

MATH 105 Quantitative Reasoning

Section 004: Mondays 8:30 AM – 10:20 AM via Zoom
Wednesdays 8:30 AM – 10:20 AM in Hemenway Hall 407



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Wednesdays 4 PM – 5:30 PM
Thursdays 4 PM – 5:30 PM
and by appointment

The ability to think quantitatively is crucial in most every discipline as well as in everyday life. While most may understand the need for these skills for those who major in Biology, Chemistry and Food Science, Computer Science, Earth Sciences, Food and Nutrition, Mathematics, Nursing, and Physics, quantitative reasoning is valuable in other majors as well. An artist may use quantitative reasoning skills in understanding her/his materials and the design, planning, and creation of artistic works.ⁱ Wise decisions in business are based on quantitative analysis, for example, cost-benefit analysis, break-even analysis, feasibility studies, and statistical analysis of data.ⁱⁱ Reporting news stories with quantitative content involves more than writing: journalists need quantitative reasoning in order to analyze, accurately interpret, and communicate quantitative information in a meaningful way.ⁱⁱⁱ Economists, even theorists, need quantitative reasoning in order to read and evaluate academic literature and determine its relevance to economic policy.^{iv} Some use quantitative methods to analyze literature^v, and some writers have used mathematics as the inspiration for their works.^{vi} Quantitative reasoning is used in fashion design, from basic measurements to pattern design and creation, the analysis of fit and form, and determination of the costs and amounts of materials for creation of one item as well as mass production.^{vii} Quantitative reasoning and knowledge of mathematics helps cartographers evaluate geographical information and use this information, for example, to determine coordinate systems and scales for maps as well as transformations to relate the coordinates of points on the earth, a curved surface, to coordinates of points on a plane, a map.^{viii} A geographer uses quantitative reasoning and statistical analysis in the study of the physical environment, weather patterns, and climate patterns of the Earth and their effect on human and wildlife ecologies as well as economics and culture.^{ix} Mathematics can be used to reveal trends in history, and historians use quantitative reasoning and statistics in research.^x Political scientists study the population and use quantitative reasoning and statistical methods to analyze "the social, political, and monetary implications of a community's opinions and actions".^{xi} Psychologists use statistical analysis to perform and assess behavioral research as well as quantitative reasoning, for example, to determine the dosage of medications prescribed to patients.^{xii} Sociologists use quantitative reasoning and statistical analysis to study society as a whole and in groups, patterns of social interactions and relationships, and culture.^{xiii} That is, quantitative reasoning skills are important in every discipline.

Course Description and Learning Objectives

An immersion in quantitative problem-solving, as it relates to real-world scenarios, with the goal of producing citizens and workers capable of making informed decisions. Topics related to numbers in the news, financial mathematics, mathematical modeling, and probability and statistics enable students to sharpen their previously learned arithmetic and algebra skills. An emphasis is placed on critical reading, sound reasoning, and precise oral and written communication in various applied situations.

General Education Domain II-A

Analysis, Modeling, and Problem Solving: The study of analytical, quantitative, and/or formal reasoning methods involving the manipulation of numbers or other symbols to solve problems.

Learning Objectives:

- 3 – Solve Problems Using Quantitative Thinking
- 8 – Solve Problems Using Creative Thinking

What is in this syllabus?

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Overall, you should gain the understanding that quantitative reasoning provides a basis for evaluating and determining the accuracy of information and make it possible for individuals to draw knowledgeable conclusions as well as make decisions about real-world information presented in different contexts and in various forms.

Attendance

Attendance at every class is expected and will be noted. Attendance will be taken during the first ten (10) minutes of each *on-campus* class meeting. Attendance during remote meetings will be collected via Zoom: Zoom notes your arrival and departure as well as the duration of your attendance during meetings. Lateness of more than ten (10) minutes counts as an absence as does leaving class early, *without an appropriate reason*. **NOTE:** Class will be held on Wednesday, November 24, 2021.

- If you miss a class, it is *your* responsibility to access the class notes on Canvas and to obtain information about assignments *from a classmate*, your email, the course website, and Canvas. Absence from class does not entitle you to an extension for submitting assignments or for taking the midterm examination.
- You may miss **no more than two (2) classes** without penalty to the participation component of your grade. If you miss more than two (2) class meetings, your participation for these days will be recorded as a zero (0). Since it is your choice how you use these two (2) allowed absences, *no excuses or doctor's notes will be accepted for absences*.

Course Etiquette

You are expected to pay attention, be respectful, and participate during course meetings. Do not talk over or interrupt others: wait your turn to contribute to discussions and analysis. Use respectful language at all times: use of profanity is unacceptable. Neither disruptive behavior nor disrespectful conduct will not be tolerated.

- During *on-campus* class meetings, all electronic devices, *including but not limited to* phones, laptops, and tablets, **MUST** be turned off and put away.
- During *remote* class meetings, all electronic devices not used for course work **MUST** be turned off and put away. Use headphones or a headset rather than the speakers on your computer; use of headphones or a headset with a built-in microphone is recommended. Turn off your microphone when you are not actively contributing to during class.

You cannot make meaningful contributions during class meetings when you are, for example, texting, monitoring social media, watching videos, playing games, surfing the web, or doing assignments for other courses: such activities should be done on *your time*, not during *class time*. Those performing such activities during class will be considered to be absent from class.

Class Preparation and Participation

Being prepared for class includes but is not limited to doing assigned readings (in the textbook and/or online) *before* each course meeting, working on assigned exercises (in the textbook, provided on course handouts, sent via email and/or posted online), reviewing class notes *daily*, maintaining and updating your course notebook (which should include class notes and the practice exercises on which you are working), and having appropriate materials such as your notebook, writing instruments, and calculator available for use during course meetings.

Class participation can be contributions to course discussions, in-class problem solving, and analysis of real-world scenarios *as well as questions*. Questions are a very important component of the learning process: *your questions are significant contributions to each course meeting*. **There is no such thing as a stupid question.**

Make-up and Late Submission Policy

Neither make-up examinations nor make-up assignments will be administered, and examinations will not be accepted after the submission deadline. The grade for an examination or an assignment which is not submitted will be recorded as zero (0).

Late written assignments will not be accepted after THREE (3) days. The grade for a late *written* assignment will be decreased as follows: B as highest grade possible if submitted one (1) day late; C as highest grade possible if submitted two (2) days late; and D as highest grade possible if submitted three (3) days late.

NOTE: The last day to withdraw from a course *without* a W-grade is Friday, September 10, 2021, and the last day to withdraw from a course *with* a W-grade is Wednesday, November 24, 2021. The last day to change a course grade-status to Pass/Fail is Wednesday, November 24, 2021.

Course Grade Percentages

Your course **grade** will be determined by your course participation during on-campus and remote class meetings, written assignments and assignments completed via MyMathLab, the midterm examination, and the *comprehensive/cumulative* final examination.

CAUTION: Missing class meetings jeopardizes your grade. When you do not attend course meetings, you miss course material and topic discussions, class and group problem solving, examples, and information about assignments and examinations. Your absence during course meetings directly impacts your course participation.

The components of your course grade will be weighted as follows:

Course Participation	. . . . .	10 %
Assignments	. . . . .	55 %
Midterm Examination	. . . . .	15 %
Final Examination	. . . . .	20 %

The weights for the graded components of the course may be adjusted, if necessary, to reflect any changes in the workload during the semester.

Assignments

Via assignments, you will apply the concepts, topics, and methods discussed and examined throughout the course. It is *your* responsibility to complete assignments on-time. Written assignments must be uploaded via the specified submission facility on the on Canvas; the assignment details are included with the submission facility. Written assignments will not be accepted via email.

- **Written assignments** must be neatly written and submitted within one (1) PDF file. Pages may be scanned to PDF format or pictures (taken using appropriate lighting and *trimmed to remove the surrounding area of the page*) may be saved to PDF format. Your full name must be written at the top left-hand corner on the *first page*, and the file must be named using the format *LastName_FirstName* for which *LastName* is your last name and *FirstName* is your first name.
- [MyMathLab](#) (a.k.a. MyLab Math) assignments are completed *entirely* online: no written work is required. [MyMathLab](#) assignments will not be accessible after the due date.

Unless stated otherwise, assignments are NOT group work: you are expected to submit your own analysis and your own work, rather than working together. Those submitting analysis and/or work procured through group efforts, whether in whole or in part, will earn zero (0) points for the *entire* assignment. **Copying the work of others is unacceptable: you are expected to do your own work.**

Examination Dates

As stated, there will be a midterm examination and a *comprehensive/cumulative* final examination. The midterm examination and the final examination are *mandatory*. The dates for these examinations are listed below.

Midterm Exam	. . . . .	Wednesday, October 27, 2021
Final Exam	. . . . .	Thursday, December 16, 2021, 8 AM – 11 AM

While the date for the midterm examination may be changed, if necessary, the date and time for the final examination are set by the University and **CANNOT** be changed.

Academic Honesty

You are expected to read the sections of the Framingham State University [Undergraduate Catalog](#) that describe the *University Policy Regarding Academic Honesty* and the *Procedures for Handling Cases of Alleged Infractions of Academic Honesty*.

- Giving/receiving help on assignments on which you are expected to do your own work, giving/receiving help on examinations, altering work on graded materials in an attempt to obtain additional credit/points, doing an assignment or examination *for someone else*, and having someone do an assignment or examination for you are *examples* of infractions of the *University Policy on Academic Honesty*. Plagiarism, *looking at or copying from* another student's assignment or examination, allowing another student to *look at or copy from your* assignment or examination, and not being truthful regarding the submission of an assignment or examination are additional examples of infractions of the *University Policy on Academic Honesty*.
- All infractions of the *University Policy on Academic Honesty* will be reported to the Dean and the Office of Community Standards, and the appropriate University procedures will be followed.

Communication

Course emails will be sent to the *primary* email address listed for each student on *myFramingham*.

- All email correspondence must be signed using your full name. The subject line for course communication is "**MATH 105 QR:**" followed by a meaningful – *not blank* – reason for the communication (quotation marks are *not* used in subject lines for email); do **NOT** put your name in the subject line.

- When you communicate by **phone**, clearly identify yourself using your full name and state the course for which you are registered *at the beginning* of the conversation or voice message. If you leave a **voice message**, speak *slowly* and *clearly* so that your name, course information, contact information, and message can be understood.

Required Textbook, Software, and Supplies

Thinking Mathematically, 7th Edition, by Robert F. Blitzer with [MyMathLab](#)

We will use the [MyMathLab](#) system throughout the course for textbook access, practice exercises, online assignments, and a variety of resources; MyMathLab provides access to the eBook.

- (Option #1) The MyMathLab standalone access (ISBN-13: 9780135903575) can be purchased from the [Framingham State University \(FSU\) Bookstore](#) as well as directly from [Pearson Education, Inc.](#) (the publisher).
- (Option #2) If you prefer to have a printed copy of the textbook to use with MyMathLab, the loose-leaf textbook packaged with the MyMathLab Access Code (ISBN-13: 9780136209171) can be purchased from the [FSU Bookstore](#).

The software for the course is MS Office, and you need a scientific calculator which must, at least, have built-in combination, permutation, and factorial functions.

FSU Notice of Non-Discrimination and Diversity

Framingham State University is committed to a policy of [non-discrimination](#), [equal opportunity](#), [diversity](#), and affirmative action. The University is dedicated to providing educational, working, and living environments that value the diverse backgrounds of all people. Furthermore, the Massachusetts Civil Rights Act ("MCRA", M.G.L. c. 12, §§ 11H, 11I, 11J) protects the rights of all residents of and visitors to Massachusetts to be free from bias-motivated threats, intimidation, and coercion that interfere with their civil rights. The MCRA protects the right to attend school, live peacefully, and enjoy other basic rights.

FSU Commitment to Antiracism

At Framingham State University, faculty, staff, and students work together to sustain a learning, working, and living community free from hate, discrimination, harassment, and intolerance. We recognize the damaging effects of systemic racism – including policies, structures, and historic practices – on the experience and success of communities of color. Coming from different backgrounds and different levels of privilege, we can all affirm and engage in antiracist work.

Diversity of voices, and of minds, strengthens our ability to solve problems and to ask and answer questions about the world we share. As your instructor, I commit to upholding community values of inclusion, civility, accessibility, and mutual respect. I expect *all course members* to commit to creating a community that affirms and welcomes all persons from diverse backgrounds and experiences, and supports the realization of everyone's potential.

Disability/Access Services

"Framingham State University offers equal opportunities to all qualified students, including those with disabilities. The University is committed to making reasonable accommodations as necessary to ensure that its programs and activities do not discriminate, or have the effect of discriminating, on the basis of disability. Disability/Access Services works with students with ADD/ADHD, learning and psychiatric disabilities, students with mobility disabilities, students who are blind or low vision, students who are d/Deaf or hard of hearing, and students with chronic medical conditions."*

"Academic Success works to provide reasonable accommodations to qualified students. The purpose of accommodations, modification, and/or auxiliary aids is to reduce or eliminate any disadvantages that may exist because of a disability.

* <https://www.framingham.edu/academics/center-for-academic-success-and-achievement/disability-access-services/>

If you are feeling lost or overwhelmed ...

1. Meet with me

You are always welcome to meet with me during student hours: student hours are for you. You may speak with me after class, call me, or email me to set up an individual or group appointment. Your questions are important to me: questions are a valuable and important component in learning new concepts and exploring new methods.

2. Use the resources available on Canvas, the course website, and MyMathLab

Class notes are posted on Canvas after each course meeting, and summaries of our in-class analysis are posted with these class notes. Course handouts, and resources are available on the course website. Practice exercises with the view-a-similar-problem feature, additional examples, videos, and Pearson Tutoring are available via MyMathLab.

3. Meet with tutors available via CASA

The Center for Academic Success and Achievement ([CASA](#)) provides tutors from whom you may receive additional help. Information about tutoring can be accessed on the [Extra Help](#) page of the course website.

Framingham State University is not mandated by law to waive specific courses or academic requirements considered essential to a particular program or degree. Rather, the University is mandated to modify existing requirements on a case-by-case basis in order to ensure that individuals are not discriminated against on the basis of their disability."^{*}

- For further information, please visit the [Disability/Access Services](#) page on the Center for Academic Success and Achievement (CASA) section of the Framingham State University web site or contact LaDonna Bridges, Associate Dean of Academic Success, at 508-626-4906 or lbridges@framingham.edu, or Vikky Angelico, Disability/Access Services Coordinator, at 508-626-4627 or vangelico@framingham.edu.

Math Lab Emporium

The Math Emporium Lab is an additional time each week during which to review related topics and to receive extra support and assistance with coursework. As stated in the [Math Placement](#) section on the [Placement Testing](#) page of the Framingham State University website, participation in the Math Emporium Lab “is a great support for students who find math to be challenging, feel underprepared for college math (especially after this last year of online learning), or haven’t been in a math class for a while”. Students have an opportunity to take a math placement test (beginning in the fall), and those who achieve a sufficiently high score may take a math course without the Emporium Lab.

Per page 55 of the [2020-2021 Framingham State University Undergraduate Catalog](#) ^{*}, “First-Year students will be exempt from Math Emporium Lab if they have met the following specific criteria based on their high school transcript: 2.7 or higher GPA, and have taken a math course during the senior year of high school. Students who are not exempt from the Math Emporium Lab are encouraged to take the Math Placement test in order to place out of the Math Emporium Lab requirement.” The [placement testing code explanation](#) provides information for whether or not the Math Lab Emporium is required for each mathematics placement code.

In addition to the weekly two-hour Lab meetings, students work on computer-based modules, completed via MyMathLab, as a means of co-requisite redress in mathematics; these modules are designed to cover prerequisite material related to course topics. Students are required to complete ten (10) modules throughout the semester (approximately one module per week), and they must complete 90% of the questions correctly; students may rework questions until the required 90% mastery level for each module is achieved. Completion of the modules is required: for each module that a student does not complete, a five (5) point deduction (out of 100 points) may be taken on their final course grade.

Final Comments

You are welcome and encouraged to meet with me if you have any concerns about the course. It may happen that our analysis and discussions of topics and methods seem clear as we work together during course meetings but seem foreign when you try to work practice exercises on your own. Try discussing and working on practice exercises with others, and *please know that you are always welcome to work with me*. I would be glad to work with you: I am here to help you to learn and I **want to help you**. When you learn new material, it is normal to have questions: *questions are a natural part of the learning process*. Asking questions helps you to identify concepts and methods that necessitate further exploration and helps you to incorporate new concepts, methods, and strategies into your knowledge base. Always remember that **there is no such thing as a stupid question**.

ⁱ <http://mathcentral.uregina.ca/beyond/articles/art/art1.html> <http://www.mathaware.org/mam/03/essay3.html>

<https://www.sciencenews.org/article/when-art-and-math-collide> <http://weusemath.org/?career=animator>

ⁱⁱ <http://smallbusiness.chron.com/examples-quantitative-reasoning-business-30966.html>

<http://weusemath.org/?career=budget-analyst> <http://weusemath.org/?career=cost-estimator>

ⁱⁱⁱ http://www.cjr.org/behind_the_news/journalists_need_to_do_the_math.php <http://www.knightfoundation.org/blogs/knightblog/2015/7/31/10-basics-todays-journalists-need/>

^{iv} <http://gregmankiw.blogspot.com/2006/09/why-aspiring-economists-need-math.html>

http://rodrick.typepad.com/dani_rodricks_weblog/2007/09/why-we-use-math.html <http://weusemath.org/?career=economist>

^v http://digitalhumanities.org/companion/view?docId=blackwell/9781405148641/9781405148641.xml&chunk.id=ss1-6-9&toc.id=0&brand=9781405148641_brand

<http://link.springer.com/article/10.1007/BF00118600>

^{vi} https://www.researchgate.net/post/Mathematics_and_literature_do_you_know_examples_of_mathematical_structure_or_concepts_leading_to_great_enduring_literary_works https://www.maa.org/external_archive/devlin/devlin_03_10.html

^{vii} <http://mathforgrownups.com/math-at-work-monday-sole-the-fashion-designer/> <https://www.youtube.com/watch?v=iY3cqChYels>

^{viii} <http://www.history.mcs.st-and.ac.uk/HistTopics/Cartography.html> <http://myjobsearch.com/careers/cartographer.html> <http://weusemath.org/?career=cartographer>

^{ix} <http://www.nap.edu/read/4913/chapter/5> <http://bedtimemath.org/interview-with-a-geographer/> <http://www.tandfonline.com/doi/full/10.1112/0140.00035>

<http://gis.stackexchange.com/questions/6535/how-much-math-does-a-gis-analyst-need-to-know> <http://weusemath.org/?career=geographer>

^x https://www.ted.com/talks/jean_baptiste_michel_the_mathematics_of_history?language=en <http://collegemouse.com/jobs/how-to-become-a-historian.html>

^{xi} <http://weusemath.org/?career=political-scientist> <https://www.quora.com/What-is-the-application-of-mathematics-in-political-science>

<https://bigfuture.collegeboard.org/careers/social-science-political-scientists>

^{xii} <https://www.reference.com/world-view/math-used-psychology-c50e4663320ecd41> <https://www.quora.com/Do-psychologists-use-math-How>

<https://www.verywell.com/why-are-statistics-necessary-in-psychology-2795146>

https://www.psychologicalscience.org/members/apssc/undergraduate_update/undergraduate-update-summer-2013/on-the-importance-of-learning-statistics-for-psychology-students

^{xiii} <http://www.asanet.org/sites/default/files/savvy/introsociology/Documents/Field%20of%20sociology033108.htm>

<https://www.britisoc.co.uk/what-is-sociology/what-do-sociologists-do.aspx>

^{*} **NOTE:** This reference and hyperlink will be updated when the undergraduate catalog for AY 2021-2022 have been posted on the Framingham State University website.