by the instructor in the CMS using course pages and/or synchronously using video conferencing tools.

Method

Observation and Demonstration

Integration

During class, technology will be used to construct the graph of polynomial, rational, exponential, logarithmic, and piece-wise defined functions along with translations, reflections and stretches of these graphs and transform general equations of circles, parabolas, ellipses and hyperbolas into standard form and construct their graphs.

DE Adaptations for MOI

The demonstrations will be delivered within the CMS by embedding applets, providing links to online resources, sharing recorded video or slide presentation. All material will meet accessibility requirements.

Methods of Evaluation

Method

Class Participation

Integration

Class participation in the form of group discussions or in-class work may be used by the instructor to evaluate students comprehension of the material. For example, students will be given a prompt that encourages them to use exponential functions to model diverse real-world applications such as wage growth across occupations, changes in housing costs, or access to healthcare. Participation will be graded based on demonstration of understanding shown by the students.

DE Adaptations for MOE

Class participation is tracked through the CMS by submissions of assignments and/or posting on discussion boards. Feedback may be provided either through comments or within an accompanying rubric in a timely manner.

Method

Exams/Tests

Integration

Interim and a comprehensive final exams may be used to determine if a student successfully acquired skills, such as finding the zeros of a given polynomial and solving exponential growth and decay applications. Exams will be graded on accuracy, completeness, mathematical correctness, and demonstration of understanding through work done to solve the problems posed.

DE Adaptations for MOE

Tests will be assigned, submitted, and graded through the course management system (CMS). For example, a link to accessible third-party publisher content may be provided or the entire test can be embedded on CMS. Feedback can be delivered using the comments or within an accompanying rubric in a timely manner. The instructions and the tests will meet accessibility requirements. Instructors may consider using online and real-time proctoring services approved by the college.

Method

Projects

Integration

The instructor may use a group or individual project(s) to provide targeted feedback to enhance the students' understanding of learning objectives. For example, an instructor may ask students to explore the way that interest compounds when taking out a loan or making an investment. Projects will be evaluated in a timely manner based on both correctness and completeness.

DE Adaptations for MOE

Group or individual projects will be assigned and submitted through the CMS. Students can communicate with peers and the instructor through the discussion boards and inbox. Students may be required to present their results through the creation of a slide presentation, a written report, or a prerecorded video and the presentations may then be made available to the entire class through the CMS. Feedback may be provided either through comments or within an accompanying rubric in a timely manner.

Method

Homework

Integration

Homework will be assigned allowing students to develop skills necessary for success in the course, such as how to accurately determine the formula of a sum, difference, product, quotient and composition of two functions and find the domain of those functions. Homework will be evaluated on accuracy and completeness.

DE Adaptations for MOE

Homework will be assigned, submitted, and graded through the course management system. For example, a link to accessible third-party publisher content may be provided or the entire assignment can be embedded on CMS. Feedback will be delivered within a timely manner using the comments or within an accompanying rubric. The instructions and the assignments will meet accessibility requirements.

Method

Quizzes

Integration

Frequent quizzes may be used to assess the students' skill development throughout the course, such as their ability to accurately construct the graph of polynomial, rational, exponential, logarithmic, and piece-wise defined functions. Quizzes will be evaluated on accuracy, completeness, and correctness.

DE Adaptations for MOE

Quizzes will be assigned, submitted, and graded through the CMS. For example, a link to accessible third-party publisher content may be provided or the entire quiz can be embedded on CMS. Feedback can be delivered using comments or within an accompanying rubric in a timely manner. The instructions and the quizzes will meet accessibility requirements. Instructors may consider using online and real-time proctoring services approved by the college.

Assignments

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

The purpose of this assignment is to become familiar with a diverse group of people who have achieved success in math by overcoming struggles related to their identity or background by reading excerpts from the book "Living Proof: Stories of Resilience Along the Mathematical Journey."

Select any one of the short stories to read in Part 2 of Living Proof: Stories of Resilience Along the Mathematical Journey; these are stories 12-23 under the section "Who Are These People? Do I Even Belong?" After reading a story of resilience, post:

1. Which story you read,
2. A brief summary of the story for those who did not read the same one,
3. A take-away that you got from that particular story,
4. (Optional) Any ways that you can relate with the story you read or a personal story of resilience that you would be willing to share.

How assignment will be adapted in online format

This assignment can be delivered as a discussion board in the CMS where students post the requested reply and interact with one another. The feedback can be delivered using the comment section or within an accompanying rubric in a timely manner. The instructions and the assignment will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

In-class

Formative or Summative

Summative

Assignment

Complete the following quiz:

1. Find the composition f(g(x)), given f(x)= 3/(x+1) and g(x)=(2x+1)/(x-5)
2. Find the zeros of the polynomial, f(x)= x^3-3x^2+3x-1.
3. Determine the sum of the given infinite geometric series: 1+1/2+1/4+...

How assignment will be adapted in online format

The quiz will be assigned, submitted, and graded through the CMS. For example, a link to accessible third-party publisher content may be provided or the entire assignment can be embedded on CMS or student may be allowed to submit a scan of their work. The feedback can be delivered using comments or within an accompanying rubric through the CMS in a timely manner. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Find the inverse of f(x)= (2x+1)/(3x-1). Include the domain and range of the inverse.

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system For example, a link to accessible third-party publisher content may be provided or the entire assignment can be embedded on CMS or student may be allowed to submit a scan of their work. The feedback can be delivered using the comment section or within an accompanying rubric in a timely manner. The instructions and the assignments will meet accessibility requirements.

Course Materials

Textbooks

Ron Larson (2026). College Algebra 12th edition. ISBN: 9798214407555

Open Educational Resources

Abraham, Jay (2025), College Algebra 2e. OpenStax. Web Version.

Class Size Information

Class Size

40

Class Size Category

A - Lecture/discussion 40

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Diversity has been infused into the learning objectives by having students apply algebraic techniques to analyze real-world applications that are culturally relevant. There are multiple infusions throughout the content by having students study the history and evolution of algebra throughout time and various regions including contributions of mathematicians from underrepresented groups. Moreover, students will be asked to explore rates of change in diverse real-world contexts such as comparing wage growth across occupations, changes in housing costs, or access to healthcare. The methods of evaluation will provide opportunities for students to explore applications of algebra to fields they are interested in and make connections to their own experiences and cultures. Assignments will include readings and discussions around the struggles and persistence of mathematicians from various backgrounds and underrepresented populations.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

A variety of assignments that explore the content through the lens of equity and diversity have been incorporated into the course. The instruction includes discussions like "Stories of Resilience" and activities that allow learners to explore the content from unique perspectives. The course includes various formats to serve a variety of learning styles; for example, graphing by transformations can be shown using online graphing tools in addition to formulaic techniques. The methods of evaluation allow for a variety of formative and summative assessments; for example, the curriculum includes new opportunities for group work and project-based learning to

explore exponential rates of change. Also, an OER textbook was included which promotes equity by significantly lowering the cost of taking the course and removing additional barriers for learners.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students will interact with one another in-person through group work and discussions that explore a variety of applications; for example, students will be asked to compare and contrast simple and compound interest. Online, students will interact through discussion boards in the CMS where they will discuss each week's content with one another; for example, students will work collaboratively as they explore zeros of polynomials.

Explain how the course will incorporate instructor-to-student interaction.

Instructors will introduce material to the students through in-person lecture or online video; for example instructors will lecture on compound interest and financial literacy. Instructors will also participate in discussions and online discussion boards; this will help to facilitate the more difficult discussions such as those around conic sections. Instructors will provide feedback on student work either directly on the work or in the comments section online; for example, the instructor can point out where a student made an error when apply Descartes's and provide the correct formula.

Explain how the course will incorporate student-to-content interaction.

Students will interact with accessible materials such as the textbooks, written lecture materials or transcripts of lectures, illustrative images, charts and graphs, video or audio lectures. In-class exercises and/or at-home assignments will allow students to practice content material such as solving polynomial equations.

Explain how the course will incorporate student-to-self interaction (metacognitive).

This course incorporates metacognition by encouraging students to actively monitor and modify their thought processes. For example, after learning a variety of algebraic techniques like the solving various equations and inequalities, students can be asked to think about what strategies they are using in order to identify when the appropriate solution technique applies. In scenarios where more than one technique can be applied, like solving quadratic equations, students may be asked to compare methods and identify their preferred procedure.

Key: 2095