



**GOSHEN COLLEGE**  
**MATHEMATICS DEPARTMENT**  
**MATH 105 QUANTITATIVE REASONING – FALL 2018**

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**Learning Objectives**

Students will correctly and confidently interpret, transform, and create quantitative information in a variety of personal, professional, and societal contexts to solve problems, understand phenomena, draw conclusions, and make decisions.

Quantitative information is conveyed by numbers, measurements, estimates, computations, data, statistics, probabilities, proportions, rates, graphs, tables, maps, diagrams, equations, functions, statistical inferences, assumptions, and logical arguments.

Students will improve learning process, problem solving, communication, collaboration, and professionalism skills.

**Am I in the Right Course?**

This depends both upon your background and goals. Math 105 Quantitative Reasoning and Math 115 Applied Algebra are designed to equip students with sufficient quantitative reasoning skills to be successful in their natural and social science perspectives courses, be knowledgeable consumers, and be effective citizens. Math 115 also integrates symbolic representation and manipulation as a means for understanding and creating quantitative information. Students who did well with symbolic notation in high school algebra classes will find the symbolic emphasis of Math 115 to be familiar and may find the relative lack of symbols in Math 105 to be unsettling. On the other hand, if high school algebra was difficult, Math 115 may be intimidating and challenging.

With respect to goals, if you plan to be a business, computer science, mathematics, or some natural science major, then you should complete Math 115 (and perhaps more mathematics courses). If you are an elementary education major, you must complete Math 131-132. If you are not ready to jump into Math 115 or 131-132, you must work for an A or B in Math 105 to be sufficiently prepared. If you do not plan to be one of the listed majors, Math 105 will be sufficient for your goals.

If you have any questions about which course you should be in, please talk with your instructor. Everyone wants you to be in the courses that will provide the best path to achieving your goals.

**Instructor**

David Housman, SC 117, dhousman@goshen.edu, 535-7405, 574-612-7185 (cell)  
Office hours posted on office door and on Moodle

**Class**

TR 2:00 – 3:15 PM in SC 107.

**Text**

MyLab Math with Pearson eText for *Thinking Quantitatively: Communicating with Numbers* by Eric Gaze, ISBN-13: 978-0-321-86988-3. As of this writing, this was available directly from Pearson for \$103.95.

For class, you will need the worksheets. These are available as free pdf downloads from MyLab Math, and so can be used in an iPad app such as Good Reader or printed on paper. They can also be obtained as a printed booklet *Guided Worksheets for Thinking Quantitatively: Communicating with Numbers*, ISBN-13: 978-0-13-454044-3. As of this writing, this was available directly from Pearson for \$31.28.

**On-line**

MyLab Math will be used for readings and videos for class preparation and assignments to help deepen your understanding. Registration instructions are on Moodle. The class key is housman42591. You can get temporary access to MyLab Math for free, but you will eventually need to pay for it online or purchase a MyLab Math access code from the bookstore.

Moodle (<https://moodle.goshen.edu>) will be used for all other electronic aspects of the course. Announcements forum postings will be emailed to students' Goshen email addresses—make sure you check your email regularly.

**Calculator**

Any basic calculator is sufficient. One that uses scientific notation and can work with fractions is best. These can be purchased for less than \$20. Calculators with graphing or programming capabilities may not be used when taking exams. The department has a small number of basic calculators that may be borrowed during class and exams.

**Excel**

Microsoft Excel will be used throughout the course. It is available on campus computers, through your [virtual machine connection](#), with the iPad you received from Goshen College, or your free subscription to Microsoft applications by going to <https://office.com/getoffice365> and signing up with your Goshen College email address.

**Notebook**

A one-inch three-ring binder with loose-leaf lined and graph paper is recommended so that you can keep printed copies of course resources and a written record of problem solving attempts, questions, math concept and technique discoveries, and skill assessments. Goodwill stores sell three-ring binders for around \$1.

**Activities**

The study of mathematics is not a spectator sport! Reading, listening, solving problems, writing explanations, reflecting upon ideas, assessing skills, and receiving feedback are essential to learning mathematics. A student with average preparation (B grades in high school algebra and geometry and 500 Math SAT) can obtain an average grade (C+ to B-) with an average of nine hours (3 hours in class and 6 hours outside of class) each week devoted to this course—adjust if you are not average or desire a grade that is not average.

An athlete plays a game or engages in a contest, an actor performs a role on stage or in front of a camera, an artist creates a painting or sculpture, a musician sings or plays an instrument at a concert, and a quantitatively literate person solves problems. While it may be helpful for an aspirant to observe or listen to an experienced athlete, actor, artist, musician, or quantitatively literate person, it is essential for the aspirant to practice.

Before the game, the best athletes have practiced passing, throwing, catching, hitting, blocking, dribbling, dodging, and kicking many times. Before opening night, the best actors have rehearsed their lines, movements, and facial expressions many times. Before creating the piece to be exhibited, the best artists have experimented with materials, colors, and strokes many times. Before the concert, the best musicians have rehearsed the music many times. Likewise, before solving an important real world problem, the best quantitatively literate persons have solved many other problems.

Practice makes permanent with the result that individual skills can be executed with little effort and multiple skills can be creatively combined to meet more complex challenges. Unfortunately, the permanence can be detrimental (e.g., swinging the bat too high for a slider or using an incorrect algebraic rule). To achieve perfection, feedback and assessment must be integrated with the practice to ensure that the skill is executed correctly and efficiently. Feedback can come from the instructor during class, MyLab Math when answering a question, and the solutions in the text and videos if you have attempted a problem before viewing the solution. Since the goal of this course is for you to become a quantitatively literate person, you should practice solving problems with feedback and assessment as much as possible. Always have paper and pencil or pen available to write down your solutions, thoughts, questions, and assessments; keep these papers in an organized fashion in your three-ring binder.

Before class, read the text and view the video in an anticipatory fashion: when you have read the description of a problem to be solved or an important statement, (1) cover what follows, (2) think and write your own solution to the problems or reasons the result is true, and only then (3) read the authors' solution or reasons, focusing on the parts you did not already obtain on your own.

If you do not understand some aspect of the text or video, write a question that is as specific as possible. Sometimes writing the question is enough to spark the insight needed for you to answer your own question. Otherwise, you will be compiling a list of useful questions to ask peers, tutors, or the instructor.

If two or more of you are reading or working on problems, try working independently first. After

you have made independent attempts, share with each other your questions and understandings.

During class, actively listen, engage in solving problems, share understandings with peers, ask your unanswered questions, assess your performance, and seek ways to improve your performance.

After reading the text, watching the videos, and participating in class, you should be ready to complete the assignment for a grade. If you find yourself guessing or unable to obtain correct answers, seek assistance from peers, the teaching assistant, or the instructor. Your goal should be to answer at least 90% of the MyLab Math and Excel assignment problems correctly without assistance. The article assignments will sometimes seem harder simply because that are not aligned with the material covered that week—that is the way the real world works. Collaborate with others to figure out the answers! Throughout these activities, try to articulate your concept discoveries and assess your skills by describing strengths, improvement areas, and insights.

Assignments on the material covered during one week of classes will be due the following Tuesday at 9:00am—remember that you need some time to prepare for the new week’s classes. Tuesday’s class will usually begin with a short quiz on the material covered during the previous week. Since you completed the assignment, you should be well prepared for this quiz.

As you accumulate conceptual knowledge and acquire skills over several days, you will be ready to synthesize and apply those concepts and skills by completing projects and taking exams.

While describing the activities in which you will be engaged, several effective learning techniques were suggested: read the text and view the videos with anticipation, write specific questions if confused, solve as many problems independently as possible, seek assistance if needed, share your understanding with others, and assess and seek improvements to your performance. Other suggestions can be found in the text ‘A Note from the Author to the Student,’ advice from previous students document in Moodle, and the Student Success section of MyLab Math. Whatever learning techniques you decide to try, give them some time and effort. Learning to learn effectively is an important goal of a college education.

### **Study Sessions**

A Student Teaching Assistant will be available at scheduled times to assist with your learning of the concepts and techniques developed during this course. The schedule will be announced shortly after the beginning of the semester.

### **Disability Services**

Goshen College is committed to providing all students equal access to programs and facilities. Students who need accommodations based on disability should contact the Director of the Academic Success Center (ASC). Students must register with ASC before faculty are required to provide reasonable accommodations. For more information or to register, please contact the Director of the ASC, Judy Weaver, Good Library 112, [jweaver@goshen.edu](mailto:jweaver@goshen.edu) or 574-535-7560. To ensure that learning needs are met, contact the director of the ASC the first week of classes.

### **Grading**

Course grades will be based on performance on assignments (20%), quizzes (10%), four projects (40%), a mid-semester exam (10%), and a final exam (20%). The score for each category is capped at 100. If helpful, the final exam grade will replace the lower of the mid-semester exam score or quizzes average. The course grade will be translated into letter grades in the following manner.

Minimum Percentage	93	90	87	83	80	77	73	70	67	60	0
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F

Note that class participation is not an explicit part of your grade; however, it may be taken into account in border line situations.

### **Assignments**

Achieve and exhibit understanding by completing assignments weekly. MyLab Math exercises deal with the fundamental ideas, provide immediate feedback, can be repeated until correct, and can even be completed after they are due with a 30% penalty. Excel problems require connecting the mathematical content with the spreadsheet interface and real world scenario in the problem. Article questions require more open ended critical thought about a topic of recent interest in the

news. Reflection questions require you to articulate a concept discovery and write a skill assessment, and you will be able to see everyone else's reflections (a good way to discover other ways of thinking about different concepts). For most of these assignments, you will not be able to simply regurgitate procedures described in excruciating detail in the text or during class. To become quantitatively literate, you must continuously practice extracting relevant information, solving problems, and communicating your understanding to others. Collaboration with other students is encouraged; think-share-discuss, review each other's answers, and try to answer each other's written questions are three productive ways to structure such collaborations.

**Quizzes and Exams**

Exhibit your ability to use quantitative techniques in well-defined contexts and without assistance or collaboration. There will be a quiz almost every Tuesday, a midterm exam, and a final exam. They will be timed, proctored, and closed book. For the midterm exams, you will have the opportunity outside of class to provide a second take-home submission of any answer, and the grades on the in-class and take-home submissions will be averaged for each take-home answer provided.

**Projects**

These require synthesis and application of the knowledge obtained from the text, videos, class, and assignments. These can be completed by groups of up to three students.

**Collaboration and Academic Integrity**

Assignments you submit in this course will be checked for plagiarized material copied from the web, other papers, online databases, and other sources. Cases of academic dishonesty are reported to the Associate Dean. Penalties for plagiarism are listed in the college catalog and range from redoing the assignment to dismissal from the college. Plagiarism entails the use of the ideas and/or words of a source without citation. Any borrowing of language (sentences, clauses, or distinct phrases) without use of quotation marks is also plagiarism.

You are encouraged to use all available resources in order to learn the concepts and techniques discussed in this course. In particular, conversations with other students and the instructor can be an effective learning method. Reading other books and web pages can be another effective learning method. However, copying someone else's work subverts the learning process.

For assignments and projects, you may look at and discuss another student's work, but any written work developed during collaboration with another student should be destroyed before writing your own solutions. It is your responsibility to make sure that you have learned the material. For projects, you should give written acknowledgement to people with whom you have had discussions and to any written materials that were helpful.

For quizzes and exams, you may *not* use any resources unless a specific exception is stated by the instructor.

Failure to observe the above rules will result in a zero on the assignment, project, quiz, or exam. Any violation of academic integrity will be reported to the Associate Dean.

Observation of the above rules will help you learn the material well and give you the satisfaction of knowing that you have earned your grade.

**Due Date Policy**

Assignments, projects, quizzes, and exams can only be rescheduled or made up if (1) there is a serious medical problem, a death in the immediate family, or an irreconcilable conflict with another official Goshen College activity; (2) there is written documentation signed by proper authorities; and (3) the instructor is notified prior to the due date or as soon as possible afterwards.