MATH 2412 - Pre-Calculus Math .401 Course Syllabus

Description
In-depth combined study of algebra, trigonometry and other topics for calculus readiness.
Prerequisites MATH 1314 or equivalent preparation

Semester Offered
Fall
Spring
Summer 2
Credits 4
Lecture Hours 3
Lab Hours 2
Extended Hours 0
Contact Hours 80
State Approval Code 27.0101.58 19
Instructor Name Chasity Klingler
Semester/Year Fall 2025

Meeting Time and Location
MATH 2412.401 Online—students are expected to spend at least 3-4 hours per week reading, reviewing, and participating in assigned activities for successful completion of this course.

Alternate Operations During Campus Closure

In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include, but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website (www.panola.edu) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Student Basic Needs

Unexpected circumstances may arise, but Panola College offers various resources to support students. If you need mental health services or are facing challenges with transportation, affording class materials and supplies, or accessing food regularly—issues that may impact your class performance—please visit panola.edu/resources.

Class Attendance

Regular and punctual attendance of classes and laboratories is required of all students. When a student has been ill or absent from class for approved extracurricular activities, he or she should be allowed, as far as possible, to make up for the missed work. If a student has not actively participated by the census date, they will be dropped by the instructor for non-attendance. This policy applies to courses that are in-person, online, hybrid, and hyflex.

Attendance in online courses is determined by submission of an assignment or participation in an activity. According to federal guidelines, simply logging into a distance learning course without participating in an

academic assignment does not constitute attendance. Distance learning is defined as when a majority (more than 50%) of instruction occurs when the instructor and students are in separate physical locations. Students must engage in an academic activity prior to the course census date.

When an instructor feels that a student has been absent to such a degree as to invalidate the learning experience, the instructor may recommend to the Vice President of Instruction that the student be withdrawn from the course. Instructors may seek to withdraw students for non-attendance after they have accumulated the following number of absences:

Fall or spring semesters:

3 or more class meeting times per week - 5 absences

2 class meeting times per week - 3 absences

1 class meeting per week - 2 absences

The student is responsible for seeing that he or she has been officially withdrawn from a class. A student who stops attendance in a class without officially withdrawing from that class will be given a failing grade; consequently, the student must follow official withdrawal procedures in the Admissions/Records Office.

Please note: Health Science and Cosmetology courses may require more stringent attendance policies based on their accreditation agencies. Please see the addendum and/or program handbook for further information concerning attendance.

Pregnant/Parenting Policy

Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in the Student Handbook or may request the form from the course instructor.

Artificial Intelligence (AI) Course Policy

There are situations throughout the course where you may be permitted to use artificial intelligence (AI) tools to aide in further understanding of mathematical concepts. However, AI tools may not be used for any graded assignments including but not limited to exams, quizzes, and projects. Use of any AI-generated content in this course without the instructor's consent qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

Instructional Goals and Purposes

The purpose of this course is to:

1. Apply coordinate geometry formulas.
2. Model application problems using functions.
3. Model and solve variation problems.
4. Perform transformations on functions.
5. Find real and complex zeros of polynomial functions.
6. Graph rational, exponential, and logarithmic functions.
7. Model and solve problems involving exponential and logarithmic functions.
8. Model and solve trigonometry problems involving both right triangles and oblique triangles.
9. Graph trigonometric functions and their inverses.
10. Solve trigonometric identities and trigonometric equations.
11. Write a sum or difference of fractional expressions as a single fraction.
12. Model and solve problems involving conic section formulas for a circle, parabola, ellipse, and hyperbola.
13. Graph polar and parametric equations.
14. Model and solve problems involving vectors.
15. Find limits of functions numerically, algebraically, and graphically.
16. Apply the definition of a derivative.

Learning Outcomes

After studying all materials and resources presented in the course, the student will be able to:

1. Improve problem-solving skills through solving application problems.
2. Demonstrate at the completion of the course the algebraic manipulation and problem solving skills necessary to be successful in future coursework.
3. Develop the vocabulary and methodology necessary for reading and understanding scientific and mathematical literature.
4. Construct appropriate mathematical models to solve applications.
5. Interpret and apply mathematical concepts.
6. Use multiple approaches - physical, symbolic, and verbal - to solve application problems. (Panola College – none in ACGM)

Course Content

Students in all sections of this course will learn the following content:

1. Simplify algebraic expressions, exponents and radicals.
2. Solve fractional equations and inequalities.
3. Model and solve problems involving linear equations.
4. Apply the formulas of coordinate geometry (distance, midpoint).
5. Write the equation of a circle given its center and radius.
6. Graph circles, linear functions, and inequalities.
7. Write equations of linear functions given slope, points, parallel and perpendicular lines.
8. Define a function, domain, and range.
9. Model and solve problems involving variation functions.
10. Find the average rate of change, increasing and decreasing intervals, and extreme values of functions.
11. Apply transformations to functions.
12. Model problems using functions.
13. Combine functions by adding, subtracting, multiplying, dividing, and composition.
14. Define one-to-one functions and find their inverses.
15. Define a polynomial function and sketch its graph using end behavior, zeros, local extrema, and test points.
16. Divide polynomials by using synthetic division.
17. Define and apply the remainder and the factor theorems.
18. Find the rational zeros of a polynomial by use of the rational zeros theorem, Descartes' rule of signs, and the upper/lower bound theorem.
19. Add, subtract, multiply, and divide complex numbers.
20. Find the complex roots of quadratic equations.
21. Apply the Fundamental Theorem of Algebra and the Complete Factorization Theorem to find the complex roots of a polynomial function.
22. Write a polynomial function give its complex and real roots.
23. Find the vertical and horizontal asymptotes of a rational function.
24. Sketch the graph of a rational function.

EXPONENTIAL AND LOGARITHMIC FUNCTIONS

25. Sketch the graph of an exponential and logarithmic function and find the domain and range.
26. Model and solve problems involving compound interest.
27. Define the natural logarithm and its properties.
28. Apply the Laws of Logarithms to simplify and solve logarithmic equations.
29. Solve exponential equations.
30. Model and solve problems involving exponential and logarithmic functions.

TRIGONOMETRICFUNCTIONS

31. Define the unit circle and use reference numbers to find terminal points.
32. Define the trigonometric functions, their even-odd properties, their signs in different quadrants have and the domains and ranges of each.
33. Sketch the graphs of the trigonometric functions.
34. Find the period and amplitude of trigonometric functions.
35. Graph transformations of the trigonometric functions.

36. Convert between radians and degrees.
37. Model and solve problems involving the formulas for length of a circular arc, area of a sector of a circle, and linear and angular speed.
38. Model and solve problems involving trigonometry of right triangles.
39. Use reference numbers on the unit circle or reference triangles to evaluate trigonometric functions.
40. Apply the Law of Sines and the Law of Cosines to solve oblique triangle problems.
41. Prove Trigonometric Identities.
42. Apply the Addition and Subtraction Formulas to problems and identities.
43. Apply the Sum of Sines and Cosines Formulas.
44. Apply the Double-Angle and Half-Angle Formulas to problems and identities.
45. Apply the Product-to-Sum and Sum-to-Product Formulas.
46. Define and sketch the inverse trigonometric functions.
47. Solve trigonometric equations involving single and multiple angles.

VECTORS

48. Understand the geometric and the analytic description of vectors.
49. Find the magnitude, horizontal and vertical components of a vector.
50. Find the resultant force of two or more vectors.
51. Apply vectors to model and solve problems involving velocity and force.
52. Find the dot product of two vectors and use it to find the angle between the two vectors.
53. Find the component vector of u along v.
54. Find the projection of u onto v.
55. Apply vectors to solve problems involving work.

LIMITS

56. Find the limit of a function numerically, algebraically, and graphically.
57. Define a one-sided limit
58. Write the definition of a limit.
59. Apply the Limit Laws.
60. Find and prove limits by applying right- and left-hand limits.
61. Write the definition of a derivative.
62. Find the equation of a line tangent to a curve at a given point.
63. Find the instantaneous velocity of a falling object.
64. Find the limit of a function at infinity.
65. Find the horizontal asymptote of a rational function by applying limits at infinity.
66. Approximate the area under a curve.
67. Find the exact area under a curve using limits.

Methods of Instruction/Course Format/Delivery

Methods of Instruction/Course Format/Delivery: Methods employed will include Lecture/demonstration have discussion, problem solving, analysis, and reading assignments. Homework will be assigned. Faculty may choose from, but are not limited to, the following methods of instruction:

1. Lecture
2. Discussion
3. Internet
4. Video
5. Television
6. Demonstrations
7. Field trips
8. Collaboration
9. Readings

Major Assignments/Assessments

The following items are assigned and assessed during the semester and used to calculate the student's final grade.

Assignments

Assignments

Faculty may assign both in- and out-of-class activities to evaluate students' knowledge and abilities. Faculty may choose from – but are not limited to -- the following methods: attendance, class preparedness and participation, collaborative learning projects, exams/tests/quizzes, homework, internet, library assignments, readings, research papers, scientific observations, student-teacher conferences, and written assignments.

The Mathematics Department does not accept late work.

Course Grade

Assignment Weights

- Daily Grades 25%
- Major Exams 50%
- Comprehensive Final Exam 25%

Letter Grades for the Course will be assigned as follows:

A: 90 < Average < 100

B: 80 < Average < 90

C: 70 < Average < 80

D: 60 < Average < 70

F: 00 < Average < 60

Texts Materials, and Supplies

- Textbook: PreCalculus (Lippman/Rasmussen) 2nd Edition (No Purchase Necessary)
- Lumen OHM (No Purchase Necessary)
- Canvas Access

Addendum

Each student will adhere to the instructor's course handout presented in the Canvas Course. See link for details.

Link to Class Handout

Other

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings: https://www.panolacollegestore.com.
- For testing services, use the following link: https://www.panola.edu/student-services/studentsupport/academic-testing-center.
- The Accommodations & Disability Support (A&DS) Office at Panola College provides and facilitates support services and accommodations for students with disabilities. The A&DS office works under the federal guidelines included in Section 503 of the Rehabilitation Act of 1973 and the American with Disabilities Act. Please contact the Accommodations & Disability Support (A&DS) Office located in the Charles C. Matthews Student Center or go to https://www.panola.edu/disabilitysupport for more information.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook: https://www.panola.edu/ (located on at the bottom under student)