



## Math 124 – College Algebra (4 credits)

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Office location: Ross 2210C (2<sup>nd</sup> floor south side of Ross Hall)

Student (office) hours: will be posted on Canvas/announcement

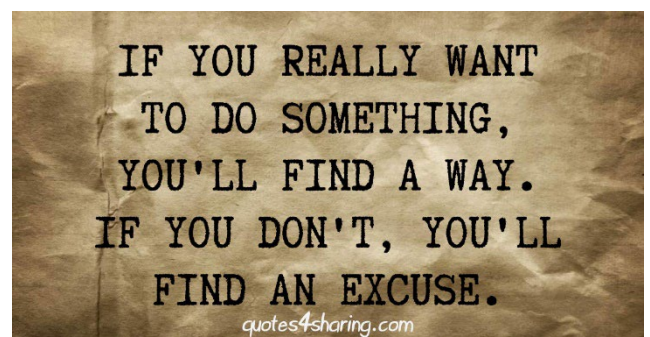
Math study center: (located in Ross 1250)

### Welcome to College Algebra!

Congratulations! You made it to college! That, in and of itself, is a great accomplishment. For many people, graduating from college is a life-long dream. On record, the oldest person to graduate from college is Leo Plass at 99 years old. **Artie Mae Grisby** was the oldest student I ever taught. In 2013, Artie Mae earned her bachelor's degree in Early Childhood Education from UNC at 79 years young.



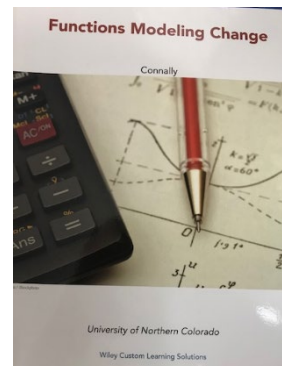
**Deciding to attend college is a big decision. Take a moment to write down your reasons for wanting to attend College.**



	Attendance and Participation (5%)	Online Homework- WileyPlus (10%)	Progress Checks (5%)	Project (10%)	3 tests (48%-3@16% each)	Final exam (22%)
How will I be graded?	Attendance and participation is expected. When you are constantly involved with the material, you are more likely to remember a greater portion of the information. If you do miss a class, you are still responsible for the material.	We use online homework so you can have <u>immediate</u> feedback. The online homework is a learning environment that encourages exploratory thought, views mistakes as stepping stones in the learning process, and is low stakes risk. WileyPlus homework is typically due on Mondays.	Progress Checks are essentially take home quizzes. It is a chance for you to work on a few problems and receive feedback	The project is an opportunity for you to explore one topic from this course and understand the topic from a different perspective.	Each test is an opportunity to show us what you know and understand.	The final exam is an opportunity to show us what you know and understand.
What can I do to improve my grade?	Two absences are allowed with no effect to your grade. These absences should be used for funerals, weddings, doctor appointments, etc.	<p>If you are struggling with the homework, visit the Math lab, the tutoring center or the instructor during their student (office) hours. Please bring your previous attempts at solving the problem because the best way for us to help you is to see your error.</p> <p>There will be opportunities for you to earn bonus WileyPlus points by completing other tasks for the course: (1) you can earn points by responding to questions posed on GroupMe. (2) You can also earn points by turning in a progress check that earns a perfect score and was turned in when due.</p>	Progress checks are due the next class period and graded using a mastery system. If you did not earn full points, you have the opportunity to fix your mistake until you have mastered the problem. You can redo the progress checks as often as needed up until the test for that chapter.	You will be provided with a rubric, which will indicate how you can improve your score.	If your final exam percentage is higher than any one of the unit test percentages, your final exam percentage will replace the unit test percentage.	

### Materials you will need for the course:

- Connally, Hughes-Hallett, Gleason, et al. (2015) *Functions Modeling Change: A Preparation for Calculus*, 5<sup>th</sup> edition, Wiley plus access code to WileyPlus
- Graphing Calculator- acceptable models include TI-83, TI-83+, TI-84, TI-84+.
  - Sharing of calculators during exams will not be permitted.
- Binder



## Course Evaluation

### Grading Scale

A	90-100%
B	80-89.9%
C	70-79.9%
D	60-69.9%
F	< 60%

### Grading Allotments are listed in the table above

- You will not be allowed to make up a missed test unless you have a university authorized absence.
- There are three unit tests. We will follow the tentative outline/pacing guide and the tests will be given when we are finished with the appropriate chapters.
- The final exam will be given during the final exam week. If your final exam percentage is higher than any one of the unit test percentages, your final exam percentage will replace the unit test percentage.
- The final exam for this course is scheduled via the University final exam schedule. In the unlikely event that the university closes during that time, the final exam will move to a new date and time which will be clearly posted on Canvas/announcements. Any student who is unable to attend the make-up exam time must contact me as soon as possible to make alternative arrangements. Alternatively, final grades will be calculated based on the work you have completed prior to the final exam.
- Attendance is expected. You are allowed two absences with no effect on your grade.

## Course Overview

The purpose of this course is to provide students with a solid understanding of functions in mathematics as well as real-world contexts. This includes the development of both conceptual understanding and procedural fluency.

This class is based on the belief that everyone has the capability to learn math. With this in mind, the class has the following rules.

- » Treat our time with respect. We have short amount of time together, so be ready to learn when class starts. This means come to class early to settle your mind for learning, put your cell phone away, and stay engaged until the class is finished.
- » Learning is a process. This class is set up so that you do smaller amounts of work over a greater number of days. An hour's worth of learning done over five days will provide more benefit than five hours of work done on a single day. It is my job to provide just the right amount of work and it is your job to do that work in a good faith way.

There are situations and contexts within this course where you will be asked to use AI tools to explore how they can be used. Outside of those circumstances, you are discouraged from using AI tools to generate content (text, video, audio, images) that will end up in any student work (assignments, activities, responses, etc) that is part of your evaluation in this course. Any student work submitted using AI tools should clearly indicate what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be generated by AI. If any part of this is confusing or uncertain, please reach out to me for a conversation before submitting your work.

## Course Objectives

**As a result of taking Math 124, students will be able to -**

- A. Describe what a function is and identify, compare, and understand the relationships between the major function families, especially linear, quadratic, exponential, logarithmic, polynomial, and rational functions and apply this knowledge in real-world contexts.
- B. Generate, interpret, and connect different function representations, especially tables, algebraic, graphs, and linguistic and apply this knowledge in real-world contexts.
- C. Define, identify, and describe characteristics of functions including: zeroes (x-intercepts), y-intercepts, increasing intervals, decreasing intervals, extrema, growth rates, end-behavior, concavity, domain, range, and asymptotes and apply this knowledge in real-world contexts.
- D. Perform operations on functions, interpret the results, and apply this knowledge in real-world contexts. Operations include: arithmetic operations, finding the inverse, composing functions, translating functions, evaluating functions, solving equations involving functional relationships.

**Prerequisites:** A satisfactory score on the math placement index and either two years of high school algebra with a grade of "C" or better (C- is not acceptable) or the equivalent.

**Description:** Topics covered in this course include linear, quadratic, exponential and logarithmic functions, matrices, theory of equations. (LAC, gtP)

## Guidelines for a successful semester:

Show up!

Keep up with the work!

Ask questions! Ultimately the responsibility for learning in the class resides on you. It is your responsibility to actively pursue the best educational environment that meets your individual needs. Everyone has a different background, you are the only one who knows what you do and do not know. You have many resources to help you fill in those gaps!

## Resources for Additional Help

The following resources can be used for homework help:

### Bio-Chem-Math Study Center

This lab, located in Ross 1250, offers homework help for a variety of mathematics courses. Tutors for math coursework will be available at most times between 9:00 a.m. and 5:00 p.m. on Monday, Tuesday, and Friday. The lab schedule is posted in the math office (Ross 2239) and on the door of the Study Center.



**UNC Tutoring Center** See <http://www.unco.edu/asa/tutoring/> for information.

### Pinterest

This is a social network in the form of an app and a website that allows users to link to websites via a picture. The purpose of this resource is to help students find websites that may help them learn/understand material covered in class. This is a new feature for College Algebra, so you can expect more websites as the semester progresses. To link to the college algebra pinterest boards, please follow: email: [angela.steele@unco.edu](mailto:angela.steele@unco.edu) OR username: angelasteel9879

## University Policy & Resources

### Portable Electronic Devices

Please extend courtesy to your instructor and fellow students by turning off your portable electronic devices such as: cell phones, pagers, and iPods. Although not an audio issue, text-messaging is a distraction to other students and prevents you from full participation in class. You should keep your portable electronic devices in your backpack or purse during class. Your personal electronic devices should not be on your desks. If you know that you may need to accept an emergency phone call during class or if you have children in childcare or school, please let the instructor know. If you need to take a phone call during class, please step out of the classroom while you complete your call. Thank you for your cooperation.

### Disability Resources

It is the policy and practice of the University of Northern Colorado to create inclusive learning environments. If there are aspects of the instruction or design of this course that present barriers to your inclusion or to an accurate assessment of your achievement (e.g. time-limited exams, inaccessible web content, use of videos without captions), please communicate this with your professor and contact Disability Resource Center (DRC) to request accommodations.

Phone: (970) 351-2289,

Location: Michener Library L-80.

Website to learn more <https://www.unco.edu/disability-resource-center/>

DRC will then notify me of needed accommodations, such as additional testing time, note taker, etc.

### **Food Insecurity and Basic Needs**

Research shows that college students experience food insecurity at higher rates than the American household rate, and that food insecurity can negatively impact academic performance and persistence. In recognition of this problem, UNC offers assistance to students facing food insecurity through an on-campus food pantry. The Bear Pantry is located in University Center 2166A, and is open for regular hours throughout the semester. Please visit [www.unco.edu/bear-pantry](http://www.unco.edu/bear-pantry) for more information.

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is also urged to contact Student Outreach and Support (SOS) for assistance. SOS can assist students during difficult circumstances which may include medical, mental health, personal or family crisis, illness or injury. SOS can be reached at [sos@unco.edu](mailto:sos@unco.edu) or via phone at 970-351-2796.

### **Academic Integrity**

You are expected to practice academic honesty in every aspect of this course. Students who engage in academic misconduct are subject to grading consequences with regard to this course and/or university disciplinary procedures through the Office of Community Standards and Conflict Resolution.

### **Title IX**

The University of Northern Colorado is committed to providing a safe learning environment for all students that is free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. UNC has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and more.

Please be aware all UNC faculty and most staff members are “responsible employees,” which means that if you tell a faculty member about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, they must share that information with the Title IX Coordinator, Larry Loftin. Larry or a trained staff member in the Office of Institutional Equity and Compliance (OIEC) will contact you to let you know about accommodations and support services at UNC as well as your options for pursuing a process to hold accountable the person who harmed you. You are not required to speak with OIEC staff regarding the incident; your participation in OIEC processes are entirely voluntary.

If you do not want the Title IX Coordinator notified, instead of disclosing this information to your instructor, you can speak confidentially with the following people on campus and in the community. They can connect you with support services and help explore your options now, or in the future.

- UNC’s Assault Survivors Advocacy Program (ASAP): 24 Hr. Hotline 970-35-4040 or [www.unco.edu/asap](http://www.unco.edu/asap)
- UNC Counseling Center: 970-351-2496 or [www.unco.edu/counseling](http://www.unco.edu/counseling)
- UNC Psychological Services: 970-351-1645 or [www.unco.edu/cebs/psych\\_clinic](http://www.unco.edu/cebs/psych_clinic)

If you are a survivor or someone concerned about a survivor, or if you would like to learn more about sexual misconduct or report an incident, please visit [www.unco.edu/sexual-misconduct](http://www.unco.edu/sexual-misconduct) or contact the Office of Institutional Equity and Compliance (970-351-4899). OIEC is located on the third floor of the University Center in room 3060.

### **Equity and Inclusion Statement**

The University of Northern Colorado embraces the diversity of students, faculty, and staff, honors the inherent dignity of each individual, and welcomes their unique perspectives, behaviors, and world views. In this course, people of all races, religions, national origins, sexual orientations, ethnicities, genders and gender identities, cognitive, physical, and behavioral abilities, socioeconomic backgrounds, regions, immigrant statuses, military or veteran statuses, size and/or shapes are strongly encouraged to share their rich array of perspectives and experiences. Course content and campus discussions will heighten your

awareness to each other's individual and intersecting identities. If you would like to report an incident or learn more about identity-based discrimination/harassment, please visit [www.unco.edu/institutional-equity-compliance](http://www.unco.edu/institutional-equity-compliance)

**Respect, inclusivity, and diversity:**

In my classroom, diversity and individual differences are respected, appreciated, and recognized as a source of strength. Students in this class are encouraged and expected to speak up and participate during class meetings, **and** to carefully and respectfully listen to each other. During the first few weeks of class, we'll work together to create a list of norms that will govern our interactions with each other.

So that everyone feels comfortable participating, every member of this class **must** show respect for every other member of this class. Otherwise, we won't learn anything from each other, and that would defeat the whole point of having a class (instead of just a book or something).

**Communication:**

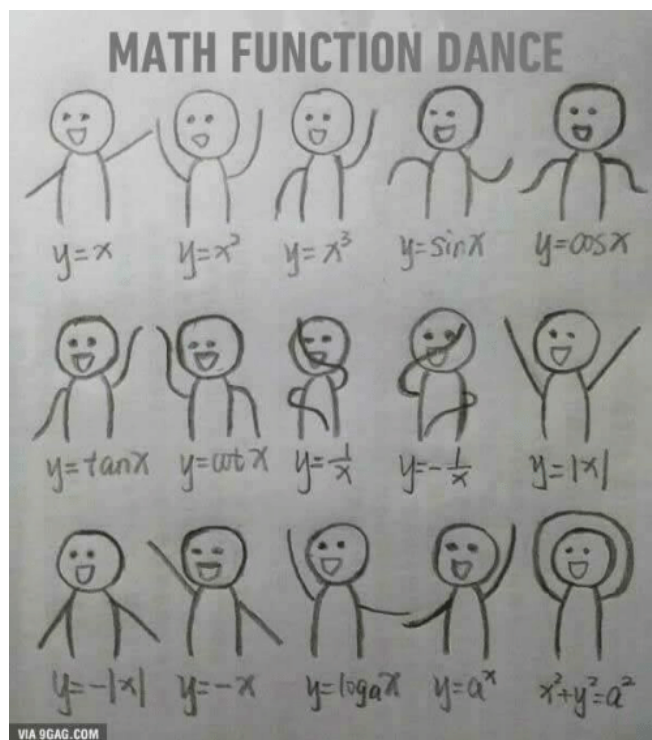
If you encounter any problems during the course that may impede your ability to complete the coursework or have any issue with a grade, please let me know ASAP. If after you have spoken to me you feel the problem is not resolved, you may contact the course coordinator, Angela Steele ([angela.steele@unco.edu](mailto:angela.steele@unco.edu)). She will further work to resolve the issue.

**Changes to the syllabus:**

I reserve the right to make modifications to this syllabus (most likely in ways that work in your favor). I will notify you in class of any major change.

## Course Outline

- 1) Functions (all semester, week 5-6)
  - a) Input and Output
  - b) Domain and Range
  - c) Function Notation
- 2) Linear Functions (week 1-2, 4)
  - a) Family of Linear functions
  - b) Rate of change
- 3) Exponential Functions (week 2-4)
  - a) Family of Exponential Functions
  - b) Comparing Exponential and Linear Functions
  - c) Applications of Compound Interest
  - d) The number  $e$
- 4) Logarithmic Functions (week 7-9)
  - a) Logarithms and their Properties
  - b) Logarithmic Functions and its Applications
- 5) Quadratic Functions (week 10)
  - a) Family of quadratic functions
  - b) Vertex of a parabola
- 6) Polynomial and Rational Functions (week 11-13)
  - a) Power Functions
  - b) Polynomial Functions
  - c) Short-run behavior of Polynomials
  - d) Rational Functions
  - e) Short-run behavior of Rational Functions
- 7) Transformations of functions (weeks 5, 14)
  - a) Shifts, Reflections and Symmetry
  - b) Vertical Stretches and Compressions
  - c) Horizontal Stretches
- 8) Composition, Inverse and Combinations of Functions (weeks 5, 15)



## Important Dates

- Last day to add classes: Friday, August 29, 2025
- Holiday: University closed: Monday, September 1, 2025
- Last day to drop classes: Monday, September 8, 2025
- Holiday: Nov 26-28, 2025
- Last day to withdraw from classes and receive a 'W': Friday, December 5, 2025
- Final Exam will be given during the University Scheduled time. (unco.edu; search final exam schedule) In the unlikely event that the university closes during that time, the final exam will move to Friday, again as outlined as part of the University Final exam schedule. Any student who is unable to attend the make-up exam time must contact me as soon as possible to make alternative arrangements.



## LAX1/ GtPathways Content and Competency Criteria

This

course is a part of the Liberal Arts Curriculum at UNC and fulfills 4 credit hours of the Mathematics category. The Colorado Commission on Higher Education has approved Math 124 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT- MA1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to <http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html>

UNC’s LAC outcomes in Mathematics are aligned with the State of Colorado’s GT Pathways student learning outcomes, competencies, and content criteria for GT-MA1. This includes CDHE competency and student learning outcomes in Quantitative Literacy.

Competency in quantitative literacy represents a student’s ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.)

Student Learning Objective	Problem	Comments
a) Demonstrate good problem-solving habits, including: <ul style="list-style-type: none"> <li>estimating solutions and recognizing unreasonable results</li> <li>considering a variety of approaches to a given problem, and selecting one that is appropriate</li> <li>interpreting solutions correctly</li> </ul>	Test #1, problem 7	Students are asked to write a function to represent the situation and thus students need to find the initial value. There are multiple ways to solve for the initial value so they can consider a variety of approaches and choose an efficient method. The students also need to check their found initial value is a reasonable answer based on the given data.
b) Generate and interpret symbolic, graphical, numerical, and verbal (written or oral) representations of mathematical ideas	Test #1 problem 1	Students have to interpret a table of values (numerical representation) and determine if it matches the equation (symbolic representation). Students will then generate a correct equation
	Test #1 problem 2 and 3	Students have to generate a table of values to either make the data represent a function or not a function.
	Test #1 problem 5	Students need to interpret the equation by evaluating the function and also rewrite the equation by changing a parameter.

	<p>Test #1 problem 6</p> <p>Test #1 problem 7</p>	<p>Students will take a written representation and generate an equation to represent the data.</p> <p>Students have to generate an equation by interpreting a graphical representation of data.</p>
c) Communicate mathematical ideas in written and/or oral form using appropriate mathematical language, notation, and style	<p>Test #1 problem 6</p> <p>Test #1 problem 9</p>	<p>Students are asked to determine the APY (annual percentage yield) and explain why the APR and the APY are different values.</p> <p>Students are given a table of values and asked to determine if a linear or exponential function better represents the data and explain their reasoning.</p>
d) Apply mathematical concepts, procedures, and techniques appropriate to the course	<p>Test #1 problem 2</p> <p>Test #1 problem 9</p>	<p>Students are asked to use their understanding of functions to complete a table of values so that it represents a function.</p> <p>Students are asked to find the decay factor of the data given. Students can use their conceptual understanding of exponential function to solve or they can solve using a procedural method.</p>
e) Recognize and apply patterns or mathematical structure	<p>Test #1 problem 9</p>	<p>Students are given a table of values and asked to determine if a linear or exponential function better represents the data. Students must look at patterns of linear functions and patterns of exponential functions to determine which function better models the</p>

		data.
f) Utilize and integrate appropriate technology	<p>Worksheet 4.3 Problem #1</p> <p>Worksheet 5.2 problem #1</p>	<p>Students are asked to find the output of an exponential function, knowing the parameters and input variable. Students can solve the problem using (1) Guess and check estimation method (2) Use their <u>calculator</u> to (a) create a table of values and find the appropriate output to determine the input value (b) create a graph of the function and a graph of the output and find the intersection of the two functions</p> <p>Students are asked to find the output value and will have to solve using logarithmic functions. Calculators can be used to solve logs.</p>
g) Demonstrate competency in Quantitative Literacy by being able to:		
<p>1) Interpret Information</p> <ul style="list-style-type: none"> <li>Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).</li> </ul>	<p>Test #1 problem 1</p> <p>Test #1 problem 6</p> <p>Test #1 problem 9</p>	<p>Students are given an equation and asked to evaluate and explain what the solution represents in the context of the problem.</p> <p>Students are given a word problem and asked to explain the difference between the APR and APY</p> <p>Students are given a table of values and asked to determine if the data is better represented by a linear function or an exponential function. They have to explain their answer in terms of rate of change.</p>
<p>2) Represent Information</p> <ul style="list-style-type: none"> <li>Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).</li> </ul>	<p>Test #1 problem 1</p> <p>Test #1 problem 6</p>	<p>Students have to convert a table of values to an equation.</p> <p>Students will take a written representation and convert into an equation.</p>

		Test #1 problem 7	Students will take data in graphical form and convert into an equation.
	<p>3) Perform Calculations</p> <ul style="list-style-type: none"> <li>Solve problems or equations at the appropriate course level.</li> <li>Use appropriate mathematical notation.</li> <li>Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.</li> </ul>	<p>Worksheet 4.3 problem #2 and worksheet 5.2 Problem #1</p> <p>Test #1 problem 1</p>	<p>Students are asked to find the output of an exponential function, knowing the parameters and input variable. Early in the semester, students will solve using a guess and check estimation method or their calculator. After the logarithmic section, students will solve the same type of problem algebraically which involves using logarithms.</p> <p>Students will need to find the equation of a line and should write their answer using correct notation (<i>i. e.</i> <math>V(n) = -625n + 22468</math>). Also students are asked to evaluate <math>V(7)</math> thus students must know and interpret mathematical notation.</p>
	<p>4) Apply and Analyze Information</p> <ul style="list-style-type: none"> <li>Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.</li> <li>Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.</li> <li>Make judgments based on mathematical analysis appropriate to the course level.</li> </ul>	<p>Test #1 problem 4</p> <p>Test #1 problem 7</p> <p>Test #1 problem 9</p>	<p>Students are given graphs and asked to determine if the graph represents a function.</p> <p>Data is given in a graphical form and the students must recognize the graph represents an exponential equation and thus their function must be in exponential form.</p> <p>Students must determine the different rates of change (average rate of change and percent rate of change) to determine if the data represents a linear or exponential function. The students must also explain their reasoning for their answer.</p>

	<p>5) Communicate Using Mathematical Forms</p> <ul style="list-style-type: none"> <li>Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).</li> </ul>	<p>Test #1 problems 1, 6, 7</p> <p>Quiz 5.2</p>	<p>Students were given a table, word problem, or graph, respectively and asked to express the data symbolically. Students were also asked explain what the parameters represent in the context of the problem.</p> <p>Students are given a verbal situation and the students need to express the situation symbolically as well as graphically. Students are asked to explain their choice of function and how they determined the shape of the graph.</p>