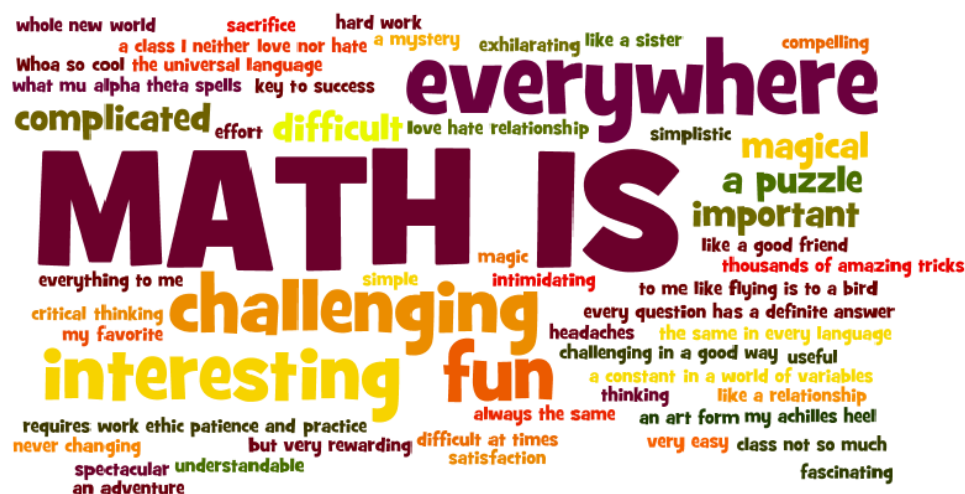


MATH 101 – MATH REASONING

Sierra Nevada College



“Empowering students as architects of their own learning.”

Course Code & No. – Section:	MATH 101 – Section 1
Course Title (Credits):	Math Reasoning (3)
Term & Year:	Fall 2019
Course Ref. Nos. (CRNs):	80114
Instructor:	Dr. Suzanne Gollery
Office Phone:	775-881-7456
Cell Phone:	775-813-4215 (8 AM to 9 PM please)
Email:	sgollery@sierranevada.edu
Office:	TCES 223
Office Hours:	Mon 4:00-5:00 PM, Tues 2:00-3:00 PM, Fri 2:00-3:00 PM or by appointment
Class Meeting Time:	Mon, Wed, and Fri, 11:30-12:45 AM
Location:	TCES 215
Prerequisites:	Passing MATH 090 with a "C" or better, or meeting the College's entrance requirements for mathematics.
Required Texts:	<u>MyMathLab</u> with <u>eText</u> and <u>Integrated Review</u> for Using and Understanding Mathematics, 7e ISBN 9780134716039 (\$105 from publisher) Our MyMathLab course will be integrated with our Canvas course.
Optional Text:	Bennet and Briggs, <i>Understanding and Using Mathematics</i> , 6e or 7e, Pearson, paper copy for students who can't tolerate eBooks (6e for rent \$18.29 on Amazon)
Required Computer Programs: (Bring laptops to class every day)	Wolfram Alpha (Pro version strongly recommended) Microsoft Office 365 (we will get this in class)

Course Description

Mathematical ways of thinking and an overview of many areas of mathematics. Included are parts of algebra, geometry, graph interpretation, probability, statistics, and topology. Emphasis on problem solving. Interesting geometric puzzles and logic problems. Intended to hone a student's reasoning and critical thinking abilities. Prerequisite: Passing MATH 090 with a "C" or better, or meeting the College's entrance requirements for mathematics.

Student Outcomes

Upon completion of this course, a student will be able to:

- 1) Think correctly about numbers and have the ability to discern the reasonableness of a particular solution.
- 2) Model a mathematical problem using various strategies in order to solve a problem.
- 3) Understand the many uses of mathematics in other disciplines (with emphasis on Environmental Science).
- 4) Gather, organize, display, and summarize data.
- 5) Use technology as a tool to solve mathematical models.
- 6) Discover when to use a linear, exponential, or power function from the given data.

The Mathematical Association of America's (MAA) Committee on the Undergraduate Program in Mathematics (CUPM) in developing future mathematics curriculum has made the following preliminary recommendations:

- Students should achieve mastery of rich and diverse set of mathematical ideas and should experience mathematics as an engaging field with contemporary open questions.
- Students should be able to think analytically and critically, to formulate and solve problems, and to interpret their solutions. They should understand and appreciate the value and validity of careful reasoning, precise definition, and close argument.
- Students should have experience applying knowledge from one branch of mathematics to another and from mathematics to other disciplines.
- Students should be able to use a variety of technology tools.
- Students should be able to communicate mathematics both orally and in writing; they should be able to read mathematics.

Methods of Assessing Student Outcomes

Students will be assessed on the basis of their graded performance on six exams, online MyLab Math homework assignments, MyLab Math skills assessments, and participation (attending class and/or math lab).

Tentative Class Schedule

NOTE – topics, exam date, and any other aspect of the class schedule are subject to change if the instructor feels it is in the best interest of students to make changes. Changes will be announced in class and will be posted on the Canvas course website.

MyLab Math homework due dates are posted on Canvas and MyLab Math. Homework is generally due at the start of the next class, for example, Ch1 A and B homework is due at the start of class on Friday, Sept 20. There are some exceptions (longer times before due dates) for particularly challenging homework sets – see actual due dates on Canvas.

Module One – Critical Thinking and Problem Solving

CLASS DATES	CLASS TOPICS	READING ASSIGNMENT
Mon, Sept 16	Why Math? Growth Mindset	Prologue
Wed, Sept 18	Critical Thinking	Chapter 1, A and B
Fri, Sept 20	Venn Diagrams	Chapter 1, C
Mon, Sept 23	More Critical Thinking	Chapter 1, D and E
Wed, Sept 25	Approach to Problem Solving	Chapter 2, A and B
Fri, Sept 27	Units, More on Problem Solving	Chapter 2, B and C
Mon, Sept 30	Exam 1: Chapters 1 and 2	Practice more problems!



Calvin has a good point? Which Hint (Ch 2, section C) refers to his logical reasoning?

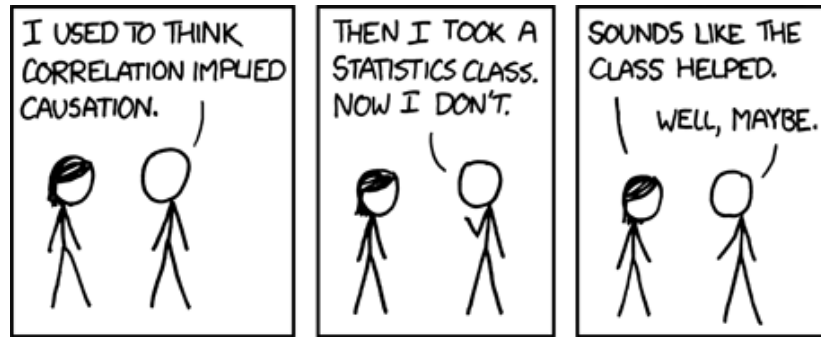
Module Two – Numbers in the Real World and Finances

CLASS DATES	CLASS TOPICS	READING ASSIGNMENT
Wed, Oct 2	Percentages and very large/small numbers	Chapter 3, A and B
Fri, Oct 4	Uncertainty and index numbers	Chapter 3, C and D
Mon, Oct 7	How numbers can deceive	Chapter 3, E
Wed, Oct 9	Your finances and compounding	Chapter 4, A and B
Fri, Oct 11	Saving and investing, loans, credit cards, and mortgages	Chapter 4, C and D
Mon, Oct 14	Exam 2: Chapters 3 and 4	Practice more problems!

Module Three – Statistical Reasoning

CLASS DATES	CLASS TOPICS	READING ASSIGNMENT
Wed, Oct 16	Basic Statistics, Statistical studies	Chapter 5, A and B
Fri, Oct 18	Statistical Tables and Graphs	Chapter 5, C
Mon, Oct 21	Media graphics	Chapter 5, D
Wed, Oct 23	Correlation isn't causality	Chapter 5, E
<i>Fri, Oct 25</i>	<i>Nevada Day Holiday (catch the parade in Carson City or go to museums in CA that are crowded on weekends)</i>	
Mon, Oct 28	Exam 5: Chapter 5	Practice more problems!

xkcd – Randall Munroe



Module Four – Using Statistics, Probability and Risk

CLASS DATES	CLASS TOPICS	READING ASSIGNMENT
Wed, Oct 30	Characterizing data: mean, median, mode, variation, normal distribution	Chapter 6, A, B, and C
Fri, Nov 1	Normal distribution, Statistical inference	Chapter 6, C and D
Mon, Nov 4	Probability basics, Combining probabilities	Chapter 7, A and B
Wed, Nov 6	Law of large numbers, Assessing Risk	Chapter 7, C and D
Fri, Nov 8	Exam 4: Chapters 6 and 7	Practice more problems!

FoxTrot – Bill Amend



Module 5 – Modeling our World

CLASS DATES	CLASS TOPICS	READING ASSIGNMENT
<i>Mon, Nov 11</i>	<i>Veteran's Day Holiday</i>	
Wed, Nov 13	Exponential and linear growth, doubling time, and half life	Chapter 8, A and B
Fri, Nov 15	Real population growth, Logarithmic scales: earthquakes, sound, pH	Chapter 8, C and D
Mon, Nov 18	Function basics, Linear modeling	Chapter 9, A and B
Wed, Nov 20	Linear modeling, Exponential modeling	Chapter 9, B and C
Fri, Nov 22	Exam 5: Chapters 8 and 9	Practice more problems!
<i>Week of Nov 25</i>	<i>Thanksgiving Week Holiday</i>	

Module 6 – Geometric Modeling, Math and Politics

CLASS DATES	CLASS TOPICS	READING ASSIGNMENT
Mon, Dec 2	Fundamentals of geometry	Chapter 10, A
Wed, Dec 4	Problem solving with geometry	Chapter 10, B
Fri, Dec 6	Voting methods	Chapter 12, A
Mon, Dec 9	Voting theory, Apportionment	Chapter 12, B and C
Wed, Dec 11	Apportionment, Redistricting problems	Chapter 12, C and D
Fri, Dec 13	Exam 6: Chapters 10 and 12	Practice more problems!



Grading in MATH 101

Grading scale: Grades will be calculated based on the number of points that you earn in MATH 101, using a 1200-point scale. Sierra Nevada College uses half grades (minus or plus), so students within 1.5% of a grade cutoff will earn the corresponding half grade.

Grading scale:

$\geq 90\%$	\rightarrow A	1080 – 1200 pts
80-89.9%	\rightarrow B	960 – 1079 pts
68-79.9%	\rightarrow C	816 – 959 pts
58-67.9%	\rightarrow D	696 – 815 pts
$< 58\%$	\rightarrow F	< 815 pts

How to earn points:

In-class exams (6 at 80 pts. each)	480 pts.
MyLab Math Chapter Homework (24 at 20 pts. each)	480 pts.
MyLab Math Skills quiz/Skills HW (10 at 15 pts. each)	150 pts.
Participation (class attendance, MyLab Math Study Plan time, office hours, evidence of exam study)	90 pts.
TOTAL	1200 points

Homework Grading Policies

- Chapter Skills Quizzes assess your proficiency at arithmetic and algebra skills required to solve problems in the chapter (for example, dividing and multiplying fractions). You should take the Skills Quiz before doing chapter homework and use the Study Plan suggested based on your skills quiz results to master these skills before attempting to solve homework problems. The Chapter Skills Homework gives you a chance to show you have mastered the skills.
- Chapter Homework associated with text sections prompts you to solve problems related directly to the text. There are sample problems worked in the text. You also have opportunities for online help at MyLab Math:
 - You have unlimited ability to ask to see similar problems before entering your homework answers. There is no penalty for this.
 - You get more than one attempt to answer most questions (when there are more than two possible answers).
 - You may also ask for help in solving the problem and get credit for correct answers in this process.
- Homework is usually DUE at the start of the next class after we covered those chapter sections. You have extra time on a few particularly challenging assignments. **Homework dues dates and times are stated on MyLab Math and Canvas.**
- Late work policy: You can work on homework after the due date up until we have an exam on that chapter. You will lose 10% of possible points per day for problems not finished by the due date. You won't lose credit on any finished problems, that is, the 10% penalty per day applies only to problems completed after the due date. Thus, it is to your advantage to do problems that are easiest for you first, so they are completed before the due date.



Exam policies

- Students will do exams individually, on paper, and exams will include problems and short answer questions.
- Students must give answers to problems in short sentences, including units, to explain what the numerical answers mean.
- Exam problems will be just like homework problems or problems worked in class, but with different numbers.
- You MAY use Excel and Wolfram Alpha to solve equations while working on exams. You may NOT use other internet sites. Please be sure to charge your laptop battery and bring your charger to exams.
- Show work for partial credit on exams, including listing what you know, what you are trying to figure out, sketches, a description of your plan to solve the problem, equations, and equations with known quantities inserted.

Important Class Policies

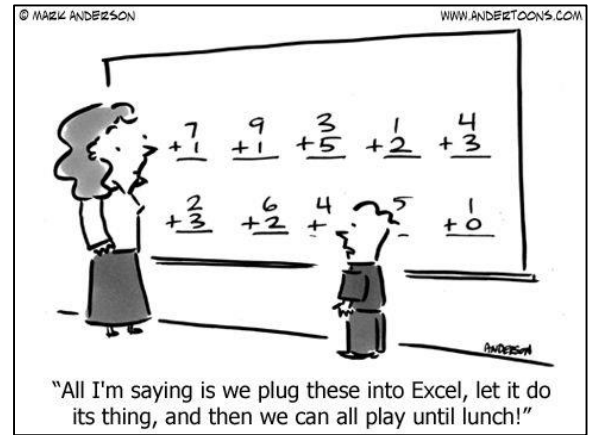
- You must bring a laptop with Internet access for Wolfram|Alpha and Microsoft Office 365 in order to participate in classes and take exams – it is very important that you accept this responsibility. The exams and homework require the use of these programs, so they are integral to the class. You should ALWAYS bring your charging cable so you can use your laptop for the whole class period.
- Bring your textbook to every class session if you prefer to use a print book.
- There are **NO make-up exams**, even for excused absences, except that athletes may take exams proctored by their coach during travel or proctored by Suzanne on the same day for home games. Students who miss an exam for ANY REASON may take a comprehensive make-up exam given on Friday, December 11 at 2:00 – 4:00 PM and use the makeup exam score to replace a missed exam score. Students with too many 0 homework scores to pass the class may also take the make-up exam and earn their make-up exam grade as their course grade, IF they pass the make-up exam with a C or better. **Warning:** don't count on passing the comprehensive make-up exam without putting work into the course! You will have to demonstrate that you have learned to use Wolfram Alpha and MS Excel on the make-up exam. Problems will use data sets that are too large to solve by hand.
- It is **strongly** recommended that you take notes during class sessions and that you use these notes for homework help and study them for the exams. If you need tips on how to take good notes ask your instructor or visit the Office of Academic Services and Instructional Support.
- Laptops and cellphones **absolutely** may not be used in class for personal use such as observing videos, instant messaging, texting, checking e-mail, doing assignments for other classes or surfing the web. Laptops should be closed unless needed for taking notes or an in-class assignment. Cellphones must be muted and put away unless you are using your cell phone calculator. You MAY excuse yourself from the class in a non-disruptive manner if you need to send or receive a text or call.
- You must be able to get emails about MATH 101 and be able to access our Canvas course. If you don't want to use the SNC student email, then have your SNC email forwarded to a messaging system that you DO use. There are instructions for forwarding email under The SNC Email System in this syllabus.

Recipe for Success in Math Reasoning

- Have or develop an intellectual curiosity and open mind in how mathematics can be used in applied in real-world situations.
- Don't always think that ideas are important only if they apply to your life right now. Math is a tool that you may value to help solve problems common to most people in your future, like buying a car, living on your income, or deciding how much pay raise to ask for.



- Become proficient in Wolfram|Alpha and Excel. Spend time exploring them on your own initiative. Your familiarity with these programs will make exams and homework much faster and easier.
- Attend office hours and review sessions. You probably chose SNC in part for easier access to your professors than possible at a university, so take advantage of this resource!!
- Take notes in class because they'll help you figure homework out later.



- Don't expect to understand all of the material right away in class. The purpose of homework is to try again and again until you get it.
- Be persistent. Don't be passive. **Try to figure things out yourself BEFORE you ask for help,** but also ask for help if you get stuck.
- Work with other students who are as serious (or more serious) than you about learning. Scientific studies show that people remember what they have learned better if they learn in a group. People remember things the best when they SHOW other people how to do it.
- Ask questions during the exams. I am happy to rephrase questions and help you understand what is being asked. I am likely to reassure you if you are on the right track.
- Don't miss classes and/or blow off homework and in-class activities. Practice is important for getting good at every skill, including math. It is my observation that very few students who do the assigned work are unable to pass exams and very few students who skip class, miss assignments, or copy from other students (even skillfully enough to earn full credit) are able to pass exams. This applies to all subjects that I have taught.



ADA Accommodations

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, hconover@sierranevada.edu or go to the OASIS offices on the third floor of Prim Library within the first week of the semester.

Sanctions for Cheating and/or Plagiarism

The Honor Code

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when expressed within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand.

Consequences of Violating the Student Honor Code

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty are responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from these and other forms of academic dishonesty. Violations of the Honor Code become part of a student's academic record.

1st Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2nd Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3rd Offense: Student is expelled.

The SNC Email System

The SNC email system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college email accounts almost daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having email redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

The Sierra Nevada College Mission Statement:

Sierra Nevada College graduates will be educated to be scholars of and contributors to a sustainable world. Sierra Nevada College combines the liberal arts and professional preparedness through an interdisciplinary curriculum that emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability.

The Core Themes:

Liberal Arts Professional Preparedness Entrepreneurial Thinking Sustainability

